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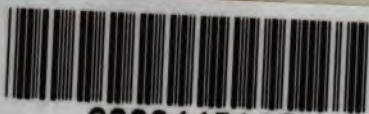
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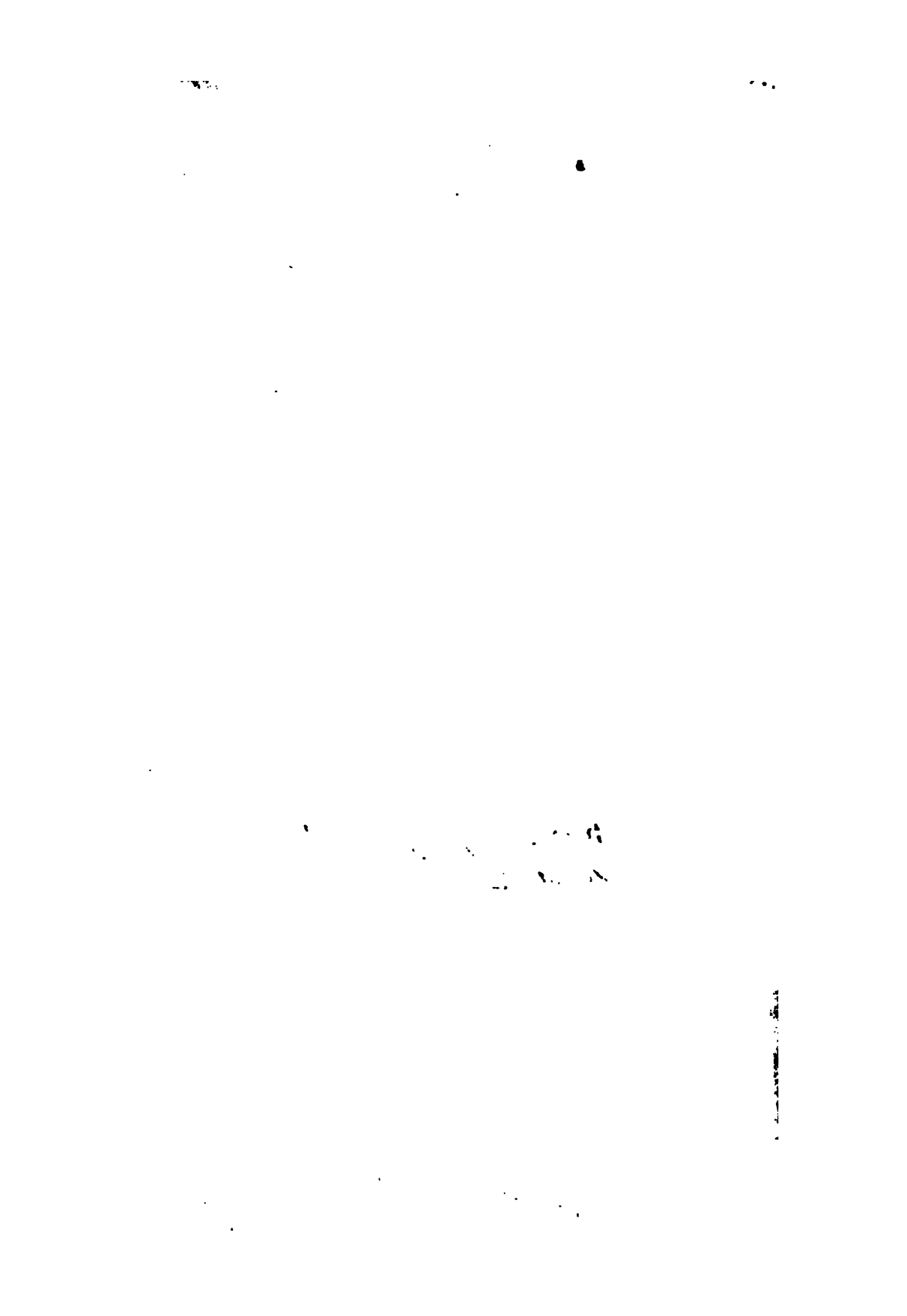


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OBSERVATIONS
ON THE
FORMATION AND MANAGEMENT
OF
USEFUL AND ORNAMENTAL PLANTATIONS;
ON THE
THEORY AND PRACTICE
OF
LANDSCAPE GARDENING;
AND ON
GAINING AND EMBANKING LAND
FROM RIVERS OR THE SEA.

ILLUSTRATED WITH PLATES:

By **J. LOUDON,**
DESIGNER, &c.

EDINBURGH:

Printed for

ARCHIBALD CONSTABLE & CO. EDINBURGH;
AND LONGMAN HURST REES & ORME,
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1804.



D. Willison, Printer,
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TO

THE KING.

SIRE,

Two considerations emboldened me to request the honour of laying the following Observations before Your MAJESTY.

Your MAJESTY has long been a cherisher and protector of the polite and useful arts. Those treated of in this volume

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are

are confessedly of the greatest importance for the ornament of Your dominions, and the defence and prosperity of the British Empire.

The DESIGNS, &c. which I had the honour to make for laying out the grounds of Her Royal Highness the DUTCHESS OF BRUNSWICK, gave so much satisfaction, that after having pleased one so well qualified to judge, and so nearly related to Your MAJESTY, I considered myself as having some claim to Your patronage on that account.

Under Your MAJESTY'S patronage, these sheets demand the attention of the Public, while the author, in the exercise of his profession,

DEDICATION.

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feffion, fhall endeavour to merit the honour
conferred.

That Your MAJESTY may long live to
fee the Arts flourish, and the British nation
happy, is the fincere wifh of,

May it please Your MAJESTY,

Your MAJESTY'S

Obedient humble Servant

And Subject,

J. LOUDON.

EDINBURGH,

October 1804.



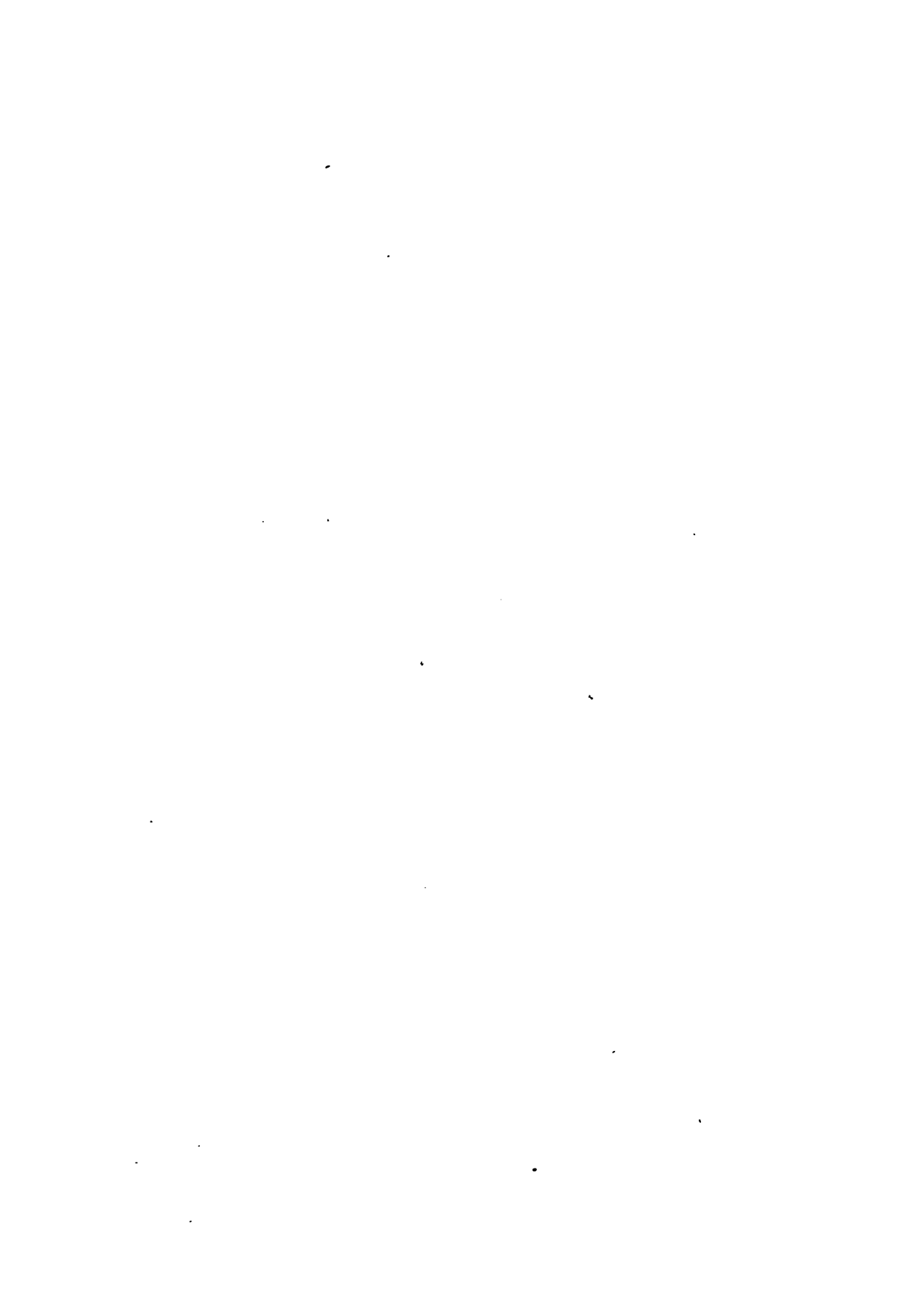
P R E F A C E.

THE greater part of the following Observations were written in London early in 1803, not long after I had commenced business as landscape-gardener, &c. My intention was to give the Public some knowledge of my ideas in those arts which I was about to practise, which, in many particulars, are different from those of other landscape gardeners. I was deterred, however, from publishing, as all my time was soon taken up, by the employment which I was

honoured with from some distinguished personages in England and on the Continent. The following year I was called into Scotland, where I have been principally detained for some months past by several noblemen and gentlemen, who have kindly favoured me with their employment—to direct or give designs for laying out their places—planting—managing their woods—draining, or otherwise improving their estates—or in enlarging their extent, by gaining land from the sea.

With respect to the ideas contained in the following pages, I shall only observe, that in general they are such as appear to me not properly understood by practical men. The sheets being now returned from
the

the Pref, I find that the style in which I have endeavoured to convey those ideas to the reader is far from being such as I could wish. In the way of apology, I can only plead my inexperience as an author, and the nature of my profession, which tends to make the mind more conversant with things than words. I shall certainly make considerable alterations in the language, if ever this work come to a second edition.



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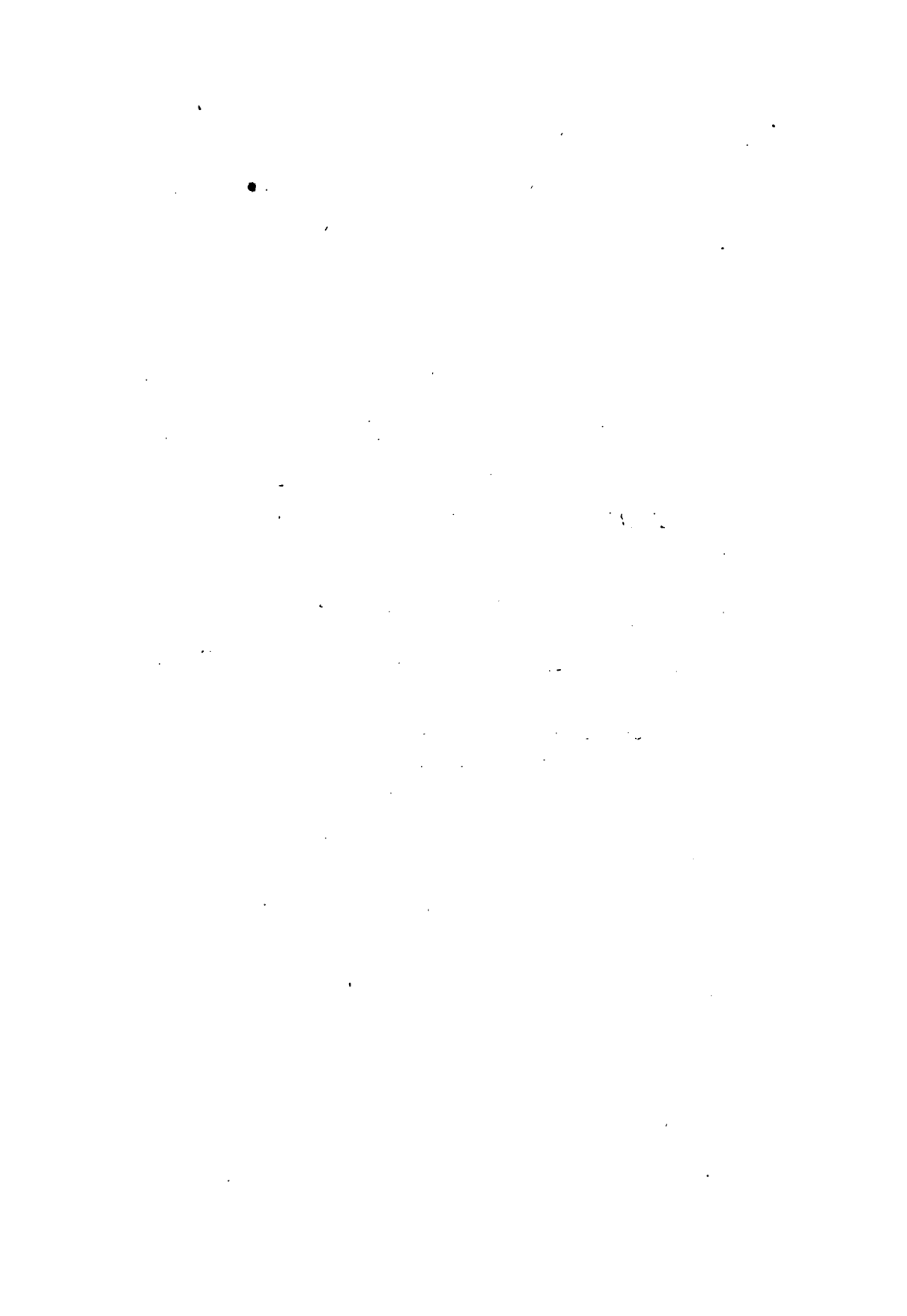
ERRATA.

- P. 149. line 16. *for* sketch 1. *read* sketch 2.
P. 155. line 6. *for* below, *read* above.
P. 248. line 1. *dele* ugly or.
P. 260. line 1. & 5. *for* ORIGINAL, *read* APPROPRIATE.
P. 287. line 8. *after* to, *read* almost.

OBSERVATIONS
ON
THE FORMATION AND MANAGEMENT
OF USEFUL AND
ORNAMENTAL PLANTATIONS.

OMNE TULIT PUNCTUM EST
QUI MISCUIT UTILE DULCE.

MOR.



OBSERVATIONS

ON

THE FORMATION AND MANAGEMENT OF USEFUL AND ORNAMENTAL PLANTATIONS.

INTRODUCTION.

VARIOUS are the vegetable productions which this earth affords. Blades of grass spring up every where, and clothe the surface with pasture; groups of shrubs arise in some places, and diversify this uniform covering; but trees are the most striking objects that adorn the face of inanimate nature. If we imagine for a moment that the surface of Europe were totally divested of wood, what would be our sensations on

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viewing

viewing its appearance? Without this accompaniment, hills and vallies, rivers and lakes, rocks and cataracts, all of themselves the most perfect that could be imagined, would present an aspect bleak, savage, and uninteresting. But, let the mountains be covered with wood, and the water shaded by trees, and the scene is instantly changed: what was before cold and barren, is now rich, noble, and full of variety. In traveling through a naked country, a whole unvaried horizon is comprehended by the eye with a single glance; its surface is totally destitute of intricacy to excite curiosity and fix attention; and both the eye and the mind are kept in a state of perpetual weariness and fatigue. But in a wooded country, the scene is continually changing; the trees form a varied boundary to every thing around, and enter into numberless and pleasing combinations with all other objects; the eye is relieved without distraction, and the mind

mind fully engaged without fatigue. If we examine even a tree by itself, the intricate formation and disposition of its boughs, spray and leaves, its varied form, beautiful tints, and diversity of light and shade, make it far surpass every other object; and, notwithstanding this multiplicity of separate parts, its general effect is simple and grand.

But wood is not only the greatest ornament on the face of our globe, but the most essential requisite for the accommodation of civilized society. The implements of agriculture, the machinery of manufactures, and the vehicles of commercial intercourse, are all made of timber; nor is there an edifice or superstructure of almost any denomination, in which this material does not form the principal part.

Wood is more particularly valuable in Great Britain, where the existence and prosperity of the Empire depends upon the sup-

port of a numerous shipping, emphatically called its ' wooden walls. '

From the universal utility, and the unrivalled beauty of wood, it may reasonably be supposed to have been assiduously cultivated in all improved countries ; and, accordingly, we find trees were planted, and the growth of timber encouraged, by every polished nation. To this subject, as to all other parts of rural œconomy, the Romans paid great attention ; and the writings of some of their most celebrated authors, contain many excellent observations and precepts, on the culture and management of timber and ornamental trees.

Planting has been more or less a prime object in this island for more than two centuries past ; but until the improvements in agriculture and the arts, the increase of our shipping, and the more general introduction of luxuries took place, there was no immediate inducement to plant, and still less
knowledge

knowledge in the art of planting. In consequence of an increasing consumption, the value of timber was enhanced; and as the number of acres planted did not keep pace with the number annually cut down, a proper supply of this article for the market, was not to be had, and still is wanting. Timber of all kinds is daily advancing in price; and, from the great number of King's ships,*

B 3

merchantmen

* ' A seventy-four gun ship (we speak from good authority) swallows up 3000 loads of oak timber. ' A load of timber is 50 cubical feet; a ton 40 feet; ' consequently, a seventy-four gun ship takes 2000 large ' well grown timber trees; namely, trees of nearly ' two tons each!

' The distance recommended by authors for planting trees in a *wood*, in which underwood is also propagated, is thirty feet or upwards. Supposing trees to stand at two roods (33 feet, the distance we recommend they should stand at, in such a plantation) each statute acre would contain 40 trees; consequently, ' the building of a seventy-four gun ship, will clear of ' such woodland, the timber of 50 acres.'—*Planting and Rural Ornament*, p. 111.

merchantmen and other craft, that have lately been built, in connexion with the wretched management of the Royal forests, oak timber fit for the purposes of naval architecture has become alarmingly scarce; and should Great Britain become dependent on other powers for the means of supporting her Navy, every lover of his country must tremble for the consequence. †

Thus, Noblemen and Gentlemen are presented with the most powerful motives to plant, both of a public and private nature. Trees are beautiful objects, the greatest ornament to individual places, and the noblest improvement of a country. Timber is a valuable article, it affords great gain to the individual, while it is the source and support of the character and dignity of the British Empire.

But,

† See the report given in by the Commissioners appointed by Parliament, some years ago, to inquire into the state of the Royal forests.

But, independently of the beauty and profit of wood, the *pleasure* attending the formation and management of plantations, will be a considerable recommendation to every virtuous mind. We look upon our young trees as our offspring; and nothing can possibly be more satisfying than to see them grow and prosper under our care and attention; nothing more interesting than to examine their progress, and mark their several peculiarities. As they advance to perfection, we foresee their ultimate beauty; and the consideration that we have reared them, raises a most agreeable train of sensations in our minds; so innocent and rational, that they may justly rank with the most exquisite of human gratifications.—But, as the most powerful motives to planting are those which address themselves to the interest of the individual, I proceed to consider it more particularly in this point of view.

The great profits which arise from planting,

B 4

have

have been taken notice of by many writers *; and if we look into their works, we shall find, of clear profit, in different instances, all the intermediate sums between forty shillings and three hundred pounds Sterling *per* acre † yearly; and this annual return commences, in some kinds of plantations, the second or third year after planting (such as osier plantations, which in many places yield from 15 to 30*l. per annum*) or in ten, fifteen, or twenty years, as coppices or fir groves, which are very profitable kinds of plantations; but the highest sums can only be expected to commence thirty or forty years, or more, after planting; and even then, the value of other products is included in connexion with the timber, as the resin of the pine and fir tribe, the bark of the oak, &c.

In

* See Du Hamel's Works; Mr A. Young's Tours; Hunter's Evelyn's Sylva; Agricola on Timber Trees; and a great many other writers.

† The English or statute acre is always understood here,

In general, however, it may be safely asserted, that no kind of plantation, if properly made and kept, will be longer of yielding returns than ten years; and that some annual profit will be obtained more or less afterwards, from the thinnings and prunings, until the trees shall be finally cut down.

From the various authors who have made these measurements and calculations, and also in a number of places both in England and Scotland, there is the most conclusive evidence that planting is equally profitable with agriculture, except perhaps in particular circumstances; and, what is of great importance too, it is commonly most so in lands not adapted for the general purposes of husbandry, such as dells, steep banks, rocky precipices, and even heaths and moors*;
for

* At Dunkeld and Taymouth, and many other places in the north of Scotland, there are larches growing in such situations, from forty to fifty years old, which, if cut down now, would pay upwards of £91, each acre *per annum* since they were planted.

for deep rich soils, however favourable for other vegetables, are not the best for producing timber; and it deserves to be remarked, that so long as ground of this kind remains unplanted, little or no rich arable land should be covered with trees.

But I wish it to be understood here, when speaking of the great profits arising from plantations, that I always suppose proper management bestowed on them. In the instances authenticated by these authors, which may be seen in different parts of the country, the soil was most commonly prepared, the plants always carefully inserted, protected from cattle, cultivated, trained, and thinned; and hence the result:—but this is by no means the case with the plantations that are generally made, and, of course, they give but a faint idea of the profits arising from planting.

Besides the intrinsic value of timber, there is another way in which wood is very profitable;

fitable; that is, by affording shelter to exposed lands. In many places, strips of wood alone, with little or no culture bestowed on the soil, have rendered pasturage of triple its former value. In the north of Scotland, belts, and even single rows of larches, have operated so rapidly and powerfully in this way, that their effects are hardly credible by any but those who have been eye-witnesses.

‘ Plantations of trees are singularly valuable in another point of view, although the trees at the time may neither be fit for timber, undergrowth, or shelter, or any other use. It is universally known, that such estates as have a portion of growing timber upon them, when brought to sale, bring an extra price, according to the quantity and value of the timber, not only at the time of sale, but counting on its value at a far distant period. Thus, supposing the half grown timber on an estate
‘ to

‘ to be valued at ten thousand pounds on the
‘ day of sale, instances are not wanting where
‘ twenty, nay, twenty-five thousand have
‘ been given over and above the value of the
‘ land. ’*

The beauty of wood on individual estates is too obvious to require any illustration. Although every one cannot analyze its effects, all mankind can relish them. The noble grandeur and rich beauty of a hanging wood, in autumnal colouring, seen from below, cannot be unknown; and the fine effect of a dark green tree, or group of trees, backed by the splendour of a morning or the glow of an evening sky, cannot be unfelt by any but the most insensible of mortals.

It is in the arrangement and management of trees and shrubs that landscape gardening almost wholly consists: all the other materials of landscape are commonly beyond our controul.

* Practical Planter, p. 341.

controul. Earth and rocks are in general too ponderous to contend with,—buildings are often too expensive,—and water is only to be met with in certain situations and circumstances; but we rarely find a spot where trees cannot be planted, and we can hardly conceive of one where they will not greatly add to the beauty and variety of natural scenery.

As wood is productive of beauty in landscape, of profit to the planter, and of advantage to the farmer, it naturally follows, that he who directs the formation of plantations should be well acquainted with trees in these three particulars. In this comprehensive point of view, I have considered the subject of planting both in theory and practice; and the following pages contain some observations, which appear to me to be little attended to, and perhaps not well understood.

SEC-

trees and shrubs as the willow, lime, acacia, variegated holly, arbutus, lilac, jasmine, honeysuckle, rose, &c. will have a quite different effect, and be attended with a different smell, from those of a path in a rugged dell, forcing itself through irregular groups and thickets of oak, elm, thorns, elder, dogwood, spurge, juniper, &c. ; and, if we were to add appropriate plants and grasses to each scene, their effects, particularly as to smells, would be much stronger.

Where a degree of *grandeur* or *sublimity* is to be produced, the effect will often depend more upon the outline and extent of the plantation, than on the kind of trees planted. But oaks, chestnuts and pines, have grand forms, and grave, solemn colours, of themselves ; and, when collected together, are better suited for this purpose than others of more light and airy shapes and gayer tints.

These

These three effects may often be mixed together in different degrees; but the separate expressions mentioned, are sufficient to shew the necessity of attending to the qualities which produce these in trees and shrubs, and in their disposition when collected together.

Where *profit* or *value* is the prime object in view, there will necessarily be a particular product to be grown, from which it is to be derived. This product may consist of all, or any of the different parts of a tree; as the roots, trunk, branches, bark, &c. or of the essence of any of these parts, as the sap, resin, gums, tar, pitch, &c. Timber and bark, however, are the products most commonly raised; and these and their properties vary infinitely in different degrees. The timber of some is brittle, of others tough, of others hard, and of others soft:—and the bark is of different degrees of astringency, sweetness, or acidity. These qualities and

C

parts

parts of trees are all suited for different purposes in the arts; and those of them which it is most desirable to raise, must depend entirely upon the probable consumption, the soil, situation, and other circumstances. Wherever profit is the principal consideration, the products most in demand should be known; and the trees most productive of these, in the given soil and situation, must alone be planted. This may point out the necessity of attending to the natural soils and situations of trees and shrubs, the qualities of their products, their uses in the arts, and their relative value.

Where *shelter* or *shade* is the principal consideration, the qualities of each require to be investigated, and those forms used which are best adapted for that purpose.

The object of shelter is to produce heat; to protect cattle and pasture from the inclemency of the weather. Hence, the trees
used

used for this purpose should be clothed with branches and foliage from the ground upwards. The foliage should be perpetual, and, if possible, a non-conductor of heat, such as that of the resinous tribe of evergreens. This may be thought too nice a distinction; but any person would be sensible of the difference, if in a windy day he were to stand alternately under the shelter of a *holly* and a *spruce* of equal thickness.

The object of *shade* is to produce cold; that men or cattle may enjoy the cool refreshing breeze during the mid-day sun. For this purpose, it is essentially necessary that the stems of the trees be free from branches to a considerable height, in order to promote the free circulation of the air. It is true, most trees may be trained in this form; but the operation would hurt some kinds, while others again are greatly improved by pruning. The shade of some trees is pernicious, and should be guarded against; o-

thers are so thin of boughs and leaves, that the rays of the sun will pierce through between them; and these also must be rejected. This may shew the necessity of attending to the nature and kinds of trees that are planted for either of these purposes.

It is the intention of this Section to shew how essentially necessary it is for the planter to be intimately acquainted with the characteristic distinctions, and particular properties of trees and shrubs. He should not rest satisfied with a general knowledge; he should have a clear and distinct picture of every individual species in his mind; that, whenever a tree is wanted, that kind may instantly present itself which is best fitted for his purpose.

SEC-

SECTION H.

**OF THE CHARACTERISTIC DISTINCTIONS
AND PARTICULAR PROPERTIES OF TREES
AND SHRUBS,**

IT is almost unnecessary to mention, that a botanical knowledge of every tree and shrub is essentially necessary for the planter; but it is not by minute botanical distinctions that these must be arranged in artificial scenery. The general magnitude, form, and colour, are what more immediately strike the eye; and the effect of a plantation consists in the agreement and relation of the trees in these characteristics. But in plantations, where profit is the sole object, the principal thing

to be attended to is their particular properties, by which they are adapted for particular soils, situations, and uses. These are so intimately connected with their characteristic distinctions, that in prosecuting this subject with a view both to ornament and utility, it seems necessary to treat of them together in the following order :

1. Magnitude.
2. Form.
3. Texture.
4. Colour.
5. Mode of Growth.
6. Smells.
7. Bark.
8. Buds.
9. Leaves.
10. Flowers.
11. Fruit.
12. Roots.
13. Propagation.
14. Soils.

ORNAMENTAL PLANTING. 59

15. Situation.
16. Culture.
17. Pruning.
18. Transplanting.
19. Products.
20. Uses.
21. Relative Value.
22. Natural Character.

1. With respect to *magnitude*, trees and shrubs are either *very tall*, as the horse-chestnut and the larch, the cornelian cherry, and the snowdrop tree; or *very low*, as the mountain ash and hemlock fir, the Scotch rose and the butchers broom. Some trees are *very broad*, in proportion to their height, as the oak and the Spanish chestnut; others are *very narrow*, as the larch and the spruce fir. There is a *medium* betwixt all these extremes, as the ash-leaved maple and the evergreen oak, the Virginian raspberry, and the Guelder rose.

2. With respect to *form*, the different varieties may be included under the following heads.—*Apparently solid*, being thick with branches and foliage, as the horse-chestnut and the English elm, the lilac and the syringo ;—*light and airy*, thin of boughs and leaves, as the ash and the hoary poplar, the bird cherry and the Canadian mespilus. There is a *mediate degree* betwixt these two extremes in the broad-leaved *euonymus* and the ash-leaved maple.

They may next be divided into *those, whose branches begin from the ground*, as the fir tribe and most shrubs ; or *those which shoot up into a stem before their branches begin*, as the mountain ash and the *althæa frutex*.

Of those whose branches begin from the ground, some rise in *an elegant cone*, as the larch and the holly ; others in a *cone whose base is very broad*, as the cedar ; or whose *base is very small*, as the upright cypress.

Some *swell out in the middle of their growth*,

growth, and diminish at both ends, as the Weymouth pine; and some are broadest at the top, as the raspberry and the Alpine honeysuckle; some are irregular and bushy throughout, as the evergreen oak, and the snowball tree.

Of those which shoot up into a stem before their branches begin, some are *slender cones*, as the deciduous cypress; others are *broad cones*, as the balsam poplar. Some assume a *globular form*, as the mountain ash; and many are *irregular throughout*, as the Scotch elm and the acacia.

3. With regard to *texture*, some trees and shrubs have a *soft, smooth appearance*, as the lime and the scorpion fenna; others have a *rough, firm-like appearance*, as the evergreen oak, and the holly. Some have a *smooth, silky-like appearance*, as the tamarisk; others have a *downy, woolly-like appearance*, as the hoary poplar. Some appear *totally covered with thorns*, as the furze and the hedgehog holly;

holly; others appear wholly composed of *bread-like shoots*, as the Portugal broom.

4. *Colour* in trees or shrubs is either *accidental* or *permanent*. *Permanent* colours include all the different shades of *green* in the summer months; *accidental* colours the tints of *red* and *yellow* that are peculiar to autumn and spring.

Some permanent colours are of a *dark green*, as those of the horse-chestnut and the yew; some are of a *light green*, as those of the ash and the common laurel; some are of a *blue green*, as those of the Scotch fir and the bladder fern. Some trees are of a *green, tinged with brown*, as the Virginian cedar; others of a *green, tinged with white*, as the abele and the Lapland willow. Some greens are *tinged with yellow*, as the ash-leaved mapple and the Chinese arbor vitæ; some are *tinged with red*, as the scarlet mapple; others are *tinged with purple*, as the purple beech. Some greens are spotted

ted with *white, yellow, and red*, as the variegated holly, privet, fycamore, box, and many others.

Accidental colours are infinite in number, and each kind is liable to much variation.

In autumn, however, it will generally be found that the wild-cherry assumes a *bright red*, the birch a *deep red*, the beech a *brownish red*, the scarlet oak a *deep scarlet*, the hornbeam a *russet colour*, the sugar-mapple a *rich yellow*, the oak a *reddish yellow*, the lime and ash a *straw colour*, the poplar *black*, the fycamore *brown*, &c.

5. The *modes of growth* are very different in trees and shrubs. Some send out their branches *horizontally*, as the oak; in others, they *tend upwards*, as in the Huntingdon willow; in others, they *fall*, as in the lime, and the acacia. In some, they *incline obliquely*, as in the Scotch fir; in some, they *recline, and then rise up*, as in the larch;

in

in others, they *hang directly down*, as in the weeping ash and weeping willow. Some shrubs *creep along the ground*, as the periwinkle; others *clasp themselves to trees*, as the passion-flower; others *fix themselves to buildings*, as the ivy.

Some trees have one principal stem, from which all the branches proceed *as rays from a centre*, as in the fir tribe; in others, the trunk divides itself into arms, which send out branches *irregularly*, as the oak, &c. Some shrubs have only a *single stem*, as the althæa; others constantly spread along the ground, sending up *more*, as the hypericum,

6. With respect to *smells*, some trees and shrubs have scarcely any, as the evergreen oak and the platanus; others have a most *grateful fragrance*, as the birch and the sweetbriar. Some have a *luscious* smell, as the mezerion; others a *disagreeable* smell, as the elder; and the smell of some is *deleterious*, as that of the walnut and the artemisia,

mifia. The fragrance of some is greatest when the plant is in blossom, as the hawthorn; in some, it is confined entirely to the blossom, as the lilac; in others, it is equally diffused throughout the whole plant, as in the sweet bay, and several others.

These are the general characteristics of trees and shrubs; but there are many other peculiarities which present themselves, upon a more minute examination, which, where ornament is attended to, deserve also the attention of the planter. Some of these I shall notice in the *bark, buds, leaves, flowers and fruit.*

7. With respect to the *bark* of trees and shrubs, in some it is of a *red colour*, as in the dogwood; in some *white*, as the birch; in others *black*, as the oak; in some *brown*, as the Guelder rose; in others *green*, as the holly. The texture of the bark of some trees is *firm*, as the oak; of others *spongy*,

as the cork tree. The bark of some is *very thin*, as the beech; of others *very thick*, as the Scotch fir. Of some it is *brittle*, as the hornbeam; of others *glutinous*, as the holly; of others *thready*, as the lime and the elm.

The *duration of bark* varies. Some trees throw off annually their outer coat, as the arbutus and the birch; but most trees constantly retain it.

The *properties* of some barks are *astringent*, as those of the oak and the bramble; of others *sweet*, as of the lime; of others *bitter*, as of the abele; of others *resinous*, as of most of the fir tribe.

8. With respect to *buds*, some trees have *no buds* at all, as the pine tribe, and most evergreens; in others they are *very large*, as the horse-chestnut; in others *very small*, as in the willow. In some they are covered with a coat of *glutinous matter*, as those of the horse-chestnut; in others with a *dry tegument*, as those of the beech. Some barks
are

are of a *red colour*, as those of the lime ; others are *yellow*, as those of the willow ; others *black*, as those of the ash ; *brown*, as in the beech ; or *red and green*, as those of the common sycamore.

9. There is an almost infinite variety in the *leaves* of trees and shrubs. Some are *very broad*, as the common laurel ; others *very narrow*, as the larch. There is a *medium* betwixt these two extremes in the willow and the almond. Some leaves are *entire*, as the bay ; others *serrated*, as the cherry ; *pinnatifid*, as the acacia, &c. Some leaves are *covered with down*, as the sea buckthorn ; others *with wool*, as the hoary poplar ; others with *prickles*, as the holly ; others with a *glutinous substance*, as the gum cistus, &c.

Leaves are of all the different shades of green in the summer months ; and of all the different tints of red and yellow in autumn and spring.

Some

Some trees retain their leaves and colour throughout the whole year, as the pine tribe; others lose their green colour in autumn, yet retain their leaves all winter, as the beech and the hornbeam in some circumstances. The elm, the ash, and most other trees, drop their leaves in autumn, and are naked all winter.

Leaves have, in general, the same properties as the bark, only in a fainter degree. These are of considerable importance. Those of the alder are refused by cattle; those of the elm are greedily devoured*; those of the fir are obnoxious to many insects which infest hothouses, &c.

10. The *flowers* of trees vary almost as much as the leaves. Those of some are *large and showy*, as the rose and the honeysuckle; in others they are *small and obscure*,

* The Romans fed their cattle with the leaves of this tree.

scure, as in the alaternus. The flowers of some *cover the whole plant*, and soon fade, as those of the hawthorn; in others, they are *thinly distributed*, and continue a long time, as those of the passion-flower. Some come into blossom *very early*, as those of the mezerion; others *very late*, as those of the sweet chestnut, and the *albæa frutex*. Some trees and shrubs are *done with flowering before their leaves expand*, as the almond; the blossom of others makes its appearance only *when the leaves fall off*, as that of the hazel.

11. The *fruits or seeds* of trees vary considerably. Some are of a *bright colour and showy appearance*, as the clustered berries of the mountain ash; in others, the seed is *very obscure*, as in the willow. Upon some trees the seeds remain *two or more years*, as the cones on the fir tribe; in others but *a few weeks*, as the capsules of the elm. Some fruits or seeds are *used as food*,

as the apple and the walnut ; others for *fattening the inferior animals*, as the acorn and the beech-mast ; some again *are poisonous*, as the berries of the nightshade, and those of the mezerion.

The observations which follow, along with *characteristic distinctions*, comprise what may be called *particular properties* of trees.

12. The *roots* of trees are as much varied below ground, as the stem and branches are above the surface. Some spread themselves *horizontally*, as those of the pine and the fir tribe ; others send down *perpendicular* roots to a great depth, as those of the oak and the chefnut. There is a *medium* betwixt these two extremes, in those of the lime and the beech.

13. The modes of propagating trees and shrubs are various. Some are raised from *seeds*, as most forest trees, such as the oak,
ash,

ash, elm, larch, &c. ; others from *layers*, as the lime, platanus, rose, and most shrubs ; others from *cuttings*, as the poplar, willow, honeysuckle, &c. ; others from *suckers*, as the abele, gale spirea, &c. Others are propagated by *ingrafting*, as the weeping ash ; others by *inoculation*, as the double-blossomed almond, and the weeping cherry. And some kinds are, or may be propagated from the *roots*, as the thorn, mezerion, &c.

14. With respect to the *natural soils* of trees : some love a *deep, strong soil*, as the oak ; some a *dry, gravelly soil*, as the beech ; some a *deep, moist soil*, as the poplar ; others a *peat-earth soil*, as the erica, &c. ; others, again, love a *wet soil*, as the alder. Some trees will grow in almost *any soil*, as the Scotch fir ; others will scarcely grow in any but their *natural soil*, as the rhododendron and the andromeda. Some hardly *require any soil*, as the ivy ; others are *parasites*, as the mistletoe.

15. The natural *situations* that trees will grow in, are various. Some will endure exposure of almost *every kind*, except a strong sea breeze, as the larch, Scotch fir, and mountain ash; some endure the *sea breeze* much better than others, as the fycamore, ash, and service; some will not prosper except in a low, *sheltered situation*, as the black spruce, and most American plants; some will grow under the *drip and shade* of others, as the dogwood and box; others would die in that situation, as the larch and the willow.

16. Trees and shrubs, especially when young, require not only a soil and situation, but a *culture*, suited to their respective natures. Some require the earth to be *frequently stirred* about their roots, as the lime and the lilac; others will make equal progress according to their natures, if *the surface is kept free of other vegetables*, as the oak and the chestnut; others thrive best when

when the *surface is covered* with mosses, as the rhododendron and the erica.

17. With respect to *pruning*, there are some trees that will *not bear the knife*, as the cherry: the wood of others is *much hurt by it*, as the pine and fir tribe. Some, again, will *bear it to any degree*, as the thorn and the crab-apple.

These peculiarities apply to trees of some height. Most trees, when very young, will bear pruning; and many require it, to train them to single stems. The *silver fir*, when in the nursery, requires its side shoots to be shortened; and young oaks, some years after they are finally transplanted, should be cut over by the surface.

18. Most trees require to be *transplanted* in the nursery-ground the first or second year from the seed; and re-transplanted from the nursery into plantations, when under four

feet high. Some are *little hurt* by this removal, as the elm; *others sometimes die* after it, as the spruce and the Weymouth pine. Some trees *will not remove* after they are eight or ten feet high, as the pine and fir tribe; others *will remove* at, and considerably above double that age, as the lime, the elm, the sycamore, and many other deciduous trees; but a year or two previous to removal, their roots must be cut, and their tops pruned, &c.; a most important precaution, that should never be neglected in removing trees above ten feet high.

19. Though shrubs are commonly planted for ornament, and trees to produce timber; yet there are other *products* for which they are occasionally planted. The *leaves* of some kinds are used, as those of the mulberry; the *bark* of others, as that of the oak and the holly; the *flowers* of others, as those of the rose and the fyingo; the *seeds or fruits*

fruits of others, as those of the beech and the apple, &c.

20. The different products of trees are used by various artists and professions.

The *chemist* uses the bark of some for birdlime, as that of the holly; the *manufacturer* the bark of others for matts, as that of the lime and the elm.

The *silk growers* use the leaves of some, as those of the mulberry.

The *apothecary* uses the blossoms of some, as those of the rose; the *confectioner* the blossoms of others, as those of the syringo.

Bread is made of some seeds, as those of the beech. *All mankind* use the fruits of others, as those of the pear, plum, &c.

Shipbuilders use some kinds of wood in particular, as the oak. The larch might also be trained for this purpose, by bending down the stem when twenty feet high, and fixing it in a certain position. (*See Plate 1.*)

House-carpenters use the fir and pine;

mill-wrights the crabtree; *plough-wrights* the ash; *cabinet-makers* the beech, elm, walnut, cherry, plum, box, holly, yew. The *carver* uses the lime; the *turner* the fycamore; the *mathematical instrument maker* the box and holly; the *last* and *beelmaker* the alder and birch.

Iron-founders use charcoal of any kind.

Gunpowder-makers use that of the dogwood, fallow, alder, and hazel.

Turpentine and its *oil* are extracted from the larch and the silver fir. *Resin, tar, pitch,* and *lamp-black,* from the spruce and the pine tribe. *Potash* may be extracted from any wood, but principally from the beech, ash, and elm.

Wine may be made of the sap of many trees, as the birch; *sugar* of the sap of others, as the sugar-maple, &c.

21. The *relative value* of timber depends almost entirely upon local circumstances.

Oak

Oak and elm, proper for ship-building, growing in the neighbourhood of a dry-dock, will be more valuable than if it were a hundred miles up the country.

Undergrowth of dogwood, fallow, and alder, in the neighbourhood of a gunpowder manufactory, is of great value : but, at a distance, it can be used only as fuel, &c.

There are, however, some kinds of wood that, from their universal application, are valuable every where ; such as the *oak*, the *elm*, the *ash*, the *beech*, and to which may be added, as the most valuable, the *larch*.

There are other kinds which, from their scarcity, are valuable every where, as the *box*, the *bolly*, and the *yew*. The lighter products, such as *birdlime*, *potash*, *turpentine*, *pitch*, &c. may be reckoned equally valuable every where.

The tree that will be most valuable in a given situation, may not grow in a given soil. In this case, the tree that will come
to

to the greatest perfection in that soil, will generally be found the most valuable,

A wood, not valuable from local circumstances, may, by manufacturing it on the spot, in order to render carriage less expensive, or by some such method, be rendered much more valuable.

From the general introduction of good roads and canals, and the spirit for increasing these, there can hardly be a situation, in which plantations will not be valuable for timber; and it is impossible to conceive one where the other products will not be of great value.

‘ Every person who can measure timber
 ‘ thinks himself qualified to value standing
 ‘ trees; but such men are often deceived in
 ‘ their estimates. It is the perfect know-
 ‘ ledge of the application of the different
 ‘ shaped trees that enables a man to be cor-
 ‘ rect in his valuation. A foot of wood
 ‘ may

' may be of little value to one trade, but of great value to another. This is the grand secret which enriches the purchasers of standing timber.' *

22. When a tree or shrub is possessed of a number of qualities that produce similar emotions, it is said to have *expression* or *character*.

Thus, the *cypress* is of a uniform, unchangeable shape, and constantly of a dark green colour. It has a still, solemn appearance; and hence it has obtained the character of melancholy.

There is a similar train of emotions, but in a fainter degree, produced in the mind by the falling branches, drooping spray, and yellow colour of the *weeping willow*. It suits with scenes of solitude, and leads to meditation.

There is a degree of cheerfulness in the
light,

* Hunter's Evelyn's Sylva, p. 112.

light, airy form of the *ash*, and the bright white of the variegated *bolly*; ease and gracefulness in the festoons of *virgins' bower*; delicacy in the *myrtle*; and a peculiar elegance in the sweep of the stem, and curve of the branches of the *larch*. The *oak* and the *chestnut* possess forms which have long been associated with *grandeur* and *sublimity*.

These and many other trees, are remarkably expressive of certain characters. This arises partly from the nature of the trees themselves, and partly from association of ideas. The *cypress* has been planted on burial places; the *weeping willow* to shade urns; the Romans crowned their warriors with *laurels*; and the *chestnut* was introduced into the landscapes of *Salvator Rosa*.

SECTION III.

OF THE ARRANGEMENT OF TREES AND SHRUBS.

ENOUGH has been done in the preceding section to shew that there is an inexhaustible fund of variety in trees and shrubs: I shall now make some observations respecting their arrangement in artificial scenery. And it may be premised here, that those who understand the general principles of painting, will easily discern and follow the proper mode; but, on the contrary, those who are ignorant of these principles, although

though they may know every tree and shrub, will ever wander in darkness, and produce confusion and incongruity.

All ornamental plantations may be divided into two kinds; those where *grandeur* is the effect to be produced, and those where *variety* is the principal object. As grandeur depends more upon the whole, than upon the parts, it may be produced where only one kind of tree is used; but as variety depends upon the parts alone, a number of different kinds is necessary. This has given rise to a most erroneous opinion and pernicious practice among landscape gardeners and planters. They imagine that variety is produced by mixture; and their rule is, to 'mix as many kinds together as they possibly can, and never to let two trees of the same species be seen at once.' This is their receipt for variety in plantations; and they never fail to follow it in every arrangement of vegetables, from the parterre to the forest.

forest. But does it produce variety? No. On the contrary, it produces the most distracting incongruity. The eye, in examining the parts, finds no connexion—no harmony—no relief—no repose of effect—no difference of composition, nor change of character: or, if from a distance we look upon the whole, it is in the other extreme, more dull and monotonous than if only one species of tree had been used.

This mixture is evidently made from ignorance of what constitutes variety; for it does not, as they imagine, consist in the diversity of separate parts, but ‘in the diversity of their effects when combined together; in a difference of composition and character:’* Such a variety relieves the eye, and satisfies the mind, without fatiguing either.

In place, then, of distinct kinds, trees or shrubs, differing in any one of the general characteristics,

* Price.

characteristics, are sufficiently distinguished for the purpose of variety. If they differ in two or more of them, they become contrasts; 'if in all, they are opposites, and will never harmonize.' But there is such an immense store in nature, that those apparently the most different may be brought together, with good effect, in the same plantation.

The upright, spiry *form* of the larch, mixes very ill with the round head of the oak. But there are trees of intermediate forms, which, placed in the interval between them, will make the connexion complete, and the gradation easy and natural; and, by this means, an endless source of variety may be had from the forms and modes of growth alone.

There is another source of variety which arises from the manner in which trees are disposed, more than from the number of distinct species.

‘ I have often observed in forests, (those
 ‘ great storehouses of picturesque dispositions
 ‘ of trees) that merely from oak, beech,
 ‘ thorns, and hollies, arose so many combi-
 ‘ nations, such different effects from those
 ‘ which are gained by ever so great a di-
 ‘ versity of trees lumped together, that one
 ‘ could hardly wish for more variety. It
 ‘ put me in mind of what is mentioned of
 ‘ the more ancient Greek painters; that
 ‘ with only four colours they did what, in
 ‘ the more degenerate days of the art, could
 ‘ not be performed with all the aid of
 ‘ chemistry.

‘ The true end of variety is to relieve
 ‘ the eye, not to perplex it: It does not
 ‘ consist in the diversity of separate objects,
 ‘ but in the diversity of their effects when
 ‘ combined together; in diversity of com-
 ‘ position, and of character. Many think,
 ‘ however, they have obtained that grand
 ‘ object, when they have exhibited, in one
 ‘ body,

‘ body, all the hard names of the Linnæan
 ‘ system : * But when as great a diversity
 ‘ of plants as can well be got together is
 ‘ exhibited in every shrubbery, or in every
 ‘ plantation, the result is a sameness of a
 ‘ different kind, but not less truly a same-
 ‘ ness than would arise from there being
 ‘ no diversity at all ; for there is no having
 ‘ variety

* ‘ In a botanical light, such a collection is ex-
 ‘ tremely curious and entertaining ; but it is about
 ‘ as good a specimen of variety in landscape, as a line
 ‘ of Lilly’s Grammar would be of variety in poetry ;

‘ *Et postis, veltis, vermis, societur et axis.*

‘ A collection of hardy exotics may also be con-
 ‘ sidered as a very valuable part of the improver’s
 ‘ palette, and may suggest many new and harmoni-
 ‘ ous combinations of colours ; but then he must not
 ‘ call the palette a picture.’

When a full collection of vegetables are to be
 planted about a place, the best way is to consider
 the whole as a botanic ground, and arrange them
 according to the natural classes of Linnæus or Jus-
 sien : This would at once be the most pleasing to
 the botanist, and the most agreeable to the prin-
 ciples of painting.

few remarks here may tend to shew its importance.

It may be thought by some, that the different tints of green in trees are too minute distinctions to be attended to; but reflection and experience shew that they are of material consequence in scenery. Imagine two woods of equal and considerable extent, —the one composed of the yellow green of the weeping willow, the other of the dark green of the oak: how different must be the impressions received from each, though the general form and composition of both, at a distance, would appear the same! It is abundantly evident, that the effect of the different greens must be much more conspicuous in scenes intended to be more minutely examined by the eye:—how different the green of even the gooseberry and currant trees when opposed to each other!

The tints of trees may be considered with respect to their harmony with one another

other—with external scenery—their gradation—and their particular effects.

The harmony of tints, in general, is derived from certain laws in optics, by which certain colours, as *red* and *green*, *yellow* and *purple*, *blue* and *orange*, agree with one another respectively; and certain other colours, as *red* and *orange*, *yellow* and *green*, *blue* and *purple*, disagree with each other respectively: and again, certain colours, as *green*, *purple*, and *orange*, when mixed together, destroy each other.

These harmonies, discords, and privations, will remain true, although the colours should not be bright of themselves. The slightest tinge will have the effect. When weak colours that agree are placed adjoining, they support and give spirit to each other. A hawthorn hedge, among the green of pasture fields, has the same dull, green appearance; but when opposed to the brown of a ploughed field, it appears with

peculiar spirit and force. Again, the ploughed field, were it not contrasted with the hedge by some such colour, would appear dark and colourless; opposed to the hedge, it appears of a rich brown.—A Huntingdon willow, observed alone, appears green, like any other tree; but, contrasted with an oak or a chestnut, it is evidently white; and the oak again, by the contrast, appears much darker than before.

If wood was arranged agreeably to these principles, the colours would at all times appear striking and forcible; but from the opposite conduct, that of mixing all colours together, the colours themselves are annihilated, and their separate effects destroyed. It is in consequence of this, that many say, *trees have no colour but green, except in autumn*; and that attention to these principles in their arrangement is frivolous. But nothing can shew greater ignorance of nature. Green is indeed the
 predominant

predominant colour of trees ; but it is only in one or two of the summer months that it nearly absorbs every other colour. All trees have their peculiar autumn and spring tints, which in midsummer are only weakened, not destroyed : And, whether it be not of greater importance to attend to the harmony of these tints, than to neglect it altogether, because the labour would be in some degree lost during a month or six weeks in summer, I leave every man of taste or sense to judge.

It is abundantly plain, that the *harmony of wood with landscape* must depend upon the general principles that have been already mentioned. One principle of harmony is, that the general appearance of the wood planted about a place should correspond with the general appearance of the wood in the surrounding country : if otherwise, the estate so planted will appear a formal spot in the general view.

The same principle requires also, that in a scene where water is a prominent part, and may perhaps make the landscape too cold; trees of warm tints (by no means evergreens) should be principally planted next it. On the contrary, where buildings make the landscape too warm, cool tints, such as evergreens, should be planted, to counteract that tendency.

Some objects in landscape require to be relieved, and set off with spirit; others require to be kept under, or prevented from becoming principal. These, and a great number of other important particulars, are effected by the colouring of trees and shrubs.

It must be considered also, that the eye feels an impression from objects analogous to that of weight, as appears from the expression, 'A heavy colour, a heavy form : ' hence arises the necessity in all scenery ' of ' preserving a proper balance of both ; and ' this

‘ this is a very principal part of the art of planting. If in a park the one half of the trees were light and airy, as the larch or birch, and the other half black and heavy, as the Scotch fir, ‘ the most ignorant person ‘ would probably be displeas’d, though he ‘ might not know upon what principle * ;’ and the painter would ascribe the harsh discordant effect to the want of balance and harmony.

If we operate with the permanent dark and light greens, as with light and shade in landscape painting, we may produce many of the effects of *aerial perspective*. The depth of recesses may be augmented by darkening the greens as they retire ; and a prominence may be made still more prominent, by the colour of the foremost tree. † The apparent length or breadth of a plantation may be altered at pleasure, either by beginning with dark green, and continuing the gradation

* Erice’s Effays, vol. I. p. 303. † Whately.

tion to light green, or the contrary ; and if, in addition to this, the line of the plantation be broken, the fallacy can seldom be detected.

Though the harmony of tints produces a pleasing scene, their disagreements, on the other hand, may produce a striking effect. An outline, which cannot be varied in form, may be broken by the opposition of its tints, or by masses of dark and light greens. Two or three trees together, that form a striking contrast with all around, may attract the eye, and fix it so as either to admire some object, as a building ; or prevent it from viewing something disagreeable, or less noble in the scene. Trees of a reddish tint, or evergreens, have the power of attracting the eye in an astonishing degree : in many places, where the former have been planted at random among other trees, they distract the whole scenery in the autumnal months.

These

These hints on the different tints of trees are of great importance in ornamental scenery: I shall now make some observations on the mode of arrangement proper for useful plantations.

As every tree has a certain soil and situation, in which it will prosper better than in any other, (that is, produce the greatest quantity and best quality of timber;) and as this tree will generally pay better than more valuable kinds that would not thrive there; it follows, that, in the formation of useful plantations, one great object must be, to accommodate the trees to these circumstances. But as the nature of soils and situations is various, this would naturally lead to a corresponding variation of the species of tree also; and this variation at once produces ornament and utility. Were this practice adopted in the formation of useful plantations, they would be made at a much less expence, and be much more profitable and
ornamental

ornamental than the common absurd mode of mixture; than which, none more destructive of these properties could possibly be imagined.

But the mode of arrangement, which I follow, is universally prevalent in the scenery of nature. To be convinced of this, we have only to observe the constituent parts of a natural forest. In one place, we find the oak as the principal tree; the hazel the principal undergrowth; the cowslip the principal plant; the *poa nemoralis* the principal grass; and the *bryum* the principal moss. Farther on, a few beeches mingle themselves with the oaks; a little farther still, beech becomes the principal tree. The undergrowths changing in the same way, we there find the thorn, the violet, the *poa trivialis*, and the *bryum*. The ground becomes moist, and gradually the birch appears; it becomes more so,—and, as the birch retires, the alder succeeds—each with appropriate

appropriate undergrowth, or ever-varying glades of pasture; which, with the grouping, &c. is foreign to my purpose here; but they are most valuable instructions for the landscape gardener.* The arrangement goes on thus throughout the whole forest; and if the soil were examined, it would be found to vary correspondently with the trees. Where the oak abounds, it will be found deep and good; dry where the beech prospers, and moist where the birch prevails.

Few have an adequate idea of the effects that might be produced by adopting this mode of arranging vegetables in artificial scenery, and particularly in woods, shrubberies, and all ornamental plantations. None but those who unite a knowledge of botany and painting, can conceive the variety and perpetual interest that would thus be created

* See Gilpin's Forest Scenery.—Walks in a Forest, &c.

ated about a place even of the smallest extent. At present, all places, and all the plantations about a place, have the same general appearance; because composed of the same kind of mixture. A shrubbery in one estate, is precisely the same with one at a hundred miles distance; and a few square yards of either is a pattern of all the shrubberies in Britain—nay, I might say, on earth. But, were nature followed in this respect, the variety would be endless. Nothing could then be more interesting than to walk or ride through a place, thus laid out; to look at the trees, shrubs, plants, and even the grasses and ferns; the infinite diversity of the shapes, colouring, and composition of the trees and shrubs; and the ever-varying openings and intricate recesses between them—again varied with groups and tufts of flowering plants and ferns, spreading themselves among the grass, in every direction, like natives;—and all this independently

ently of every other object,—such as buildings, rocks, water, animals, distant prospect, and even variety in the grounds. So that, by this mode of planting, a place, naturally the most dull and insipid, may be made infinitely varied and interesting. And I repeat, that this mode of arrangement is not more beautiful in shrubberies, flower-gardens, and green-houses, than it is profitable in extensive plantations.

S E C-

SECTION IV.

OF THE DISPOSITION OF WOOD, WITH RESPECT TO THE SURFACE OF THE GROUNDS ABOUT A PLACE, AND THE GENERAL SURFACE OF THE COUNTRY.

THE form of surface most desirable to be planted with wood, in the grounds immediately adjoining a gentleman's seat, must be determined by the general character which the place is to assume, and by the particular expressions of the several parts.

In a place where the grounds are of an even, or level surface, there can be nothing to interfere with this rule; but when the
surface

surface is varied with swells, hollows, and abrupt spots, the great art is to combine the natural character of the place with the character to be created ; and if both these are understood by the designer, an effect may be produced, much superior to the other.

Independently of artificial characters, however, nature always points out rising grounds for plantations. Wood placed on knolls or swells heightens their effect, and gives spirit, force and intricacy to a scene, otherwise tame and monotonous. On the contrary, wood placed in the hollows only, or in the hollows and eminences indiscriminately, destroys all the expression or natural features of the grounds, and often produces deformities. Nothing is more noble than a steep hill clothed with wood : but, imagine this hill perfectly bare, while the surrounding country is wooded, and it becomes a deformity in the general view.

In almost every situation, it is counter-
F
acting

acting nature to plant the hollows, and leave bare the eminences. Even in pleasure grounds or parks, a group of shrubs, or a few trees placed upon a gentle rise, fet off the scene, as it were, at once, or at least after two or three years growth : but, plant them only in the low places, and they will remain, until full grown, before they have much effect ; and at that time, though the place may have the appearance of wood at a distance, yet, when it is examined particularly, the features of the ground are totally destroyed. There are many places that have a sufficient quantity of old wood, which, if it had been planted with a proper regard to the natural variety of the grounds, would have made these places as superior to their present state, as that is superior to a place totally destitute of trees.

It is not intended, however, that no low place should be planted, or that trees should be placed formally on the summit of every eminence ;

eminence; on the contrary, dells, dinglea, and such romantic places, should be shaded with wood; and not a group nor a single tree should exist but what appears connected with other trees as well as with the grounds.

Taking the country in a general point of view, the hills should be wooded; the rising grounds betwixt the hills and the vallies diversified with gentlemens' seats, pasture lands, and some corn fields; and the vallies themselves kept in a state of almost perpetual aration.

Most of these vallies, to prevent the stagnation of the air, and to suit the particular mode of farming for which they are adapted, should be free from plantations, and sometimes even from hedges. They should present, in autumn, broad flat shades of rich yellows, interspersed with farm-steadings, and relieved by roads, canals, and rivers,

such as the Carle of Gowrie and Strathearn appear from the surrounding mountains.

Upon the rising grounds and the sides of hills, the castles, mansions, towns and villages, with every variety of pasture and wood, interspersed with streaks of corn fields, would form a contrast with this fore ground ; and the mountains, almost wholly clothed with wood, would form a grand back ground to this rich and noble scene.

There is nothing of so great importance as the situation of wood, whether we look to the general appearance of a country, and the improvement of its climate, or to the beauty and value of individual estates. All other operations that can be made about a place are, comparatively, of little importance. It is the wood, like the shades in a picture, that gives the effect ; and as it is by the situation and relative connexion of these shades, that an expressive or unmeaning picture is produced by the painter ; so,
by

by the site and connexion of plantations, a place is either deformed or beautified by the planter. Even small groups and detached trees, like the last touches in a picture, are of the utmost consequence; and every painter knows, that, when these are laid on by an unskilful hand, they never fail to spoil the whole piece.

It is lamentable to see the plantations which are daily making at a considerable expence, without any regard to this principle. In the dull levels of England, it may be thought of less consequence; but in Scotland and Wales, where the grounds are beautifully varied by nature, it is of the utmost importance. In less than half a century, wood will completely change the appearance of gentlemens' places, and of the whole country; and those who understand the subject will allow, that there is a great danger of the change being made for the worse. Scotland, at present, is a pleasant country, as

expressive of a peculiar character. If that character is partially changed, the effect will be disgusting ; but, change it completely, and the expression will be infinitely superior to its present state, and much more rich and noble than England, or almost any other country. *

§ E C=

* That range of mountains called Pentland Hills, in the neighbourhood of Edinburgh, are well known. Now, suppose all the country around them wooded, (that is, the trees about gentlemen's places, and the hedgerow timber grown up), while the hills are left naked and bare, in place of being a grand feature in the country, they will be a striking deformity. But, suppose them properly varied with wood, their pasture, climate and appearance, will be greatly improved ; they will be at once the noblest ornaments to the country, and of ten times their present value to the proprietors.

SECTION V.

OF THE OUTLINE OF PLANTATIONS.

THE outline or boundary of plantations must be determined by the *character* which they are to assume. As a tree is a picturesque object, so, all wood is picturesque; and as the addition of wood to ground is always an addition of picturesqueness, though often mixed with grandeur or beauty, hence the propriety of an irregular outline in every kind of plantation.

When the character to be produced is *grandeur*, the bounding line should consist of bold, angular prominences, succeeded by

F 4

deep

deep incisions, forming large bays and promontories ; and to give these still greater effect, and vary their outline against the sky, they should be adapted to the variations of the ground, the bays being in the hollows, and the promontories on the eminences.

In this mixture of curves and straight lines, the former should generally be obtuse and convex, and the latter of considerable length. All should appear ‘ irregularly great.’

Plantations made on hills ought always to assume the character of grandeur. Those introduced among cultivated fields, and bounded by straight lines, may have a very grand effect, if due regard be had to vary their outline, by attending to the angular insertions of hedgerows or belts ; though, in this case, it is impossible to avoid a degree of formality which is always connected with cultivation, and which, being essential to it, may be considered as a beauty.

When

When a plantation is to be made of a size which does not assume the character of grandeur, the outline should be composed of such a mixture of straight and curved lines as will relieve each other, produce *variety* and intricacy, and correspond with the surface of the ground. Nothing can be more unnatural or insipid, than a serpentine line, or a line wholly composed of curves, as a boundary of a plantation: it is totally void of variety and intricacy, and destitute of force and spirit, which is one great object obtained by planting, and which it is the peculiar property of irregular or picturesque forms to give.

The outline, where ornament is a principal consideration, should be broken by single trees and groups, so dispersed, as to increase its irregularity, and take away from that formality and sameness which lines of every kind have, when viewed alone. Those who attempt this, without understanding effect,

fect, clog up the bays and recesses, in place of making them appear deeper and more intricate ; and thus they do much more harm than good.

The outline is also greatly varied, and much improved, by mixing low growths with timber trees along the boundary of the plantation ; and afterwards by taking away the fence, and making partial inroads among such undergrowths, of different forms and degrees of depth.

In open groves, where the trees stand single, and have no fence, the outline is easily varied, and with great effect.

The different forms, colours, and shades of green, when no other mode is applicable, may often have a surprising effect in apparently varying the boundary of a plantation. I am persuaded also, that when a plantation is newly made, a very great deal might be done by party-colouring the paling with which it is enclosed.

Groups

Groups and thickets, when planted, in place of a circular fence, like a clump, should always have the most irregular outline. This irregularity is apparently increased, by mixing low with tall growths at planting; by removing the fence when these are grown to a certain height; and by judicious thinning.

The great beauty of small groups and single trees, arises from their connexion,* and the bends and inclinations of their stems. This may be produced, by planting two or more trees or shrubs in one hole, of different kinds, or the same kinds, of different sizes,

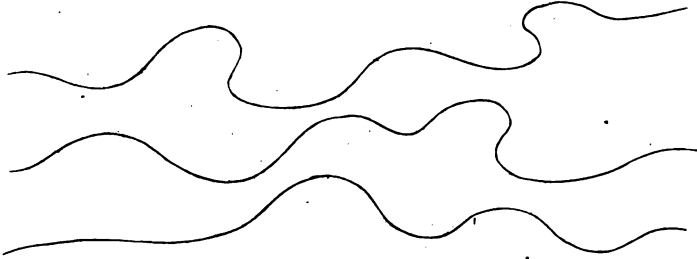
* ' In the *Liber Veritatis*, consisting of above three hundred drawings by Claude, I believe there are not more than three single trees. This is one strong proof (and I imagine the works of other painters would fully confirm it) that those who most studied the effect of visible objects, attended infinitely more to connexion than to separate forms. The practice of improvers is directly the reverse.' *Price's Essays*, Vol. I. 321.

sizes, &c. and connecting these by others straggling around them. The most beautiful examples for this work are to be found in natural forests, or in woody banks and commons, where trees have sprung up accidentally.

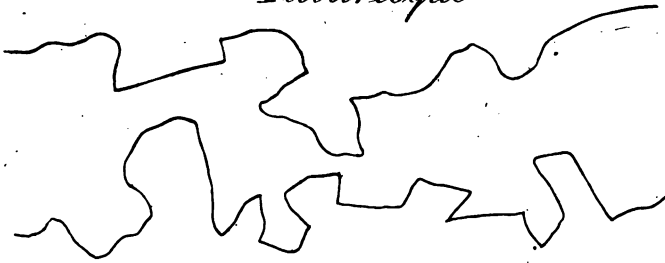
How different from all this are the circular clumps, the serpentine belts, and the dotting of single trees by landscape gardeners! From their formal outlines and equidistant mode of planting, more than from any other error, arises that distinctness and monotony, which is so disgusting in made places, and which will ever distinguish a tree, or a collection of trees, planted by them, from the same tree or trees in natural scenery. ' It is most amusing to see the *number of days* occupied, and the labour and difficulty they have in staking out the serpentine sweeps of a plantation of two or three acres, which, if nature were followed, might be traced by
the

OUTLINES of NEW MADE PLANTATIONS

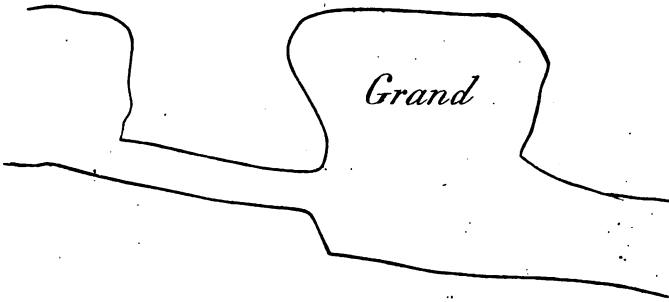
Beautiful



Picturesque



Grand

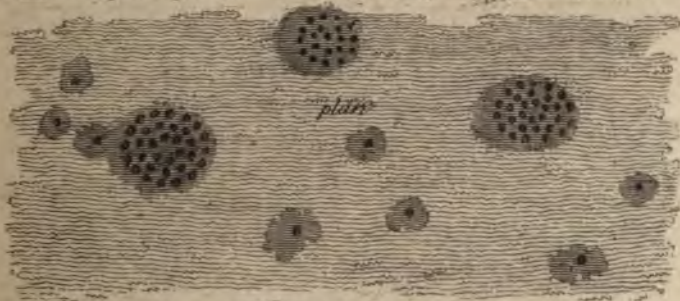


J. Loudon Del.

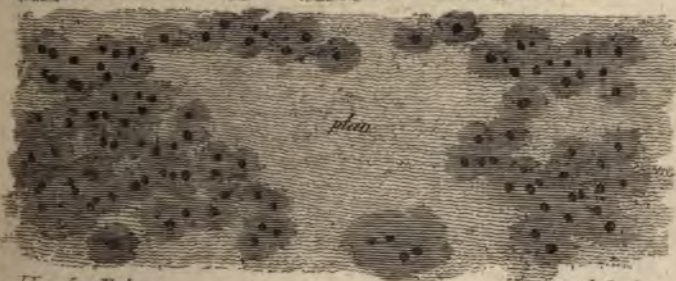
F. Lamb Sculp.

Pl. VIII.
CLUMPS & GROUPS Compared

Clumping & Dotting



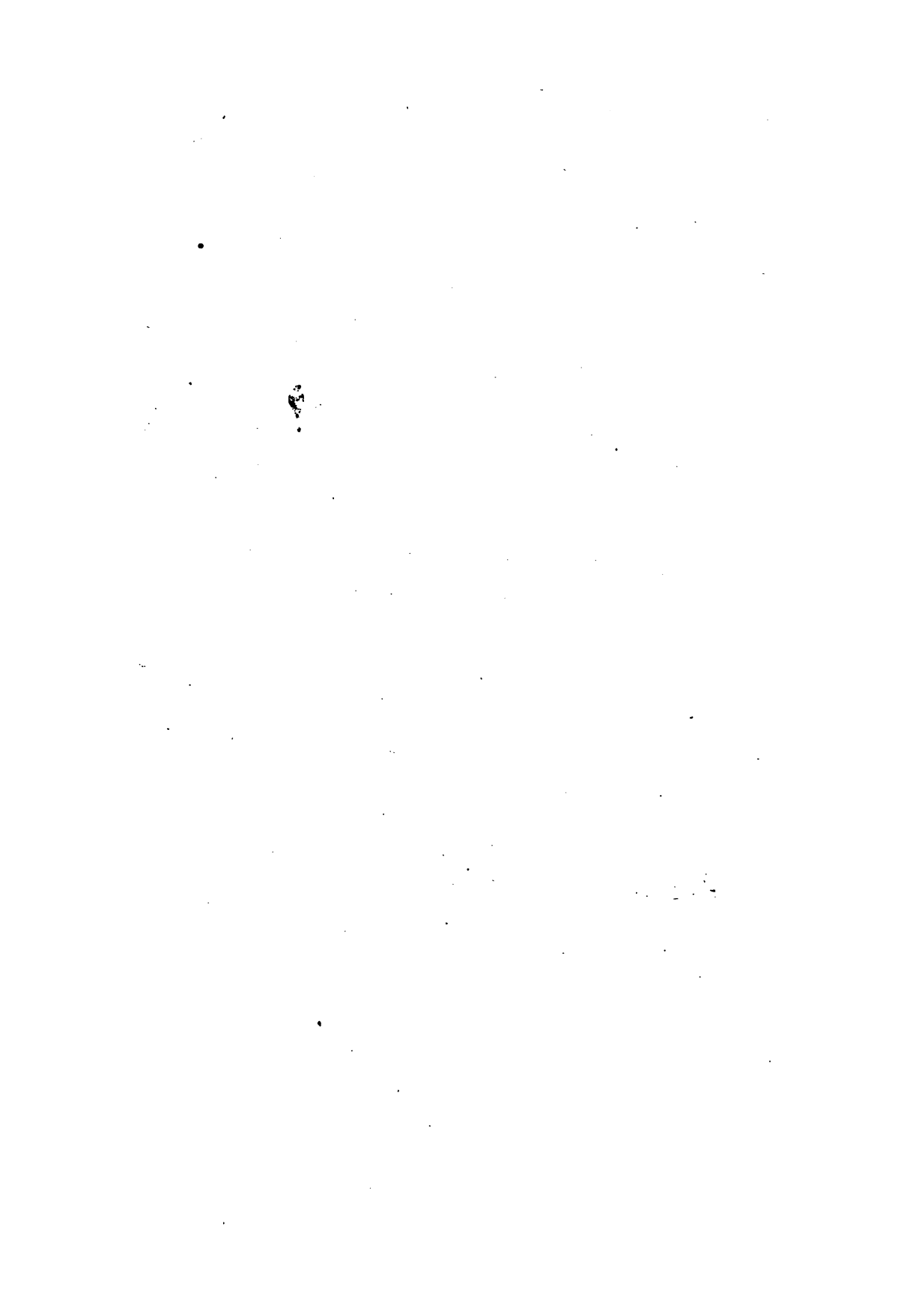
Grouping



J. Loudon Del

Face PLATE II

Flamb. Sculp



the plough, after the footsteps of a designer,
in two or three hours. ' *

S E C-

* See the Sketches in Plate II.

SECTION VI.

OF THE DIFFERENT KINDS OF PLANTATIONS.

THESE may be reduced to—

A grove, or a collection of trees without undergrowth ;

A wood or forest, or a collection of trees with undergrowth ;

Copsewood, undergrowth alone.

Groves are of two kinds. *The first* is generally made for ornament in parks. They are unenclosed ; admit the pasture to grow below them ; and they appear, when walking through them, as a large collection of single trees.

The

The second are composed of the pine or fir tribe. They are commonly planted on hills, moors, or commons; they are thicker than the former; they effectually prevent the growth of pasture; and they are for the most part enclosed. The character of the former is generally beauty and grandeur; of the latter picturesqueness and some degree of grandeur.

Groves are at first planted equally thick with other plantations. As they grow, they are gradually thinned out, until the trees left standing, are able to defend themselves from cattle. The fence is then removed or destroyed, the outline varied, and the spaces betwixt the trees sown with grass seeds.

Fir groves are often allowed to remain without thinning, until they are fifteen or twenty years old; and then they are considered as a full crop, and cut regularly over.

A wood is well adapted for both ornament and utility. It is formed, at first, by planting

planting timber trees at such distances as would form a grove, and filling up the interstices with the kinds intended for undergrowth.

This is the most generally applicable kind of plantation, and commonly the most profitable, particularly in strips and belts. There, the undergrowth grows best; thickens the strip below; completes the shelter; and, by concealing the real breadth, gives a majesty and grandeur to narrow plantations, which they can never have, if planted in the grove style.

Oak undergrowth is generally the most proper; and, if its value were fully known, many plantations might be made of double their present value, be much more characteristic, and afford better shelter.

Most plantations, particularly in Scotland, though they generally go under the name of woods, are in reality of the grove kind; we find none of the trees kept decidedly under the rest, cut over, and allowed

ed to spring up again, while a certain number, from 15 to 30 feet distance, are preserved until their timber be full grown; but the trees being once planted, are allowed to grow up together, a few being thinned out where they are too much crowded (an operation to which by far too little attention is paid): Those taken out, are either cut over, or grubbed out by the roots, as is found most convenient, without any regard to propriety; and in consequence of this management, a few bushes of undergrowth are found in some places, and the rest of the ground, if not shaded too much by the crowded trees, is covered with pasture; and neither the pasture, nor the undergrowth, from being intermixed, can be turned to the advantage of the proprietor.

There are other plantations, where undergrowth exists among timber trees in a more general way, but of kinds which are of little or no use, except for fuel; and this

is far from being a profitable article, particularly in a coal country.

But, on the other hand, there are woods in some places where both timber and undergrowth are cultivated; and it is from seeing the great profits obtained by the proprietors of these, that I make the following observations on the advantage of raising oak undergrowth in woods.

The high price given for oak bark is pretty generally known; and the sum given for an acre of oaks, from 12 to 25 years old, for the value of the bark alone, is very considerable. Among the instances that occur to me at present, the Duke of Athol's at Dunkeld appear the most proper to be mentioned. There, on land worth little or nothing in aration or pasture, are oak woods, principally natural, the undergrowth of which is fold every twenty-five years, at the rate of 35*l.* or 60*l.* *per* acre;* the purchaser being
at

* The statute acre is understood here.

at all expence of cutting, carriage, &c. This is from 25s. to 48s. *per acre per annum*, independently of the value of the trees left, fifty of which may stand on each acre.

If the soil and exposure of these woods be taken into consideration, the growth of the trees will appear considerable. But I have observed that oaks do not grow half so fast at Dunkeld as they do in the low and comparatively sheltered grounds of the Lowlands of Scotland, or in England; and I am confident, if oak woods were planted (or at least undergrowths of oak, in woods of any other deciduous tree) in these districts, it would afford at least double the profit it does in the Highlands: it would grow equal in size to Dunkeld undergrowth in twelve or thirteen years, and afford two cuttings in place of one. At Dunkeld, many places in the woods are too thin, and other parts are covered with birches; but where artificial plantations are to be made, the plants could be

placed regularly thick, which of course would produce a much more uniform crop, and also make a given surface more profitable.

Left, however, I should be thought in any degree to make oak undergrowth appear more profitable than it really is, I shall only say, that, in most cold, hilly situations in Scotland and Wales, it will produce upwards of 2l., and in more favourable situations upwards of 4l. *per acre per annum*; and I do not hesitate to add, that the profit would far exceed these sums in both cases, were proper culture bestowed upon the plants.

This profit is independent of that of the timber trees; and if we suppose fifty, or say only forty, are cut every fifty years from each acre, at 5l. each, this is 4l. more, or in all from 6l. to 8l. *per acre per annum* for oak woods; and I am sure no one will allege that these calculations are in the least degree overrated.

Another

Another consideration which ought to operate as some inducement to plant oaks, is the easy charge with which it may be accomplished. It is beyond a doubt the speediest, and in every respect the best method, to raise oaks from the acorn,* by sowing them at once where they are finally to remain. Now, three or four bushels are abundantly sufficient for an acre, which, at 5s. *per* bushel, is for the whole acre much below the price of a single thousand transplanted trees of any kind; and transplanted oaks, which would cost
nearly

* An acre of oaks affords a greater quantity of vegetable product than the same space occupied with any other tree. This is owing to the tap-root of the oak penetrating many feet below the surface, and deriving the principal part of its nourishment in the bowels of the earth, where no other tree can reach. It is from the tap-root principally that this tree increases in size, although it will live many years with horizontal roots only. This is a most important fact, well deserving the attention of planters. See *Miller's Dict.* art. *Quercus*. See also *Hunter's Georgics*, vol. VI. 442, &c.

nearly double that price, would, in the space of four years, be at least three years behind them in point of size, both kinds being planted at the same time.

Supposing the ground, then, on which an oak wood was to be planted, summer-fallowed and trench-ploughed at 2*l.* *per* acre, and sown broad-cast before the last ploughing with acorns, the total expence (making an ordinary allowance for the proportion of the expence of enclosing) would be only 3*l.* 5*s.* or 3*l.* 10*s.* *per* acre. *

Or, if it were desirable to have the undergrowth oak only, and the timber trees of some other kinds, then 250 ash, beech, or elm, on each acre, (which would afford a distance of more than twenty feet between each tree) could be planted immediately after the acorns were ploughed in, at an expence not exceeding 10*s.* *per* acre more, or 3*l.* 15*s.* or 4*l.* *per* acre in total. And

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* See page 118, Note.

I appeal to every one, whether plantations, with the soil thus prepared and planted, for 4l. 10s., would not far exceed in growth those where the soil is uncultivated, but which are pitted and planted with transplanted oaks, at the rate of 8l. or 10l. *per* acre. If the method which I contend for is the best, it surely deserves the serious attention of gentlemen who plant several hundreds of acres by this last mode.

It is not my intention, however, to recommend the formation of woods, exclusively of groves or coppices; on the contrary, there are thin soils, with bad under strata, where fir groves are more profitable than any other kind of plantation: and there are steeps and rocky banks, where no tree can be so advantageously cultivated as the common ash; and rich moist places, where no plantation will turn out so profitable as oaks. But, generally speaking, it may be safely asserted, that *woods* are the kind of

plantation that ought to be most generally formed; and that though the kind of timber grown in these woods must vary according to the consumpt of different places, yet that oak will be found the best and most profitable undergrowth.

Copsewood alone is seldom desirable in point of character, though, in many places, it is the most profitable kind of plantation. Their formation is simple: when they are of a proper size they are cut down; after which, the stools spring up; and this operation is repeated periodically. Copsewoods, however, are in general wretchedly managed, particularly in England.

Wherever a plantation is to be made, it is of great consequence to fix upon the proper kind. In determining this, the kind of woods, and species of tree in the surrounding country—the market—the present

or

or probable expence of carriage by land or water—and a variety of other circumstances are to be considered, and that kind fixed upon, which shall in the end turn out the most profitable. The plantation being made, the particular kind should be held strictly in view in their after management. A collection of oaks intended for a grove, if not gradually thinned out as they grow up, will never succeed ; but if the same collection were intended for a wood, thinning them out, in place of cutting over, would lessen the crop of undergrowth. Again, a collection of firs will never become a wood, nor a collection of thorns a grove.

In planting, few have any idea of making one kind of plantation more than another ;—a certain space is to be planted, and it is just filled up with trees, no matter of what kinds.

From this neglect alone, independently of all others, (such as preparing the soil previous

vious to planting, cultivating it afterwards, training and thinning, &c.), few plantations yield one third of the profit which they might do. But when the kind of plantation to be formed is previously fixed upon, then a proprietor, who intends to lay out money in this way, can say—Here I shall plant *a wood*; it will cost just so much at first; in so many years, the undergrowth will yield a certain sum; it will do so always at the return of the same period; so many timber trees will stand upon each acre, which, at such a time, will yield so much: And all these returns is just so much *per cent.* for the money which I have laid out; and, after deducting all expences, my profits will stand thus, &c.

Here again I make *a coppice*: Such a tree is the most profitable to plant; I can plant so many acres for so much; and these will yield so much *per acre* in such a time, and the same periodically afterwards.

In

In another place I plant *a grove*: It costs me so much; in a certain number of years I will commence thinning; in so many years more I shall have thinned out just so many trees, at so much each, and left so many remaining on each acre. Now, I sow grass seeds among these trees, and next year it will afford me so much *per acre* for pasture; which it will continue to do for so many years; until, at last, I cut down the full grown timber, when each tree will afford so much; or my total expence will stand thus, &c.

But, mix all these different kinds of plantations, and the species of tree suitable for each kind together, as is commonly done, and what can be said about them? Who can tell the expence of a plantation? Or to what advantage can such plantations be turned? The proprietor must feel great difficulty in directing their general management, and great uncertainty as to what they should

should produce; nor has he any kind of check upon either the manager, the buyer, or the feller of his timber. But, by the mode which I recommend, he has a certain object in view in every plantation, even in every hedgerow or single tree, which he plants or may possess; and all his operations tend to promote this object: In this way he operates, though not with an absolute certainty of the profit and loss, yet with such clear ideas on these heads, that he can never be at a loss how to proceed, nor ever greatly disappointed in his expectations.



S E C-

SECTION VII.

OF SHELTERING YOUNG PLANTATIONS.

SHELTER is a most powerful promoter of the growth of vegetables: it is peculiarly necessary for many kinds of young trees in all exposed situations: but there are some kinds that will endure the most severe exposure; and the tenderer kinds are sheltered by intermixing some of these hardier sorts among them as nurfes.

A nurfe plant should be of a quick growth, especially when young, and endure the particular exposure, in which it is to be planted,

planted, better than the tree that is to become principal. We have several quick-growing kinds adapted for all the different degrees of exposure, from the sea-shore to the tops of the highest hills ; * and those undoubtedly are the best that can be employed for this purpose.

The proportion of nurfes planted to the principal trees, must vary according to the exposure, and the degree of shelter necessary : in some cases, there may be one half of the whole, nurfes ; in others, not above one twentieth part.

It may sometimes happen that more than one half are nurfes ; and in that case, as the whole grow up, a few of them should be removed, and more of the principal tree planted in their room, especially if the plantation is intended for a wood : but this case can rarely occur, except in situations near the

* See Sect. II. on the Characteristic Differences of Trees and Shrubs.

the sea; for the larch * is at once the most valuable tree, and the one that will best endure every kind of exposure.

Nurse plants have long been introduced into plantations; and although they have, in almost every instance, tended to suffocate and overpower the principal trees, rather than promote their growth, the idea is good; the bad consequences resulting from the practice have arisen from improper management.

Nurses, however, have at all times a tendency to exhaust the soil, and deprive the principal tree of its proper nourishment. For this reason, they should be planted with great

* The insect which, for three years past, has infested the larch, has greatly limited the quantity of that tree planted in Scotland. But those planted from thirty to fifty years ago have, in every situation, grown to large timber trees; hundreds of which may be seen in many parts of the country, from one to four feet diameter. This shews that the soil and climate suit the tree; and it is to be hoped a few years will remove the insect and its pernicious effects.

great caution. In most situations, the principal trees, if planted sufficiently thick, will shelter one another; they may not indeed be so tall at the end of a given period, as if they had been 'drawn up' by nurseries; yet they will be much more strong and hardy, and better calculated to produce timber, and resist the weather ever afterwards. Where ornament is taken into view, this mode should almost always be followed. The incongruity produced by mixtures, and particularly by many nurseries, which are generally of spiry forms, with other round-headed trees, is quite incompatible with every idea of beauty or variety. Another bad effect is, such plantations always appear young, without giving any of those ideas of youth and beauty, that young plantations, composed of kinds varied, but not mixed, or even young trees simply considered, never fail to communicate.

SECTION VIII.

OF THE PREPARATION OF THE SOIL PREVIOUSLY TO PLANTING.

NOTWITHSTANDING all that has been written upon this subject, and the many facts brought forward to prove the propriety and ultimate economy of preparing the soil previously to planting; the operations of most gentlemen shew that they are doubtful of the subject, or ignorant of its importance. It is needless, however, to add any thing to what has already been said; for it is unreasonable even to suppose that a square yard of earth, matted and consoli-

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dated

dated with the roots of heath or grass, can be penetrated by the delicate fibres of a young plant just brought from the nursery; and still more absurd to imagine that it can find sufficient nourishment in the compass of the pit in which it has been planted. Thus, in plantations made by pitting and planting, whatever be the nature of the soil, it will frequently be found, that to supply the deficiencies by death that occur for two or three years after planting, will require a sum equal to that which would have prepared the soil; while those that survive are so choked with grasses or heath, and become so coated with moss as to make no progress. The pine and fir tribe, it is true, are less liable to this than others, as they soon cover the surface, and destroy all vegetation; but I apprehend that the deciduous kinds are more checked by it than most people imagine.

But where the soil is prepared, the plants
rush

rush up to trees with vigour and alacrity, and soon begin to yield returns to the owner. Nor is the additional expence of preparing the soil considerable; in many cases, it will be more than repaid by the green crops, as potatoes, turnips, &c. which may be raised on it for two or three years after planting; and where no green crop can be raised, the saving in plants and planting, (as few or none require to be replaced), will entirely or nearly defray the expence of preparation.

Thus, independently of timber produce, it appears that the additional expence of preparing the soil will generally be repaid the second or third year after planting; if not positively by vegetable produce, at least negatively by preventing further expences. But if we consider the returns in timber produce, it may appear astonishing, that any should be so blind to their own interest as to neglect the preparation of the soil. If

we suppose that trees grow only twice as fast where the soil is prepared, as where it is not, then a plantation worth 100*l.* in fifty years, had the soil been prepared, would have been worth 200*l.* in the same time, or worth 100*l.* in twenty-five years. But every one will allow that all kinds of deciduous trees will grow four or six times, and often ten times, faster in prepared, than in unprepared ground; and, of course, the return of profits will be correspondent.

The ground being drained and cleared, as far as necessary, of surface incumbrances,* the mode of preparing the soil will vary according to circumstances.

Where a considerable extent is to be planted, the ground should, if possible, be prepared

* He that for wood his field would sow,
Must clear it of the shrubs that grow,
Cut brambles up, and the fern mow.

BOETHIUS, Book II.

prepared by the plough; † by autumn or summer fallowing; or, in very rough moors, &c. by fallowing two seasons; and trench-ploughing should be added to the fallowing wherever it can be accomplished. This mode decomposes the organic matter, and pulverizes the soil much more completely than

† Then see your hopeful grove with acorns sown;
 But, ere your seed into the field be thrown,
 With crooked plough first let the lusty swain
 Break up, and stubborn clods with harrow plane.

To barren ground with toil large manure add;
 Good husbandry will force a soil that's bad.

RAPIN.

————— Fostered thus,
 The cradled hero gains from female care
 His future vigour; but, that vigour felt,
 He springs indignant from his nurse's arms;
 He nods the plumed crest, he shakes the spear,
 And is that awful thing which Heaven ordain'd
 The scourge of tyrants, and his country's pride.

Masson's *English Garden*.

than trenching with the spade, while it will not cost above one third the expence.*

In places inaccessible to the plough, the ground should be prepared with the spade, either by digging or trenching.

In steep banks, or places much covered with stones, or other impediments to digging or trenching, or where there may be danger of the winter rains carrying away loose soil, pits should be made the summer previous to the planting season.—One pit being opened, the earth of the next should be

* Where extensive plantations of deciduous trees are to be made, sowing will generally be found the most profitable mode; and there are many cases (as in old moory pastures) where a single furrow would be abundantly sufficient to prepare the soil for this purpose. If acorns were to be sown, they might be ploughed in; or ash, beech, &c. might be sown immediately after the ploughing, and then harrowed in. Thus, thousands of acres might be planted under the expence of 20s. per acre, which would prosper better than those which cost half as many pounds.

be thrown into it, with the surface undermost. By the time the pit is re-opened, the sward will be rotted, and should be incorporated with the rest of the soil in putting in the plant.

Other places still more difficult may be planted by slits; or by putting in acorns, ash keys, or other tree seeds; many of which will grow in crevices of rocks and precipices, where little or no earth can be seen.

SECTION IX.

OF THE SIZE OF THE PLANTS, AND MODE OF PLANTING OR SOWING.

EXPERIENCE has shewn, that where there is any degree of natural shelter, and especially where the soil has been prepared, plants that have been transplanted in the nursery, and that are from eighteen inches to three feet high, are the most proper to be chosen, and planted from four to six feet asunder irregularly.

In exposed places, where shelter is to be obtained only by planting thick, or by planting nurser, transplanted plants, under
eighteen

eighteen inches high, should be chosen, and planted from thirty inches to four feet asunder. The distance betwixt the plants, in both these cases, will vary much, according to soil and other circumstances. The margins of extensive plantations, and narrow strips or patches, should be thicker planted than the inside of a great extent, though in the same exposure; on the other hand, where the soil is a deep loam, they may be placed wider than where it is thin and gravelly.

In very extensive plantations, it becomes an object to plant in rows, as thus the trees may be more easily cultivated. In many cases, this may be done to great advantage with the plough and horse-hoe; and often, particularly in England, vegetables might be introduced betwixt the rows with great propriety.

In all ordinary plantations, the plants should be put in irregularly; and where-

ever

ever ornament is in the least degree attended to, *irregularly irregular*, just as if they had grown up by chance from the seed, or as we see in natural forests; where often two or three trees appear to spring from one root, and the rest straggling around, in some places thick, and in others thin. This produces an endless variety of grouping, and at the same time as many trees, equal, in timber produce, to the same number on the same space, planted at regular distances. Neglect of this kind of irregularity is what disgusts every man of taste, when he looks at artificial scenery; and surely nothing can be easier than to copy nature, and please.

The different modes of *inserting* the plants, are either by pitting or slit-planting, which are the best modes; or by dibbling, which, however, can seldom be practised with propriety.

Planting the pine and fir tribe, I consider as more economical and expeditious than

than sowing; but most of the deciduous trees, and particularly the oak and ash (which ought to be the deciduous sorts most generally grown) should be raised from the seed, where they are finally to remain.

An acorn put in the ground at the same time with an oak five or six years old, will overtop it in seven years,* and often sooner; and Miller says, that they last much longer, and produce more valuable timber. † Where-
ever

* 'We have known an instance of transplanted oaks remaining upon the ground so long as eight years, before they began to move.'—*Marshall's Planting*, vol. I. p. 122. second edition.

† 'When oak trees are cultivated with a view to profit, acorns should be sown where the trees are designed to grow; for those which are transplanted will never arrive to the size of those which stand where they are sown, nor will they last near so long. For in some places, where these high trees have been transplanted with the greatest care, they have grown very fast for several years after; yet are now decaying; while those which remain in the places where they

ever the foil is prepared, and it is desirable to raise oaks, it will be found preferable to sow acorns; which may be done at one

they came up from the acorns are still very thriving, and have not the least sign of decay. Therefore whoever designs to cultivate these trees for timber, should never think of transplanting them, but sow the acorns on the same ground where they are to grow; for, timber of all those trees which are transplanted is not near so valuable as that of the trees from acorns.—*Millar's Dict.* art. *Quercus*.

This passage should be understood in a limited sense. It has been used, by some, to shew that no oaks ought, on any account, to be transplanted. In my opinion, however, it amounts only to this—that oaks should not be removed at such an age that they cannot, nor upon a soil where they will not push down tap-roots: for upon these two things depend the quantity and quality of the timber. Without a tap-root, an oak may live a long time, but will not increase in size.—See, as a proof of this, an excellent paper in Dr Hunter's *Georgics*, vol. VI. p. 442.

All transplanted oaks under seven years old, when finally removed, should be cut over by the surface, in the second or third year after they have taken with the foil.

fifth the expence of planting; and they will turn to advantage, either as timber or undergrowth, much sooner. As oak is a peculiarly valuable tree, both for its bark and timber, it should be universally planted; and were this mode attended to, it would be a saving, even in the first instance, of from 3l. to 6l. an acre, which, to gentlemen who plant extensively, would be of considerable importance. (*See Sect. VI.*)

With respect to the mode of performing the operation, acorns might be sown either in drills or broad-cast, and *ploughed in* in autumn; and where any other species was intended to be grown among them, they might be planted; or, if these were the ash, beech, or elm, they might be sown, the following spring. In small plantations, where the plough could not be used in sowing, they might be put in either with a spade, hoe, or planting instrument.

SECTION X.**OF THE CULTURE OF THE SOIL IN
PLANTATIONS.**

THE culture of the soil, or at least the keeping of it free from weeds, is of material consequence in promoting the growth of vegetables ; when this is not attended to in plantations, the young trees are often more liable to be choked by grass or weeds, than if the soil had not been prepared. This is evident ; for if the soil, by preparation, is better adapted for the growth of trees which are foreign to it, it must be much better adapted for the growth of weeds, which it produces naturally in abundance. To check these, then, so that the roots of the trees may
range

range at liberty, and enjoy the full strength of the soil, must be an object of considerable importance to the planter.

The kind of culture most proper to be followed, will vary according to the nature of the plantation. Wherever the ground will produce vegetables, as potatoes, turnips, beans, &c. a few of them may be planted or sown in the centre of the intervals (where the roots of the trees do not reach) for a year or two after planting. This necessarily supposes that the whole will be dug and cleaned annually during that time; and afterwards it may be hoed, two or three times a year, until the trees cover the surface, which will generally be the fourth or fifth year after planting.

In extensive plantations, all this may be performed by the plough and horse-hoe; except perhaps a little hand-hoeing next the plants, where the other instruments did not operate. And,

In

In plantations where, from different circumstances, it may be found impracticable to introduce the plough, the spade and hand-hoe naturally present themselves.

In cases where the soil will not produce vegetables, or at least where it may not be thought adviseable to cultivate them, the ground should be kept clear of weeds by hoeing only; or by digging or ploughing a year or two at first, and afterwards by hoeing.

Whenever trees cover the surface of the ground, there is no further need of culture; the soil afterwards is kept abundantly porous, and the surface sufficiently free from weeds, by the shade of the trees and the falling of the leaves annually. This is particularly the case in woods and groves of resinous trees. It is the peculiar property of deciduous groves, that the surface among them is covered with pasture, which should
be

be sown when the trees are about nine inches or one foot diameter; previously, they should be kept free from weeds.

I

S E C-

SECTION XI.

OF PRUNING PLANTATIONS.

PRUNING, though not so important in plantations as thinning, is of considerable use. It corrects the extravagancies, and lops off the redundancies of trees, and directs their produce into a proper channel.

Two trees of the same kind planted in like soils and situations, the one pruned, and the other left to nature, may produce in a given number of years the same weight of timber: but the one that was pruned would contain the greater part of that timber in ar
erec

erect stem ; while the one, left to nature, would contain great part of it in arms and side branches. Hence, if the object was ship-building, as is most likely, the natural one was preferable ; but if it was waincoting, the other was undoubtedly the most profitable tree. But the larch, without any pruning, is the best for the purpose of waincoting ; and the oak, without any pruning, is the most proper for ship-timber. This, and other instances that might be given, would seem to point out that trees, both as to the quality of their wood, and their mode of growth, are by nature fitted for certain purposes in the arts of life ; and this again tends to prove that pruning is unnatural and unnecessary.

From different circumstances, however, it often becomes necessary to use trees for purposes which they are not naturally designed for. Before the larch was known, or where it could not be had, it was neces-

fary to train the oak for wainfscotting ; and where the larch alone will grow, and ship-timber is requisite, it may be necessary to prune or bend it to the form that will suit the ship-carpenter, as is explained in Plate I. *

If

* ‘ I conclude with recommending the bowing and bending of young timber trees, especially oak and ash, into various flexures, curves and postures, which may be done by humbling and bending them down with tough bands and withs, or hoops, either cut screw-wise, or slightly haggled and indented with a knife, and so screwed into the ground, or by hanging of weighty stones to the tops or branches, till the tenor of the sap, and the custom of being so constrained, do render them apt to grow of themselves, without power of redressing. This course would wonderfully accommodate materials for knee-timber and shipping, the wheelwright and other uses ; conform it to their mould, save infinite labour, and abbreviate the work of hewing and waste.

——— *adeo in teneris consues ure multum est.*

Virgil, it seems, knew it well, and for what purpose :

Continuò in silvis magna vi flexa domatur

In larim, et curvi formam accipit ulmus aratri.

Georg. II.

When

PL. I.

*BENDING the LARCH to Produce
SHIP TIMBER*



First Operation



Second Operation



Effect Produced

J. Loudon Del.

Face P. 132.

F. Lamb Sculp.



If we consider the ash, the elm, the beech, &c. we shall find that they are wonderfully adapted by nature, without any pruning or culture, further than to be planted in their natural soils and situations, for the several uses and purposes for which they are applied. But, reverse or intermingle their applications, and pruning then (and then only) becomes necessary. In pruning, the great art is, to attend to the purposes for which the timber is to be applied ; and this will naturally lead to the best manner of performing the operation.

However, in artificial plantations, a good general rule may be, to consider pruning as the means of throwing more timber into the trunk or principal stem, whatever direction that may have assumed by nature ; and in all plantations where ornament is the prin-

I 3

cipal

When in the woods with mighty force they bow
The elm, and shape it to the crooked plough.

Hunter's Evelyn's Sylva, 480.

cipal consideration, the trees should be left entirely to nature.

Pruning should commence after the trees have been five or six years planted, and continue until they are nearly full grown. In performing the operation, no tree should be suddenly divested of all its side shoots. A sufficient number of small ones should always be left to circulate the sap through the tree. These branches never become principal, and, of course, cannot spoil the trunk. No branches should be pruned from resinous trees until they shew evident marks of decay.

Where pruning is attended to, it is most commonly overdone, to the great prejudice of the timber, and the appearance of the tree. Better proof cannot be given than the tall, naked elms, and pollard oaks, that prevail in many places of England, and disfigure whole districts of the country. The timber of those species of trees, as every one knows, is the most valuable of any; but
after

ORNAMENTAL PLANTING. 135

after this kind of management, its quality and quantity are much injured, and, being unfit for every purpose in the arts, it is commonly used as fuel.

In an artificial plantation, the soil is equally cultivated, and the plants put in the ground much about the same size, and at the same time. Hence, they rush up together like so many maypoles, producing neither beauty nor timber: and as, in most plantations, the fir tribe have been introduced either for ornament or shelter, they have overtopped, and partly destroyed those they were meant to nurse up, and given a most unnatural sameness to every part, and to all the artificial plantations in the island.

The plantations where thinning is principally requisite, are those intended for groves. In woods and copses, none require to be taken out but the nurse plants, where any have been planted.

Plantations of the fir tribe should be gradually thinned, beginning after they have been five or six years planted, and continuing for ten or twelve years; after which time thinning becomes pernicious. Those
thinned

guments for thinning ; so that even for this unnatural-like *operation*, there may be found a precedent in nature. Natural woods, sown by birds or the winds upon different kinds of surface and various sorts of soil, spring up at different times, and of different degrees of thickness and vigour. Hence it is easy to conceive, that those in favourable circumstances will soon overtop the rest, and, if they do not kill, will at least weaken them so much as not to be affected by them, until at last the trees are left at proper distances, according to their kinds, and the quality of the soil. Thus, though nature be slow and tedious in her operations, yet she accomplishes her purpose in the most complete manner ; and artificial thinning is only assisting nature.

Leaving even natural woods to be thinned by time, would not be economical ; and those who argue from thence not to thin artificial plantations, do not consider the difference between them.

In

from one another, but, as formerly mentioned, *irregularly irregular*.

Woods (where undergrowth is always intended if they are properly planted) require no thinning : the whole should grow for twelve or fifteen years, until it is proper to cut over the undergrowth ; and at that time the strongest trees should be pitched upon, and left as standards.

Copsewoods grow a certain length, according to their kind, and then are cut wholly over by the surface ; of course, they require no thinning, unless nurfs have been planted among them ; and both in woods and copses, these, as they are removed, should be replaced with the principal tree.

SECTION XIII.

OF INCLOSING, AND OF DIFFERENT KINDS
OF FENCES.

HOWEVER well a plantation may be made in the first instance, unless it is well enclosed it cannot be expected to prosper. ' But how much cause have we for censure respecting this point ! Truly, too much. In many instances, we find plantations entirely unfenced ! In others a mock ditch or bank, not meriting the appellation ; and in others, a rugged hedge or broken wall, with perhaps one yard up, and two down. Can this be called rational management ? Is it not the height

height of carelessness, nay, even a cruelty, to abandon trees, which otherwise might soon become useful, not only to the proprietor, but to the community, to the ravages of cattle? ' *

There are a great many different modes of enclosing suited to different situations and circumstances, a few of which, with some original kinds, I shall notice under

Live fences ;

Walls ;

Fences composed partly of both ;

Ornamental fences ; and,

Fences for groups and single trees.

Live fences include all kinds of hedges, many excellent ways of rearing which are well known.

Thorn is the best plant where the soil is good ; crab the next best. Beech, horn-beam,

* Nicol's Practical Planter, p. 350.

béam, berberry, &c. where the soil is too dry or thin for the thorn. Elder, birch, poplar, alder, &c. where it is too moist for any of the above.

Before a hedge is planted, the ground should be well cleaned and pulverized. A strip six or eight feet broad may be fallowed and trench-ploughed the preceding summer. When the soil is naturally good and deep, the thorns may be planted along the centre of the strip; or, if it is thin and too moist, it may be planted on double earth, which is accomplished by forming a ditch of depth and width according to the water it is to contain, or the cattle it is to defend from the hedge. Every hedge should be well cleaned and defended from cattle for five or six years after it is planted; and in the mean time, its sides should be trained in a tapering form with the hedge knife.

The great art of preserving hedges fencible, after they are raised, consists in keeping them

them three or four times broader at the bottom than at the top. By this means, every part has the full advantage of the sun, air, and rain: it grows equally thick throughout, and particularly below, where it is most necessary. But when a hedge is trained broader at top, or even perpendicular, that half of it next the surface is under the drip of the rest; and, deprived of sun and rain, it sickens; produces few or no young shoots; the sap runs all to the top of the hedge; it gets quite bare below; and soon becomes unfit for a fence. Every accurate observer will allow that this is the case, more or less, in the greater part of what are generally considered as the best kept hedges, such as those surrounding market gardens in the neighbourhood of towns, which, though they are annually cleaned and shorn with great care, are commonly so naked below, as to admit hares, dogs, swine, &c.

In pruning a hedge, the bill or knife
should

should be used as preferable to the shears. They bruise off, rather than cut over, the twigs ; and hence, every thorn hedge throws out a great number of small shoots from the surface only, which in time forms a kind of coating or net-work all over the hedge, enclosing the naked stems within, and excluding them from the air. But the knife cuts off the twigs clean and smooth. By this means, they throw out fewer shoots, but those are of greater strength ; and the hedge is equally thick in every part, without being crowded. This excellent mode of pruning hedges is practised in some of the southern counties of Scotland, where they are productive of many other advantages.

Walls are generally formed of earth or stone. Some are made of stone alone ; others of stone and lime ; others of turf, or of turf and stone in alternate layers. Some are erected upon the surface, as all common
 K walls ;

terials, is raised on the top of the earth dug out of the ditch, the medium size of which is ' thirty inches in height, twenty inches wide at bottom, and fifteen inches broad at top.' * (See plate III. fig. 1.)

Any of the foregoing may be made *ornamental* fences : the walls may be covered with shrubs, creeping plants, or ivy ; the hedges intersperfed with roses, briars, honeysuckles, and other shrubs or trees, and never thorn ; and the palings may support climbing plants, shrubs, or brambles. †

A number of other fences might be mentioned, which are particularly applicable to ornamental scenery ; but I shall only notice three, which appear to me the best.

The *first* is used for preserving sheep only,

* Nicol's Practical Planter, p. 362. first edition.

† No plant gives a more natural appearance to artificial scenery than the bramble ; as may be seen at the Earl of Selkirk's, St Mary's Isle.

only, or excluding hares, rabbits, &c. from groups, and single trees; or for enclosing trees on a lawn, or in a small ornamental park where deer or cattle are not kept; such as we frequently find adopted in the garden front of villas in England. Wherever this fence can be used, I think it is the simplest, the cheapest, and in every respect the best.

It is from three to five feet high, composed of wire, placed wider or narrower according to the purpose of the fence, and fixed to the ground by small posts of iron at regular distances; the whole coated over with the *patent British invisible green*.

It will be easily understood from sketch 1. plate III.

The *second* kind may be used in place of the funk fence, and I think it is much preferable in ornamental scenery. It is evidently more economical.

It is formed by digging a ditch eight or ten feet wide, and two or three feet deep. Plant the bottom of it with thorns, about two feet square, or sow it with furze: as they grow, cut them down until they become bushy, and cover the ground; and when they are as high as the surface, mow them along with the surrounding lawn, and they will have nearly the same appearance. It is needless to add, that no cattle will venture to tread on them. And planks, painted green, might be laid across, and half concealed here and there, where it might be thought necessary.—See a section of this fence, plate III. sketch 3.

An excellent fence might be made for plantations much in the same way. The ditch might vary in width: it may be in some places twelve or fourteen feet, in others three or four only, the thorns partly mown level with the surface, and partly allowed to assume their natural magnitude and form.

Thus

FENCES

Pl. III.

Fig. 1. Section



Fig. 2. View

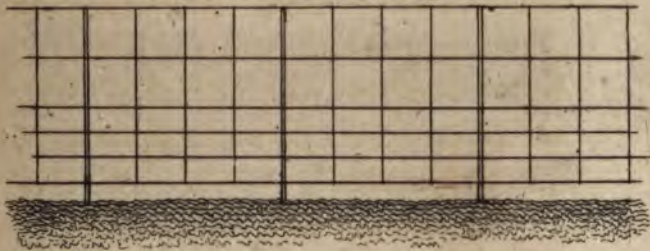
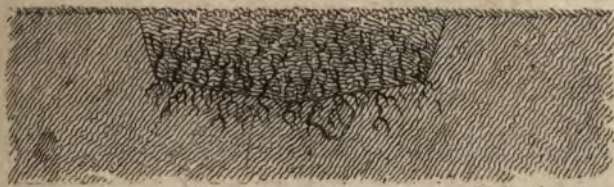
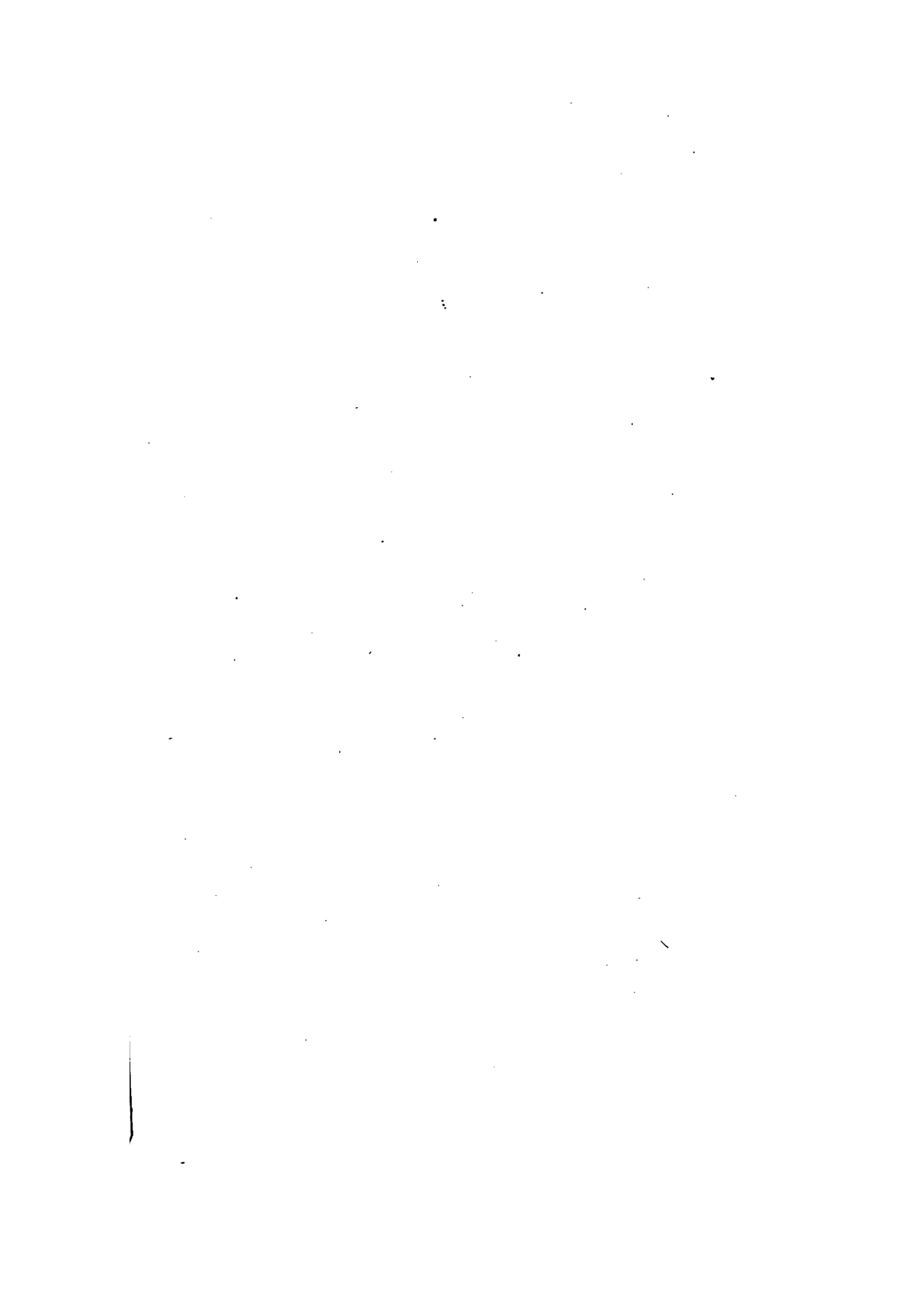


Fig. 3. Section



J. Loudon Del.

F. Lamb Sculp.



Thus the outlines would be quite open and free, and the fence at the same time complete. Or,

The thorns might be planted in the same irregular way upon the surface of the ground, and partly intermingled with the trees of the plantation: when they have grown five or six years, they might be thinned, so as to make a varied outline and complete fence.

The *funk fence* has been used more than any other in ornamental scenery; but it is unseen only when approached at right angles from one side. If there are any bends in the line of this fence, or any inequalities in the surface of the ground, the wall never fails to strike the eye. A place where they abound is always confined. Should we leave the gravel walk and saunter over the lawn, or take a direct road to any object in the park, we are continually pained with the idea of meeting with this invincible barrier, which often suddenly intrudes itself, and

forces us to return and walk in that path only which the ground-worker has gravelled.

But the following barrier, which I have invented, and called the **INVISIBLE FENCE**, is equally unseen from every point of view. It completely excludes cattle, but can never confine the human species;—the most delicate lady may walk over it in any direction; and, of course, all places where it is used, will, as to fences, be free and unrestrained as nature herself.

This kind of fence is applicable to any purpose, whether ornamental or useful: it is equally cheap with the former; and appears to me the best unseen barrier as a substitute to the sunk fence.

An excavation is formed eighteen or twenty inches deep, and six or eight feet wide; a railing made of larch wood (either a plain rail, or crossed in the way of wicker-work by the small branches), is placed horizontally above it, on a level with the surrounding



INVISIBLE FENCE

P. IV

Invented by J. Loudon

Fig. 4. Section

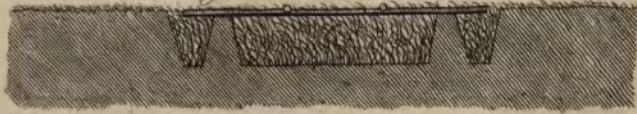


Fig. 5. Sect.



Fig. 6. Horizontal View

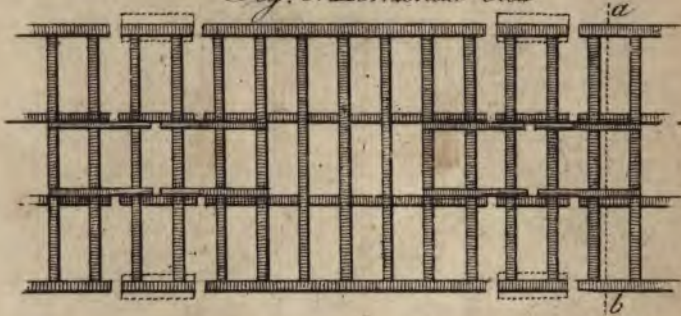


Fig. 7. Sect. a-b



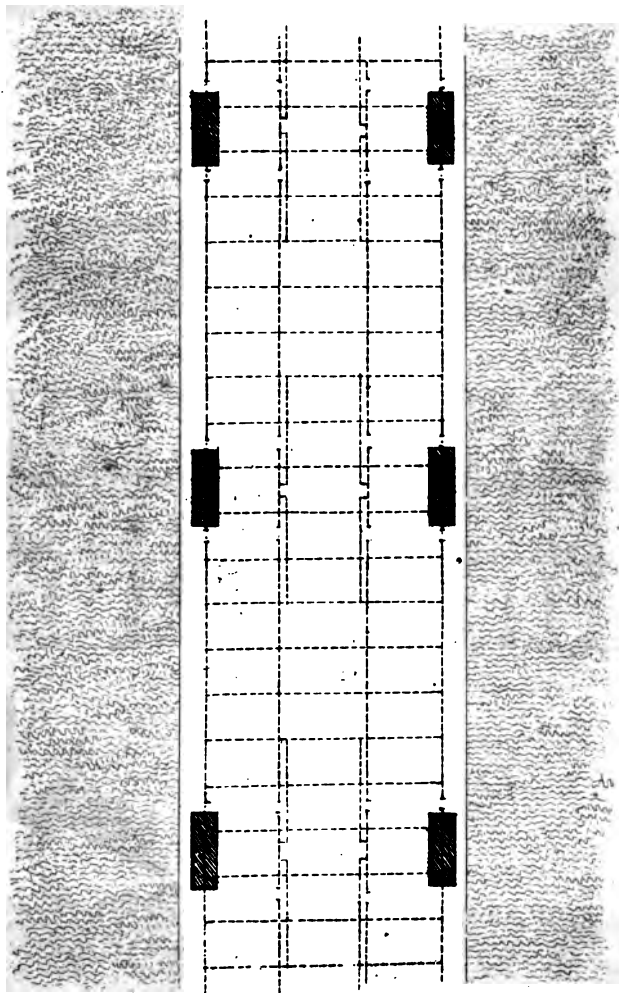
J. Loudon Del.

Face P. 133.

F. Lamb Sculp.

INVISIBLE FENCE .. Pl. V.

Ground Plan



J. Loudon Del.

F. Lamb Sculp.

Face PLATE IV

rounding surface; the bottom of the excavation is sown with grass seeds, which will grow about as high as the rail, and, covering it, will render the whole invisible. Should it grow much higher, it can easily be topped with the scythe. (See a section of this fence, Plate IV. sketch 5.)

It is evident that this will be a sufficient barrier for sheep, cattle, &c. while the human species may walk over it every where at pleasure. There is but one trifling objection that can be brought against it, which sunk fences are equally liable to, that is, it may be covered with snow in winter; but this can be easily remedied, by fixing it upright at that season (as shown sketch 6.); or it may be composed of several pieces, every one of which may rest upon cross supports by four pins placed horizontally, as represented by *a a a a*, sketch 7.; and then, whether covered with snow or otherwise, the weight of cattle, should they tread on it,

it, will weigh it down, and frighten them away, as represented sketch 8. *

Fences, or guards for single trees and small groups, are of various sorts. Some of the best shall only be mentioned here.

Where the trees are small, the kind made of wire, already mentioned, is the most elegant, and the least visible.

Where the trees are single, and eight or ten inches diameter, pieces of lath, or bark of trees, may be neatly placed, and tied round close to the stem, as shown fig. 1. plate VI. The height of the lath or pieces of bark may be more or less, according to the cattle to be defended against. They will require to be untied, and an additional piece of lath or bark put in every two or three years,

Where

* A more particular description of this fence, with a drawing and model, was sent by me to the Society of Arts, Strand, London.

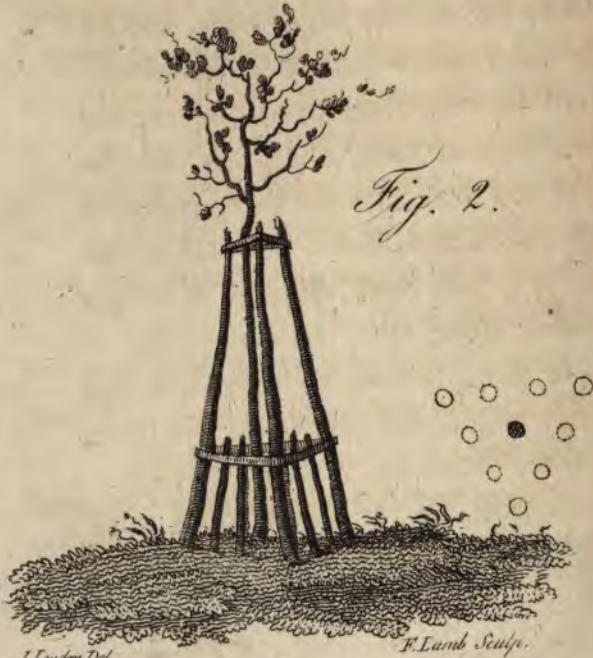
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FENCES for SINGLE TREES

Fig. 1.



Fig. 2.



J. Loudon Del.

F. Lamb Sculp.

Where a group of trees, each of which may be of three or four inches diameter, are to be defended from both cattle and sheep, a couple of rails fixed to posts, the lowest three feet from the surface, and the other two feet below it, may surround the whole; and each particular tree in the group may be defended with lath, bark, or wire, for thirty or forty inches high. This will completely exclude the larger cattle, and admit the sheep only to pasture in the group.

Were the outer fence painted green, and the inner ones of bark, something near the colour of the trees, and the sheep pasturing through among their stems, it would not be known, at a very small distance, that they were fenced at all.

Single trees, or two or three into one hole, may be guarded from cattle and sheep by the fence shown fig. 2. plate VI.

When trees are planted of a very small size, the guard should be larger, so as that the
cattle

SECTION XIV:

OF HEDGE-ROW TIMBER:

ALTHOUGH a few trees growing in a hedgerow, when considered singly, may have little effect, and be of no great value; yet a number of hedgerows, all properly interspersed with timber trees, will completely change the appearance of a country, improve its climate, and yield a considerable quantity of timber to the proprietors of the lands. The consideration of this subject, then, must be of great importance to the landed interest and the farmer.

The

The few hints I shall give, will be included under

The *lands where hedgerow timber may be planted*, without injuring the farmer; and

The *species of tree* most proper to be planted.

With respect to the *farmer's interest*, the lands most obviously adapted for hedgerow timber, are those which are kept principally under pasturage; and with respect to the beauty of a country, the improvement of its climate, and the health of its inhabitants, the rising grounds alone should be planted; except a few in the vallies, by the sides of public roads or rivers, to form foregrounds to the rest of the country; and a few near houses or villages, to group with them, and enrich their appearance.

Low rich vallies between mountains, that are kept in perpetual aration, should not be planted

planted with hedgerow timber (*see* Sect. IV.) But a country wholly level, as many counties in England are, may be planted without doing much injury to the farmer; while, if properly managed, it will vary the country, and improve its climate. In such levels, the hedges should be kept very low, and the trees trained erect, with single stems and few lateral branches; or, as is done in some places, the width of an ordinary ridge on each side of the hedge may be kept in perpetual pasture, which prevents the corn from being so much injured by the trees, and is a great ornament to a farm. But if the whole farm is kept in perpetual pasture, the trees may be allowed to extend their branches, and the hedges may be kept high or low, at pleasure.

Moist or clay soils, under perpetual aration, should never be planted with hedgerow trees. And, indeed, before they are planted any where, a due estimate should be made

made of their effect on the annual rent of the land—on the value of the estate—on the climate—and on the appearance of the country.

The species of trees which are most proper for hedgerows are, in good deep soil, the oak and Scotch elm; in stony soil, the ash; in poorer soil, the beech, sycamore, and birch; in the case of a moist soil, as meadow, &c. the Lombardy poplar, which, besides its timber produce, forms, as it were, a close, erect, narrow hedge, sixty or a hundred feet high, in a few years.

The oak and the Scotch elm prosper better in this situation than in any other; their roots have a free range in the adjoining enclosures, while their tops shoot out their herculean arms in every direction; and thus, strong, crooked ship-timber is rapidly obtained.

The beech is peculiarly adapted for thin

L

soils

foils and exposed situations. When planted about ten or twelve feet asunder, it produces excellent shelter, and at the same time a very considerable quantity of timber.

The ash and sycamore will grow erect in the most exposed situations. When planted in good soil, they should generally be trained to single stems; in which state, their timber produce is most valuable; that of the ash, in particular, is becoming very scarce, in consequence of the tree being too much neglected by planters. *

In the cyder counties of England, fruit trees are frequently introduced in the hedges and in ornamental groups, and interspersed among other trees in the park or lawn; and they are highly profitable. In many other counties in England, and in many parts of Scotland, they might be planted with equal, if not superior advantages.

The

* See some Observations by the author on Hedges and Hedgerow Timber, in the Gentleman's Magazine for January 1804.

The resinous tribe, and the evergreen sorts of trees, are generally improper for planting in hedgerows.

In many places, where hedgerow timber exists, the situation is improper, and the management wretched. Hence it has become an injury to the farmer, without yielding any advantage to the proprietor. Two more glaring instances of this cannot be given than in the tall, naked elms, and pollard oaks which prevail in many places in the south; the former, by improper pruning, are worth nothing; and the latter, by being cut over at the height of eight or ten feet high, form ugly clump-headed bushes, which do great injury to the farmer, and yield nothing to the landlord.

In defence of these practices, it may be said, that fuel alone is the intended produce; but it would be much the best way to allot a space by itself for raising fuel, and devote the hedgerows for the more important purpose of

raising timber. The fuel plantation could be let at so much to the farmer, and the hedgerows would belong exclusively to the proprietor.—Keeping each species of plantation strictly characteristic of its kind, is as beneficial in planting, as the division of labour is in political economy.

There are a great many places in Scotland, and the northern counties of England, where hedgerow timber might be planted, to the great advantage of both landlord and tenant, and the great ornament of the country. Suppose an estate of two thousand acres, divided into fields of ten acres each, and the hedgerows planted with trees at fifteen feet apart; this would be upwards of eight trees upon each acre, or sixteen thousand trees in the hedges only. At the end of thirty years, they would be worth from twenty-five to forty shillings each, say only thirty shillings each, this is *twenty-four thousand pounds*. A very considerable sum for

for a proprietor of only two thousand acres, to receive every thirty years, over and above the annual rent of his estate. The farmer will allow, that the pasture would be worth a higher rent, when thus enclosed and sheltered, than before ; and every traveller would confess the good effect of the trees upon the appearance of the country.

SECTION XV.

OF THE MANAGEMENT OF NEGLECTED PLANTATIONS, WITH A VIEW TO RECLAIM THEM.

I APPREHEND that there are few plantations in this island which will not come under this Section. Many gentlemen, who are very careful in the first formation of plantations, never think of their future management. Some, from erroneous ideas, contend for leaving them afterwards entirely to nature; while others argue, that nothing should be done in the way of thinning or pruning, for a considerable number of years after planting.

planting. Neglect of the fences, and a general carelessness, ruin many others; and not a few are wilfully neglected, from an idea that no return will be made for a great many years after planting. These, and many other causes have contributed to the neglect of almost all the plantations of this island, to the incalculable loss of the proprietors, and the nation in general.

Nor need it appear wonderful that this is the case; for there are so few examples of well-managed plantations, that gentlemen who plant have no proper examples to imitate; and notwithstanding the many valuable treatises on this subject which are already written, and read by many, yet, until the precepts which they contain are exemplified by some individuals, no real improvement can be expected in the general plantations of the country. But when here and there a gentleman, previously to planting, prepares the soil, then inserts the plants judiciously,—en-

closes his plantation,—cultivates, trains and thins it with propriety;—when, in consequence of this, his trees are outgrowing those planted many years before, and yielding more than woods of three times their age—the neighbouring gentlemen take the hint, and adopt the practice—it spreads around, and in a short time it is followed throughout the whole country.

This was precisely the case with farming. The most approved systems of agriculture and rural economy, which are followed at the present day, were long since described by the ancients, and more recently detailed, in publication after publication, by the moderns; but until a few spirited and liberal-minded men set the example, and proved, by their superior crops, the advantages of the new system, nothing was done. But this being now accomplished, good farming is spreading wider and wider,
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and every gentleman, as well as farmer, feels the happy consequences.

In bringing a neglected plantation under proper management, the first thing to be considered is, the kind of plantation which ought to have been made there. Whether an open grove, thick wood, or copse only. It is then to be considered by what means it may be reduced to the proper character, or to which character it can most easily be changed; for cases will often occur, where the requisite character must not be attempted, but that which is already produced must be rendered more characteristic.

In proceeding to accomplish this purpose, all plantations will be found to consist of

Hardwood alone;

Resinous trees alone; or

Hardwood and resinous trees mixed together.

Hardwood,

Hardwood.—If a plantation of hardwood is to be reduced to a *wood* (that is, to timber trees and undergrowth) and the undergrowth is to be used for fuel only, then good trees, of kinds suited to the soil and the probable demand, &c. must be pitched upon, and left as standards; while all the rest are cut over by the surface, that they may become stools for producing undergrowth. The ground should then be dug, trenched or hoed, according to circumstances; though, from the crowded state in which the trees may have previously been, these operations will generally be rendered unnecessary.

But in place of common undergrowth, suppose that of oak was desirable; then, after having fixed upon the proper standards to be retained, all the rest must be grubbed out by the roots, the ground dug or trenched, and acorns planted; and again, when these are grown, they must be kept free from

from weeds, for two or three years, to promote their progress.

Suppose it were desirable to reduce the whole to *copsewood*. If for fuel only, then cut over the whole by the surface; if for bark, root out the whole, reserving all the oaks, and plant with acorns, &c. as before.

Or if it were desirable to reduce a neglected plantation of this kind to a *grove*, then the most suitable trees are to be reserved at proper distances, and the rest grubbed out by the roots: afterwards, the ground should have the necessary degree of cultivation, until the trees can defend themselves from cattle; when the whole may be sown with grass seeds.

Resinous trees.—When an artificial plantation of the fir tribe has remained without thinning for twenty years, the case is frequently desperate: about that age they are generally so overpowered with one another, that

that they stop growing; and whenever one is thinned out, all around it die. The best way is to grub them all out by the roots, and replant, after the soil is properly prepared by summer-fallow, or two or three corn crops.

Natural plantations of resinous trees, under twenty, and artificial ones under ten years old, may most commonly be much improved by thinning. In reclaiming plantations of resinous trees, it is unnecessary to cultivate the soil, as their shade destroys almost every other plant: often, indeed, cultivating the soil becomes hurtful to them, as their roots run so near the surface, that they are liable to be much injured by the operation.

Hardwood and resinous trees mixed together.—Few artificial plantations are entirely void of resinous trees. Here I refer to those where the number is so great, that they cannot be brought under the management

nagement recommended in the first head, and at the same time not sufficient to warrant the management recommended for resinous trees alone. Plantations of this sort can be reduced to the grove kind only; or, if the resinous trees are unequally distributed, to the grove in some places, and the wood in others; the methods of accomplishing which have been already noticed.

Under each of these heads, cases will frequently occur, where the tree or trees which are most profitable in that part of the country are deficient or totally wanting in part, or the whole, of the plantation to be reclaimed. In this case, these parts may be grubbed up and replanted; or, where the whole is to be grubbed up, it may be divided into parts, half the number of which are to be taken up and replanted, and the other half left alternately to shelter them the first two or three years: afterwards, those parts left

left are to be taken up and replanted with young trees also, when they will again be sheltered by those parts first planted.

Draining is an improvement applicable to every kind of neglected plantation that stands in need of it. When it is omitted, every other operation, however well performed, will in the end prove unsuccessful. The damage many plantations suffer for want of draining, particularly all the Royal forests, is incalculable. Many thousands of acres would, by this operation alone, be rendered of twenty times their present value*. As all plantations may be drained by open cuts, the necessary expence is very trifling compared with the drainage of arable grounds.

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* See the Reports of the different counties given in to the Board of Agriculture. The Bishop of Landaff's Observations, &c. The most glaring instance which occurred to me, in the course of my practice, was at Schawpark, near Alloa.

It is almost unnecessary to mention, that in reclaiming neglected plantations, the fences are always supposed to be kept in proper repair, this of itself being often the complete ruin of numberless acres.

Thinning old or neglected plantations should always be performed gradually, and with a due regard to the age and kinds of the trees, the soil, situation, and other circumstances. The margin should generally be left thicker than the inside; and that place where the soil is thin, should not be left so thick of trees as where it is deep and good.

Pruning, also, should go hand in hand with these operations, according to the age and size of the plants, the particular species, and the purpose in view.

It becomes a matter of great importance for those who have neglected plantations, to
 proceed

proceed immediately to reclaim them, ere, by delay, it become less practicable, or too late. Making young plantations is highly commendable, as it tends to provide for posterity an indispensably necessary and highly useful material ; which, perhaps, at a future period, may be hard to purchase in a foreign land. But reclaiming those which are neglected, or improperly managed, would produce more immediate returns to the proprietor, and spare much money to the nation, which is now paid for imported timber.

SECTION XVI.

OF FELLING WOOD.

IN trees, as in men, there are three stages, youth, manhood, and old age. In the period of youth, the growth is rapid; in manhood, that growth is matured; and in old age it begins to decay.

The most profitable season for *felling timber*, is at what may thus be termed the beginning of manhood. After that time, though the tree may appear sound and healthy, its annual increase is so little, that it would be more profitable to cut down and

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replant.

replant. The number of years a tree may stand, before it arrives at this period, must vary in different soils and situations; but the period itself may easily be ascertained—by the annual shoots—the state of the bark—and by taking the circumference of the tree at the same place for two or three successive seasons, and comparing the difference.

In the view of profiting from timber produce, it is of great consequence to cut down plantations at manhood.* Many trees will stand half, others a whole century, after that they are full grown,—appear quite healthy,—and, at the same time, make little or no increase of timber. But there are particular cases, arising from the nature and state of the markets, where it may even be more profitable

* 'It should be in the vigour and perfection of trees (which, for the oak, I take to be about the age of fifty, or betwixt that and sixty years of growth, where the soil is natural) that a felling should be celebrated.'—*Hunter's Evelyn's Sylva*, p. 508.

profitable to cut timber before it is arrived at a full growth.

Undergrowth is always cut in the stage of youth, sooner or later, according to the kind of tree, and the purpose for which it is raised.

It may be difficult to say when timber, which is principally planted for ornament, should be cut down. A tree, when young and fresh, is beautiful; when middle-aged, it is more or less picturesque; when in old age, strikingly so, with a degree of grandeur; and its greatest height of picturesqueness and sublimity is in decay. Hence, if ornament (or expression, which is a better term) were the sole object in view, trees need never be cut down. But most men have a liking for beauty; and, though all may be struck with grandeur or sublimity, few have so much enthusiasm as to sacrifice the profit of valuable timber for the pleasure of enjoying any of these characters.

The *modes of felling timber* ought to be different, according to the kind of the plantation.

In deciduous groves, the trees must be gradually thinned out as they arrive at maturity: if the grove is to be continued, they should be cut over by the surface, and each stool enclosed with a fence, that, being defended from cattle, it may produce a new tree. If it is not to be continued, they should be rooted out at once.

Pine or fir groves, or any fir tree whatever that is felled, should be taken out by the roots at once.

In woods, the undergrowth should be cut over within three or four inches of the surface, reserving always a good sapling to succeed any timber tree which may be cut down.

The proper time and manner of felling timber and undergrowth, are of great importance. 'A timbered estate should frequently be gone over by some person of judgment,

those who have the care and management of timber should studiously endeavour to avoid. But while we thus hold out the disadvantages of suffering timber to stand until it be overgrown, it is far from our intention to recommend, or even countenance, a premature felling. *

There are many very judicious observations made on this subject by the Bishop of Landaff, in the Introduction to the Report of the County of Westmoreland, which merit the particular attention of those who are cultivators of oak timber. 'If profit is considered' (his Lordship says) 'every tree ought to be cut down and sold, when the annual increase in value of the tree by its growth, is less than the annual interest of the money it would sell for. This being admitted, we have only to inquire into the annual increase in the value of oaks of different

* Planting and Rural Ornament, vol. II. p. 98.

ent ages.' After various statements, his Lordship fixes upon thirty shillings each as the price of trees which should be cut down; as, if they be cut before they arrive at that value, or if they be allowed to remain till they will fell for a much higher price, the proprietor of the soil on which they grow will be a loser. He also mentions its being the general opinion 'that it is more profitable to fell oak wood at fifty or sixty years growth, than to let it stand for navy timber to eighty or a hundred, owing to the low price that is now paid for oak trees of large dimensions, either by the Navy Board or the East India Company.' For this reason, he recommends the making a much greater than ordinary increase of price on timber of a large scantling, viz. that 'in place of four or five pounds per load, if they would give eight or nine pounds per load for trees containing each one hundred cubic feet and upwards, every man in the kingdom would

have a reasonable motive for letting his timber stand till it became of a size fit for the use of the navy ; whereas, according to the present established price, it is every man's interest to cut down his trees before they arrive at a proper size to be useful as navy timber.' This points out, in the strongest manner, the necessity of attending to the Royal forests ; for, unless this is done, or such a price given for large timber as his Lordship mentions, it is evident that oak proper for ship-building, which is already very scarce, will be completely exhausted in a very short time. *

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* Modern Agriculture, vol. IV. p. 23.

SECTION XVII.

OF SOME PARTICULAR USES AND PRODUCTS
OF TREES.

‘ALTHOUGH there are many situations in which it is impossible to make any profit of the wood of trees in substance; yet, as many of these yield some other produce of great value independent of that, it is impossible to conceive a situation in which profit may not be made of a plantation of trees, as I hope to be able to demonstrate in the most satisfactory manner. If the wood is of no value, it is still in his power to extract from it *turpentine*, and its *oil*, *rosin*, *tar*, *pitch*, and *lampblack*, which can easily bear the expence
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of transporting. If it is not proper for these, it may be reduced to ashes, and afford that valuable substance called potash. In some situations, charcoal may be of use; and in others, the bark becomes of great value; and sugar may be extracted in abundance from trees which may yet grow in our most barren mountains: nor is it impossible but the Caledonian hills may yield from their trees a wine not inferior to those which the grape affords in warmer climates. * *

Here I might add to these, several other valuable products of trees, as birdlime, galls, &c.; but I beg rather to refer for these, and the various methods of obtaining them, to Du Hamel's *Traité d' Arbres*. Some of those noticed above, however, are very profitable, and may be obtained from trees which, in this country, are generally cultivated. To them, in a most particular manner, I wish
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* Agricola on Timber Trees, p. 134.

to call the attention of proprietors of plantations; and as I have not had much experience in this particular myself, I shall make some extracts from Agricola's Observations on Timber Trees.

Alluding to the rosin and turpentine which may be extracted from the fir tribe, and to the probability that tar also may be obtained from these as well as from the pine, he says, 'But, valuable as the wood of the larch may be, it is not on this account alone that the inhabitants of *Italy* prize it so much. They likewise make use of its bark for tanning leather; and from the body of the tree, while growing, they extract that resinous balsam, commonly known by the name of *Venice turpentine*, which yields them a very considerable revenue. The manner of extracting the turpentine is as follows:

'The whole of the wood of the *larch* tree is richly impregnated with this resinous juice, and, when young, it is almost equally

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ly diffused through all the parts of it; but, as the tree advances in size, there is gradually formed, in the body of the wood, especially near the root of the tree, small cavities, which are filled with this liquid rosin, quite pure, and separate from the wood. As the tree grows bigger, these cavities likewise increase, inasmuch, that when a tree is in full vigour, and of a considerable magnitude, these will sometimes be found about an inch in thickness, three or four in breadth, and as much in height.

‘ These cavities are chiefly met with about five or six inches from the heart of the tree; and it is generally observed, that, in the trunk of a tree about forty feet in length, there will be found about six or seven of these principal reservoirs, and a great number of smaller.

‘ When the trees begin to decline, the cavities contract, and afford but little turpentine; for which reason, the workmen seldom choose a tree that is very young, or ve-

ry old, as neither of these would yield much of this balsam ; but prefer such trees as are of a considerable magnitude, and still in high vigour, before all others.

‘ To extract this resinous juice, (if I may so term it), they bore a hole into each tree in the month of March, piercing very near to the heart of the tree, and making the hole slant a little upwards, to allow the balsam which may be collected in it to flow out more easily. To each of these they fix a small tube of wood, at the end of which they hang a vessel for receiving the rosin, as it flows from the tree. They come to the wood every morning, from the end of May till the end of September, to empty the vessels which are hanging at the tree ; the balsam taken from which they carry home, and keep in proper vessels till the end of the season ; and when they can obtain no more, they strain the whole through a cloth, and put it in proper vessels for sale.

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‘ This is a semifluid balsam, which never hardens in the air, and is commonly sold by the name of Venice turpentine, although it is of an inferior quality to that obtained from the fir tree, which is the only genuine kind. If it is distilled with water, it yields an essential oil, which is likewise called oil of turpentine, although it is also of an inferior quality to that obtained from the fir tree.’

‘ Such is the process for obtaining the turpentine from the larch, the profits arising from which must be very considerable, seeing it is generally computed that a vigorous larch tree will yield seven or eight pounds of turpentine every year for forty or fifty years. * ’

Agricola

* ‘ The usual felling price of this resin, I am told, is about sixpence per pound. But supposing it were only twopence, the annual produce at the above rate would amount to 1s. 4d. or 1s. 6d. per tree: A Scots acre contains 450 trees, at ten feet from one another; at which rate, the annual produce would be 28l. 2s. 6d.’

Agricola afterwards describes the processes for obtaining the true Venice turpentine and Burgundy pitch from the silver and spruce fir. The profits that would arise from the rosin of the spruce, at a very low computation, would amount to 75l. Sterling *per acre per annum*. The turpentine is obtained from the silver fir when 'the tree is about three inches in diameter,' and continues to yield an increasing quantity, 'till it becomes about a foot in diameter; nor is the tree in the least damaged from having its rosin taken from it.'

'From this peculiarity in the manner of yielding its juice (he observes) it would be extremely proper to plant this species of fir tree along with the larix, in those situations where the rosin is a principal object of consideration; because, as these trees yield their rosin when very young, while the larix only affords its balsam at a more advanced age, a considerable profit might be drawn from them

them before the larix was of such a size as to yield any turpentine; and when the larix should advance in size, and require more room, these might be cut out, after they had furnished all the turpentine they could yield.

‘ Thus it appears, that a plantation of these two kinds of trees might be made to turn out to good account, even in situations where the wood could be of little value; and it is more than probable, that either of these kinds of trees would afford tar as well as the pine, although I do not know that ever it has been tried. They likewise afford an excellent charcoal.’

Agricola next shews how the pine tree may be successively made to yield rosin, tar and pitch, lamp-black and charcoal; and concludes with the following sentence:

‘ I have never heard that tar has been extracted either from the fir or larix, although, as I have already observed, from
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the resinous nature of these trees, it seems probable that both of them might be made to afford it in as great quantities as the pine; nor have I been able to learn, whether any of the different kinds of pines are incapable of being made to yield this substance in abundance, and, in particular, whether the Scots fir would be proper for this use or not.*

Should it be found true, that tar may be extracted from the fir as well as the pine, it will be of great importance to many individuals who may wish to plant, but are doubtful of turning the produce to advantage. Those who have plantations of fir trees, of whatever kinds, should try the experiment, and favour the public with the result.

From these extracts, I trust it will appear evident that there is no situation where trees will grow, in which, if proper kinds be chosen, they will not turn out to great advantage.

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* Agricola on Timber Trees, p. 160.

CONCLUSION.

HAVING now thrown out those few hints, I beg to refer such of my readers as may wish for more information on the subject, to the many very good Treatises on Planting which are already published. Something useful will be found in every one of them. Some contain minute practical directions for performing the operations of planting; others treat of the various soils congenial to the different kinds of trees, and the various modes by which they are propagated; others have embraced the subject in a more general way, and treated of both trees and plantations. But it appears to me, (and, I doubt not, it will occur to every one who is in any degree conversant with planters or books on planting), that none have hitherto considered wood, in an ornamental point of view, in connexion with the actual formation and management

management of young plantations; two things so intimately connected, that we do not conceive how they can be separated from each other with propriety. For though a tree is the most beautiful and the most useful of inanimate objects, yet, from ignorance of one or other of these properties, we daily see planters making plantations that hurt the appearance of the country and particular places, or such as will not turn out one-half, frequently not one-fourth, so profitable as they might.

A judicious attention to the preparation of the soil previously to planting, to the culture of the soil, and to training and thinning afterwards, is of more consequence to the prosperity of the plantation, than most men imagine. The progress which trees have made under the management of some gentlemen who have attended to these circumstances, is hardly credible. But there are very few, indeed, who attend to these parti-

culars ; and hence few experience that success which attends proper planting.

Some prepare the soil before planting, and enclose well ; but when this is over, imagine all is done, and pay no attention to training and thinning, though, the more thriving the plantation, the more this operation becomes necessary.

Others plant in rough, uncultivated ground, where many of the trees very soon die ; and the rest, perhaps scarcely alive, remain for a great many years, until at last they overcome the natural rubbish ; and then perhaps some attention is paid to thinning and pruning them ; or perhaps these operations are overdone, and the trees are trained up like so many may-poles, or lopped over as pollards.

Trees and undergrowth, in many places, are cut down before they arrive at a proper size. On the other hand, many gentlemen having formed mistaken ideas respecting the
annual

annual increase of timber in full grown trees; suffer them to remain until they give evident signs of decay; thus losing both the trees, the interest of their value, and the rent of the surface which they stand upon. Now, it deserves particularly to be remarked, that under each of these ways there is something good, or singular, or recommended by some author, that makes them pass for rational management with superficial observers.

The whole direction of plantations is too generally submitted to gardeners and foresters, who, though highly proper in their own place, cannot be expected to have a sufficiently comprehensive view of the subject. Besides, these men are so frequently changed from one place to another, that the one often, unknowingly, undoes or counteracts the labours of his predecessor.

This consideration obliges me to confess,

that though I have written these hints, I am not so sanguine in my expectations of the good which will result from them alone ; but the following mode, or something similar, it appears to me, should be adopted by noblemen and gentlemen with their estates.

Every proprietor who does not completely understand the subject of planting himself, should commit the formation and general management of his plantations to some person of known abilities, who shall give all the leading directions and proper examples respecting planting, cultivating, pruning, thinning the trees, and felling and felling the timber—inspect them occasionally as these operations are going on,—and give in a report of the condition of all the plantations and trees on the estate, and, when necessary, a report of the value of the timber. A person thus employed in different parts of the kingdom, would soon acquire an accurate idea respecting the kind and quantity

city of wood in the country ; by which he could discern the most economical methods and kinds of trees for each particular place, both in respect to the growth of trees and the value of timber. His attention should not be directed merely to the extensive plantations,—he should examine every hedge-row and single tree ; nor should he confine himself to the trees that already exist, but examine every farm—every hedge—every vacant spot, or spare corner,—and observe whether trees might not be planted in some, or all of these, with advantage. A place once fully examined by this inspector, might be managed afterwards with a few visits every year ; and of course his salary would be but a trifling object.

An estate, though there were little more room for wood on it than the hedgerows, would soon be greatly heightened in value by a person of this kind. And if such a general inspector of wood were considered

as essential to an estate as a steward, I am persuaded it would remove bad planting and bad management, and prove of very great advantage to the landed interest and the nation at large.

It may be thought by some, that a common steward is sufficient for these purposes; but this is viewing the subject in a manner very superficially. Few stewards know much about the value of timber; and scarcely any understand the formation and management of plantations. If gentlemen were to be guided by their stewards in every thing, their estates would perhaps cost them little thought; for all would go on easily and apparently very well. But a landed proprietor, alive to his own interest, considers that there are a number of other things from which he may profit, besides the mere rent of arable land. He has an eye to the bowels of the earth for minerals; to his lakes for fisheries; his

his rivers or brooks for driving machinery, and to his hedgerows and barren spots for valuable plantations, &c. ;—and perhaps he has an idea of adding to the extent of his property, by gaining land from the sea. There are men who have confined their studies to one or more of these subjects, each of whom must have acquired a far greater knowledge on the branch which he has chosen to follow, than the most judicious general observer. A wise proprietor will listen to the advice of these men; and he will always find that this leads to the true way of rendering his estate of the highest possible value,



OBSERVATIONS

ON

THE THEORY AND PRACTICE OF LANDSCAPE GARDENING.

INTRODUCTION.

THE present mode of laying out grounds is but of late origin. From the earliest ages until this system was introduced, every thing seems to have been done, in the most formal manner, by straight lines. Lately, the change was made to curves and circles, under the plausible pretext of restoring nature. But, however laudable the intention, formality is not yet destroyed. Squares, octagons
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and parallelograms, are only exchanged for circles, ovals and ellipses. The canal, now no longer straight, is regularly serpentine, but with the same formality and nakedness as before. An estate is not now laid out into avenues, straight ridings, and wilderness work,—but covered with clumps, belts, and serpentine walks. Places in the old style, crossed with dark avenues and long rows of trees, have a degree of simplicity and grandeur, though mixed with formality; but places in the modern taste, from an eternal flow of distinct curve lines, have an appearance of affectation and studied grace, which always creates disgust.

The absurdities of the old style, however, were obvious and striking; and those who made the first deviations from it, deserve praise for having overcome long established prejudices, although they may have placed other narrow prejudices in
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the room of those which they had destroyed. *

The first reformer in this way was Kent. Kent was originally bred a painter; but, from some circumstance or another, turned his attention to gardening, and became a layer out of grounds. His first essay in this capacity was Esher, a small place in Surrey. The beautiful variation of the grounds at this place, with the water and rich distant scenery, made this an excellent subject to work upon; and here Mr Kent boldly deviated from the straight lines of his predecessors. That place, as it remains at present, although formal and distinct, shews he had some knowledge of design and effect; and, considering it as the first innovation upon old absurdities, it might have passed very well, and Mr Kent might have improved in the course of practice. But, what is a most convincing proof of his contracted ideas

* Price.

ideas as a painter, Esther became a model for all his future works. The novelty * of this place, however, attracted general attention at the time ; and every gentleman being eager to have his grounds laid out according to this plan, it is easy to account for the rapid progress of what is called English gardening, which has extended itself so widely in the southern parts of this island, as to have vitiated the taste of many proprietors, and almost to have gained an absolute ascendancy over natural scenery.

But Kent, besides being a mannerist in painting, was also evidently ignorant of the characters, habits, shapes and colours of trees and shrubs ; without which, no painter, in laying out ground, however good his ideas may be in other respects, can produce even
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* The love of novelty, or the love of art, it must always be remembered, are quite different from the love of truth or nature. The former cease to please after a limited time ; the latter please for ever.

the effect which he intends. For the art of creating real landscapes depends not only upon the knowledge of the principles of painting, which indeed is the leading principle, but equally also upon the knowledge of botany, gardening and architecture, as containing the materials with which to work. With a knowledge of the principle alone, any one may judge of effects after they are produced; but without a knowledge of the materials, no man can produce effects agreeable to the principle,—that is, agreeable to truth,—which is nature, the only safe guide in the imitative arts.

The most eminent professor that succeeded Kent, was Brown. He was originally bred a ground-worker. He had no knowledge of pictures or painting, nor, as appears from his works, any relish for natural scenery. What first brought him into reputation, was a large sheet of water* which he made

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* The glare of water, and of white-washed buildings, always pleases the vulgar taste.

at Stowe, in which, as in all his other works, he has displayed the most wretched and chinese-like taste. Wherever his levelling hand has appeared, adieu to every natural beauty!—see every thing give way to one uniform system of smoothing, levelling and clumping, productive of the most tiresome monotony, joined to the most disgusting formality.

Brown, however, from his extensive practice, carried every thing before him, and completely established his system, which has been held sacred by his disciples ever since; and to shew that it is the most prevalent taste, it is only necessary to mention, that Mr Repton, the most eminent professor of the present day, in his book (published 1803) declares himself a follower of Brown.

Other professors of inferior note, who follow Brown's system, I pass over, to make some observations on the art itself.

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ALL imitative arts set out, as it were, in a manner as much distinguished from the common appearances of things as possible. They are admired for their novelty, and as works of art; and it is not until these have lost their power of pleasing, that men have recourse to the purity and simplicity of nature, which pleases from qualities that never grow out of fashion. Such has been the case with painting and ornamental gardening. Painting now imitates nature. Gardening has made advances to this; but I think it may be said, it is as far distant from nature as Chinese representations are from Italian or English landscapes.

Lord Bacon says, ' that when ages grow to civility and elegance, men come to build stately, sooner than to garden finely, as if gardening were the greater perfection; '*

O 2

alluding

* Essay on Gardens.

alluding to the progress of these arts both in the Grecian and Roman commonwealths. But it need not appear wonderful that gardening is behind both architecture and painting.

A building can generally be completed in a few years ; and, that instant, it is in its greatest perfection. A painting can be finished in a few hours, or at most in a few days, and is equally perfect in its kind, the moment it comes from the hands of the painter ;—while both the building and the picture remain as models for future artists to improve upon or copy after. But in gardening it is totally different.

To lay out and plant an ornamental garden (or a place) is an operation of difficulty, and considerable time ; and those who have done so, seldom or never have lived to see their labours arrive at maturity, and, of course, have no opportunity of correcting errors, or supplying deficiencies. That instant, too, in which it arrives at maturity, it begins

begins to decay, or change its appearance ; so that, in this art, it is difficult to profit even from the experience of others.

Besides these, there are many other causes which operate against gardening, in favour of the other two arts. Gardening is a greater luxury than either fine pictures or fine houses ; the latter of which have been long necessary, and very naturally lead to the former. An elegant house, well furnished, is complete of itself, and, as such, exists in the possession of thousands who have no place nor opportunity, nor indeed could be at the expence of an ornamental garden.

Mr Price, in his *Essays on the Picturesque*, has shown, that if the men who were generally employed to lay out places had been acquainted with the principles of painting, (which apply to the composition and arrangement of all visible objects), they would have found few disadvantages arising from

these circumstances: and, it is plain, had this been the case, landscape gardening would, long ere now, have been equally perfect with painting; and undoubtedly its productions would have been much more admired than those of that art.—Mr Price's admirable *Essays on the Picturesque*, and Mr Knight's most excellent poem, *the Landscape*, point out the distinguishing errors of the present system of laying out grounds, and contain the best ideas that can be imagined for those who practise this art. Modern professors, indeed, have endeavoured, in some publications, to confute the reasoning of these gentlemen; but their ineffectual attempts had only the happy effect of rousing the attention of the landed interest to see the absurdity of Brown's whimsical system.

I believe that I am the first who has set out as a landscape gardener, professing to follow

follow Mr Price's principles. How far I shall succeed in executing my plans, and introducing more of the picturesque into improved places, time alone must determine.

I must observe here, however, that I am not so much prepossessed in favour of Mr Price's *Essays*, and Mr Knight's poem, as to imagine that there are no other books which can give information on the subject; or that no place has hitherto been well laid out; or, that the picturesque is to be admitted about the environs of a mansion, to the exclusion of every other species of beauty. On the contrary, I fully coincide with Mr G. Mason's *Essay on Design*, and Shenstone's *Remarks*;—almost entirely with Mason's *English Garden*, and R. Le Girardin's *Landscape and Village Memoirs*. I admire the imitation of nature at the Leafowes *—the creative genius display-
at Painshill †—the correct fancy of the
O 4 scenery

* Shropshire.

† Surrey.

scenery at Hagley*—the woods of Stoke †
—at Wroxton ‡—and in the Valley of Bad-
minton §—although I see glaring errors at
all these places.

‘ Nature’s favourite haunts are the school
of gardening.’ She appears in ‘ *sublimest
rudeness* ’ upon the mountains of Scotland
and Wales. ‘ Her *milder train of Graces* ’
disperse themselves along the banks of rivers,
and around the lakes. Her ‘ *majestic retire-
ments* ’ are situated on the streams of Dove
and Derwent,—in the vale of Hackness, ¶ and
in the groves of Eastwell ¶¶. She assumes on
‘ Richmond Brow,’ or Cowpershill, ** ‘ a
gayer and a *softer* dignity,—making every
sprightly work of art serve for her embel-
lishment.’

‘ But

* Worcesterhire.

† Near Bristol.

‡ Earl of Guilford’s.

§ Duke of Beaufort’s.

¶ Near Scarborough.

¶¶ In Kent.

** In Surrey, where I had the honour of laying
out Kingwoodlodge, a celebrated place, the property
of G. Bickerdike Esq. formerly belonging to Denham
the poet.

‘ But from a general view of our present gardens in populous districts, a foreigner might imagine they were calculated for a race of Lilliputians. Are their shades in any degree proportionable to common mortals? By the turns of their winding walks, one should take them to be the footsteps of some reeling drunkard. Such are the symptoms of a sect of whimsicals, which seem to have been continually increasing under repeated literary persecutions. The undistinguishing herd, in a region of elegance, will always be awkwardly imitating, or attempting to excel what they cannot help admiring; whilst nations that are but partially civilized do little injury to the face of rural nature. Neglect of order, not premeditated design, makes Turkish gardens irregular. As arts increase, they come to be misapplied to the supposed decoration of natural scenery, till correcter taste discovers a display of art to be there inadmissible. Thus, finally resorting

referring to nature's standard, is a proof of the height of civility.' *

Nature is the great schoolmaster and storehouse of the landscape gardener. He ought to look around upon all her works with a penetrating eye, and a capacious mind; compare her various forms with each other; mark their defects and excellences; and, from this wide survey, acquire a correct taste, and an ample supply of ideas suited to every case that can possibly occur in the course of his practice.

THE

* Mason on Design, p. 105.

THE THEORY AND PRACTICE OF LANDSCAPE GARDENING.

THIS subject may be treated under the following heads:

1. The principles of landscape gardening, which include *utility*,* and the general *principles of painting*.

2. The *materials* of landscape gardening, as *ground, wood, plants, lawn, water, rocks and buildings*.

3.

* Real landscapes, may be created from the principles of painting, and a knowledge of the materials alone. But a knowledge of *utility* is equally necessary for the landscape gardener or layer out of grounds, who, in all his operations, must unite *convenience* with *beauty*.

3. The *subjects* of landscape gardening, such as the *palace*, the *villa*, the *mansion*, the *cottage*, &c. as general subjects ; and the *flower-garden*, the *shrubbery*, the *approach*, &c. as *particular* parts, or scenes.

To enter at length on the two first heads, would be foreign to the nature of this volume, and is the less necessary, as there are many excellent observations on the subject contained in Mr Price's *Essays*, Mr Knight's *Poem*, Maſon's *Essay on Deſign*, Maſon's *Engliſh Garden*, Abbé de Lifle's *Poem*, Whatley's *Observations*, Mr Gilpin's writings, and ſeveral other works.

The nature and uſe of *Character*, and the different *subjects* of landscape gardening, have been leſs touched upon than the other heads by moſt writers. Theſe parts of the ſubject appear to me not well underſtood by practical men ; and, as they contain the eſſence

fence of both the theory and practice of the art, I am induced to make the following remarks.

ON CHARACTER.

UNITY of character is the fundamental principle of nature, and of the most exquisite productions of art. In every scene where the attention is divided, there is an end to all interest: it is like putting several pictures on the same canvas, or discordant representations on the same theatre.

All the objects in a picture should tend to the particular character, or expression, of that picture. All the parts belonging to a place should have a similar relation to the whole, and, in each part, the objects which enter into its composition should agree in expression. Thus will all the separate scenes please

please of themselves, and, by their connexion and concord, contribute to the general effect and harmony of the landscape.

Different characters or effects should not only be preserved distinct; but they should also be strongly impressed. A man or woman may be very handsome, and at the same time little better than a statue;—want of animation or expression is the most disagreeable thing in the human countenance.

In like manner, in scenery, there may be an assemblage of forms and tints, which, though they do not disagree, are perfectly insipid: they may be looked on without raising any degree of emotion; and, whenever we see a human figure, or a scene that does not powerfully strike us at the first glance, we may pronounce them featureless and void of expression. In vain our eyes wander over such scenes or objects in quest of something to satisfy and please. It belongs to expression alone to fix and detain the
the

the eye, arrest the attention, and captivate the soul.

Of all the knowledge necessary for a landscape gardener, or a creator of landscapes, that of *character* is the most important: it is the leading guide which should direct him in every operation in the management of natural or artificial scenery. With this knowledge, the slightest operations will produce the most enchanting effects; but, without it, every thing goes on with immense labour and difficulty,—consequently is attended with much unnecessary expence,—and the result, after all, will be incongruity. It is plain, however, that most of those who follow the profession of laying out grounds, have no conception of this kind of knowledge;—nor do they need it, according to their system: for Mr Brown ‘ has so fixed and determined the forms and lines of clumps, belts, and serpentine canals; and has been so steadily imitated by his followers, that had the improvers
been

been incorporated, their common feel, with a clump, a belt, and a piece of made water, would have fully expressed the whole of their science, and have served for a model as well as a seal. ' *

Landscape gardening professes to heighten characters already more or less impressed by nature;—to change *natural* characters into others;—to create *original, imitative, and emblematical* characters.

In proceeding to make some remarks on these heads, it is necessary to observe, that there are five natural characters, independent of all others, which are universal throughout this globe, and to one or other of which may be referred every other *character, scene* or *object* in nature, or the works of art.

These

* Price's Essays, vol. I. p. 264.

These are, *sublimity, picturesqueness, beauty, ugliness* and *deformity*.

As this arrangement of the effects of visible objects will be new to some, I shall just take notice of the principles which produce each of these characters:

1. The *sublime* astonishes; or suspends the senses. It is founded on principles of awe and terror, which, in visible objects, are produced principally by greatness of dimension and obscurity. Perpendicular rocks of great height—immense mountains—deep chasms—the boundless ocean,—are all powerfully sublime, from greatness of dimension. The sublime arises from obscurity, when ‘thunders roar,’ and clouds begin

‘*To darken all the bill, and smoke to roll.*’ In gardening, it is impossible to create this character; but, where it already exists, we
 P may

may often heighten, and always lower its effects.

2. The *beautiful* is a pleasing quality. It is founded on the principles of repose, produced by smoothness, softness, freshness, and gradual variation. A better idea of beauty cannot be given, than that captivating object—the most enchanting which the eye of man can possibly behold—that which instantly presents itself to the imagination when beauty is mentioned—that, in comparison of which, all other beauty is dull and insipid—the face of a beautiful young woman.

Beauty, however, is seldom or never alone, but is generally more or less accompanied with the picturesque, which is always necessary to preserve it from dulness and insipidity. Even in the fascinating face of a beautiful woman, where nature (as Mr Price says) may be said to have fixed the throne of beauty, we find the line of the nose and forehead

forehead nearly straight, which gives a zest to all the other flowing lines of the face : while the eyebrows and the eyelashes, by their projecting shade over the shining surface of the eye, and especially the hair, by its roughness and intricate concealments, relieve, and give spirit to the fresh softness, clearness, and repose of all the rest.

The beautiful in grounds ought always to be mixed in a similar manner with the picturesque,—as where soft, smooth, gentle undulations are intercepted and relieved by level places, or hanging slopes, (as the flowing lines of the face are set off by the right line of the nose and forehead), and the whole varied with groups of trees, shrubs and flowers, which will give intricacy, spirit and effect similar to the hair, eyebrows, and eyelashes. But when, in place of varied groups,—clumps and patches are stuck on a beautiful lawn or park, their formal, compact, lumpish appearance, is totally destitute

of variety and intricacy—they are deformities the most hideous that can be imagined—worse even than large warts or pimples on a beautiful female face.

3. The *picturesque* is another pleasing quality, founded upon the principle of irritation, which is produced by roughness and sudden variation, joined with irregularity. This is the most *general* character in nature. It is often mixed with the others, and particularly with beauty. Almost all objects, as they approach to age and decay, are picturesque—all irregular buildings and ground—all rivers, aged animals, &c. The picturesque is mixed with the sublime, as in a raging sea; with the beautiful, as in the human countenance; or in most scenes composed of trees and smooth lawn, or still water, &c.

*‘ Ce qui plait sans règle et sans art,
Sans airs, sans apprêts, sans grimaces,
Sans gêne, et comme par hazard,
Est l'ouvrage charmant des Graces.*

‘ Such is picturesque beauty—the beauty of preeminence ; because it is the beauty of the Graces—because it is animated, and gives motion, character and expression to the physiognomy of all objects. This it is which is designed by the man of genius, and adored by the man of feeling. ’ *

4. *Ugliness* may be called a quality that produces infipidity, or a slight degree of disgust. It arises from a want of form, or an unshapen, lumpish appearance, such as ground which has neither the beauty of smoothness, fresh verdure, and gradual variation, nor the picturesque-ness of bold and sudden breaks,

P 3 and

* R. L. Girardin.

and varied tints of soil,—as a rough ploughed field turning to sward, or what are called pig-backed hills.—Convex surfaces of ground are generally more ugly than concave ones.

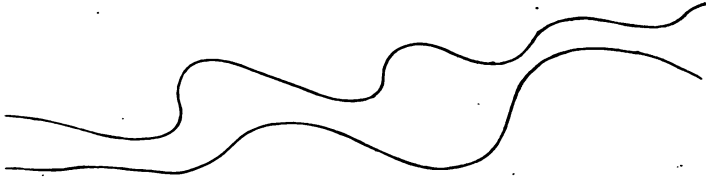
5. *Deformity*, as opposed to beauty, is productive of disgust. It is produced by unconnected, mishapen protuberances, or similar hollows on the surface of objects, as naked quarries, or gravel pits, &c. Deformity is to ugliness, what picturesqueness is to beauty; it heightens its effect: and hence, an ugly object, which is simply disagreeable, when deformed, becomes hideously disgusting.

To illustrate these two characters, and their connexion with the three former, let us suppose ‘an artist to model, in any soft material, a head from the Venus or the Apollo; and then, by way of experiment, to make the nose longer or sharper, rising more suddenly towards the middle, or strongly aquiline—



OUTLINES OF GROUND

Beautiful



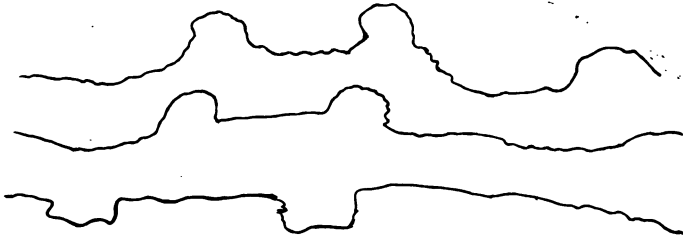
Picturesque



Ugly



Deformed



J. Loudon Del.

F. Lamb Sculp.

quiline :—Were he to give a striking projection to the eyebrow, or to break the outline of the face into angles—though he would destroy beauty, yet he might create character ;—and something grand or picturesque might be produced by such a trial. But let him take the contrary method ;—let him clog and fill up all those nicely-marked variations, of whose happy union and connexion beauty is the result—ugliness, and that only, must be the consequence. Were he afterwards to place warts or carbuncles on the nose, or any other unnatural wens and excrescences on the face ; were he to twist the mouth, or make the nose awry, or of an enormous size,—he would then add deformity to ugliness. ’ *

In all scenes or objects that are pleasing, some of these three characters will prevail ; and, in all others, the two last are intermixed in a greater or less degree. .

* Price's Essays, vol. I. p. 206.

CHARACTERS,

already more or less impressed by nature, are heightened by *adding* or *taking away*. Places abounding with too much wood, are principally those that can be improved by the latter method : Such as have too little, as is generally the case, are those which can be improved by *adding*—in which indeed the great art of improvement consists ; for we can seldom remove any quantity of the other materials of landscape. The modes applicable to both cases will be easily understood by the following observations.

 ON HEIGHTENING NATURAL CHARACTERS.

I. Suppose a place by nature grand or sublime. This estate is very extensive. The surface of the ground does not consist so much of undulations or abruptnesses, as of large

large plains, broad swells, and wide vallies. It is bounded, on one side, by a range of immense mountains ; and, on the other, by the ocean.

Every natural feature here being great, the operations of art must be great also. The principal materials for improving this estate, are wood and buildings. Near the centre let a palace or castle be built, of large dimensions, with an extensive front looking towards the sea. Plant the wood, not in small groups and single trees, but in massy thickets and dark forests,—not bounded by a line of insipid curves, but by bold projections, and deep angular recesses, forming large bays and prominences, or long straight lines. The predominant trees about this place must not be larch, ash, or willow, but the more noble oak, elm, and pine. While some of the mountains, partly bare, shew immense perpendicular rocks towering almost to their summits ; let others be totally clothed

clothed with wood, and, throughout the whole range, as far as may be practicable, let ' hill be united to hill with sweeping train of forest, and prodigality of shade.'

To correspond with these general features, every part, as the *lodges, approach, pleasure-ground, gardens, &c. &c.* must have a greatness of manner and dimension corresponding to the general character of the whole. Thus:

At the extremity of the estate, on the side of the highway, let two lodges be placed, of a considerable size, and at a proper distance from each other. Let the gate betwixt them be of ample magnitude; and from thence let a broad road or approach proceed, in great irregular sweeps, sometimes through forest scenery, and at other times through open park or pasture, until, at last, it begins to ascend from the valley, and, bursting from a thicket, the castle itself appears to view in the noblest perspective.

2. Suppose a place, the natural character of which is chiefly *beauty*.

This estate, not very large, is situated on a gentle eminence, sloping with gentle undulations towards the south. The surface in general is soft, smooth, beautifully waved, and clothed with a carpet of the freshest verdure. It is surrounded by a country abounding in little hills and lakes;—the former varied by pasture, cattle, corn-fields and villages; and the latter by islands and fishing-boats.

The natural character of this place, then, is beauty, in the proper sense of the word; that is, beauty with the least mixture of picturesqueness. It is to be improved by the addition of wood, to give intricacy; and with beautiful buildings, for character, ornament or utility.

Upon a convenient swell, backed by a little hill, build an elegant Grecian villa. Clothe the hill behind it with wood, and vary the park with light and airy groups of
ash,

though this estate should be covered principally with wood in rough thickets, groups and masses, yet the rocks, varied in colour and form, will be seen raising their heads on the sides of the wooded hills, and on the banks of the water courses; and the broken surface of the ground will shew the different tints of earth, overhung by various wild plants and ferns,—while deer, goats, wild horses and asses, will be seen fauntering in the woods, skulking among the thickets and bushes, or grazing in the winding glades of pasture.

Through one of the wooded dells carry a rough road, winding from side to side, and crossing the brook in various ways, and let it ascend to a plain-looking Gothic mansion.*

Though the general appearance of the whole should be picturesque, yet in the
pleasure-

* Rather a plain mansion, in order that the eye may find relief from the multiplicity of separate parts which meet it almost every where through this place.

wherein beauty shall be the prevailing emotion.

3. Suppose a place, the natural character of which is the *picturesque*.

This estate does not appear of a large size. It is situated partly in a hollow, and partly on the surrounding mountains, which are greatly diversified in shape and appearance. It is interspersed in many places by rivulets, which run down the sides of the mountains in hollow dells and dingles to a considerable river, which winds with many a crook and turn through the lowest part of the grounds. From the irregularity of the surface, the rocks, stones, and diversity of soil, the whole estate assumes the most picturesque appearance, even with the little wood naturally there; and it is easy to conceive that this may be made a most romantic and singularly delightful place, by following out that which nature has begun. But
though

and the more solitary the scene—the further removed from interruption—the more interesting will be the effect, and the stronger and deeper the impression upon our minds.

‘ Poetry and painting are the offspring of these impressions. Those who felt strongly, wished to describe what they felt. In situations like these, pastoral lays the scene of man’s first happiness, and paints, in affecting colours, the true pleasures of simple life. Whenever we meet with any happy spot, where art has not yet penetrated, we are delighted to find those scenes realized which have given us so much pleasure in the description. All the attributes of such a spot, which poetry has rendered sacred, immediately recur to our memory. Inscriptions on the bark of ancient oaks ;—urns in the wood ;—in the consecrated grove, a rustic temple ;—in the orchard, under the shade of fruit trees, a neat cottage ;—groups of cattle feeding in the meadows ;—the chorus of the
shepherds

shepherds, assembled round the living spring, while every maid of the village becomes a wood nymph.

‘ Such is poetical landscape, whether exhibited to our view by nature in some favoured spot, which has escaped the general destruction, or created anew by the hand of taste.

‘ But if picturesque beauty gives pleasure to the eyes; if a poetical scene interests, by bringing before us the happy pictures of Arcadia; and if it is in the power of the painter or poet to produce these—some situations there are, which nature only can give, and which I will call the ROMANTIC.

‘ In the midst of all the great objects and wonderful effects of nature, this sort of country contains all the beauty of picture, and all the charm of poetry. It is neither severe nor grotesque, but peaceful and solitary; so that nothing divides our attention.

Q. or

or interrupts that calm and delightful sentiment which penetrates the heart.

‘ Through dark pines and ample theatres of rock, the clear stream descends by different falls into the quiet vale, and, spreading, forms a lake amidst the surrounding cliffs, between whose openings stupendous mountains are discovered in the distance, the summits of which, covered with eternal snows and ice, seen from afar, resemble masses of agate and alabaster—by which all the colours of light are reflected as in a prism.

The water, of celestial blue, and transparent as the purest crystal, shows all the sportive play of the trout, upon its bed of various-coloured marble. An island rises in the midst of it, the scene of rural pleasures.

‘ Diversified by vineyards and meadows, and wood of various growth, this delightful spot affords a multitude of agreeable recesses. The cattle crop the leaves of the strawberry, which reddens the banks; and happy couples, whom

whom no interested views united, sit upon the soft grass, surrounded by their children. The light of the pale moon shews the distant undulations of the water. Its glassy surface is divided by a light bark, which brings the daughters of the neighbouring cottage. A white bodice marks their well-proportioned shape; long tresses float upon their shoulders; a little hat of straw, decorated with fresh flowers, makes the only ornament of their smiling countenances. Resplendent with health, and serene with innocence, their sonorous voices are only formed by natural harmony, and they have no teachers but the birds. The echoes, which never knew the jargon of chromatic music, repeat only light airs of cheerfulness, the voice of nature, or the simple sounds of the harp-boy.

‘ Quitting the lake, the river pierces into a deep and narrow vale. High mountains and frowning rocks seem to separate

this retreat from the rest of the universe. On their craggy tops, covered with fir, the rude axe was never heard. White goats bound from rock to rock upon beds of thyme and marjoram. Their fearless ease in this sequestered spot gives a sort of security to man, and takes off the idea of total solitude, by making him expect to find some peaceful dwelling not far distant.

After some rapid falls, occasioned by the rocks which cross each other, and oppose its passage, the river at length finds, in this narrow vale, a small space in which its disturbed and foaming water dilates, and flows calmly on. The gently rising shore is covered with a wood of rising oaks, under whose mysterious shade is spread a carpet of finest moss. The clear stream, flowing among the twisted roots, and over beds of various-coloured sand, invites to bathe. Wholesome herbs, aromatic plants, and the odoriferous gums of the pine, perfume the
air

air with balsamic vapours, which refresh the lungs. At the end of this grove of oaks, through an orchard where the trees are loaded with fruit, and interwoven with the vine, appears a cottage. Under the far projecting roof, are arranged all the simple utensils of the family. Planks of fir, put together by the cottager, compose the building; a trellis forms the peristyle and portico, instead of architectural columns; and the interior neatness surpasses that of a palace. If the food is not seasoned with the poisons of the East, the quality of it is excellent, and the taste wholesome and pure. Love discovered this retreat, and Happiness dwells in it.

‘ In such situations as these, all the force of that analogy is felt which subsists between physical and moral impressions. Here the mind wanders with pleasure, and indulges those fond reveries which become necessary to such as are open to soft affections, and

know the just value of things. We wish to dwell in these scenes for ever; for here we feel all the truth and energy of nature.

‘ This is nearly the style of romantic situations; but very few of this sort are to be found, except in the bosom of those immense ramparts, which seem intended by nature as the last asylum of peace and liberty.’ *

ON CHANGING NATURAL CHARACTERS.

So much with respect to the heightening of natural characters. Those which require to be *changed*, are chiefly such as are productive of disgust, as scenes of *ugliness* and *deformity*, or in cases where any of the other natural characters do not agree with that which is to be created.

OF

* R. L. Gerardin. Viscount D’Ermeonville’s Essay on Landscape, p. 147.

OF CHANGING SUCH CHARACTERS AS ARE
PRODUCTIVE OF DISGUST.

1. Suppose a place naturally ugly, that is, what the beautiful place formerly mentioned would be, if all those 'nicely marked variations, of whose happy union and connexion beauty is the result,' were clogged and filled up—the pasture rough—the surrounding country naked or moory, and destitute of trees and water, &c.

The most complete improvement here with the grounds, would be, to restore its gentle undulations, and reproduce beauty:—or, if the ugliness were so great as to make this too expensive—by breaks and abruptnesses, the character of picturesqueness might be produced, and the place may then be planted and laid out accordingly.

2. Suppose a place naturally ugly or deformed ; that is, an ugly place covered with unshapen bumps of earth, or interspersed with naked quarries and gravel-pits—such a subject as this is much easier improved than one simply ugly, because it is more easily reduced to picturesqueness of the most interesting kind, either by breaking the ground, or simply planting groups and thickets more or less upon and around the bumps and holes ; the broken earths and stones of which, and the water, &c. in the pits and quarries, would form singularly picturesque scenes of themselves, while they were totally concealed from the general view. Beauty might also be produced in such a place as this, by levelling down the bumps, and filling up the quarries and gravel-pits with attention to the proper principles of this character.

It is of great importance to the landscape gardener to know how to improve ugliness

or

or deformity; for though a place wholly ugly or deformed may seldom occur, yet more or less of these qualities exist almost every where, and they may generally be changed into beauties with little trouble or expence. A very few cartfuls of earth will turn a considerable extent of the most beautiful surface into an ugly one, by distributing it in the concavities; and, *vice versa*, a very few cartfuls taken from the concavities of an ugly place, and judiciously spread upon the eminences or convexities, will restore beauty. Ground-workers, who are ignorant of this, never fail, in removing earth, to spread it in the hollows; or, if they have no hollows to fill up, nor undulations to round off (as they term it) their next step is to lay it down in heaps here and there, and form these into little round bumps, which are the most disgusting kind of deformities. When these bumps are *large*, they stick on a
clump

clump on the top of each ; when small, they plant a single tree.

OF CHANGING SUCH NATURAL CHARACTERS
AS DO NOT AGREE WITH THAT WHICH
IS TO BE CREATED.

BUT there may be cases, where the grounds are neither ugly nor deformed, and, at the same time, the natural character must be changed.

Thus, a gentleman may purchase a few acres of ground on the sea-shore, and the natural character of this situation would be sublimity. Here he wishes to build a house ; but it would be absurd to erect one that would have pretensions to grandeur. An extensive plain, which is surrounded by high mountains, is a suitable situation for a building of grandeur ; but it will frequently happen

pen that no other edifice exists there but a farm-house.

On the other hand, a wealthy nobleman may wish to build a palace or castle on grounds that have naturally little grandeur. In such cases as these, the great art is to combine the character to be created with the natural character of the grounds, so as the former may become predominant.

Wherever trees will grow, this can generally be accomplished with no great difficulty ; but, where the soil or the situation are unfavourable to these, the natural character of the ground or surrounding scenery will be impressed upon the building or work of art.

Thus, a cottage on the brink of an immense precipice, or a farm-house on the margin of the ocean, partake of the sublimity of these scenes ; * But, even in these situations,

* But the ocean and the farm-house, or the cottage and the precipice, are far from being so powerfully sublime as an immense ruin of a castle would be in either of the situations.

situations, should every other object be shut out with trees, and the cottage or farm-house viewed by itself in this reclusé scene, their original characters would be fully preserved, although, in the general view of the country, the mass of wood on the precipice containing a cottage, and the thicket by the sea-shore containing a farm-house, would naturally, as before, be impressed with the character of sublimity.

But though the scenery of nature may confer upon artificial objects a character different from that which they naturally possess, yet when this is attempted by art, it often produces incongruity, and is sometimes disgusting. Thus, an attempt to ornament a cottage, by loading it with architectural decorations, destroys its simplicity, without raising its character. An extensive palace, upon a knoll little larger than the base of the building, appears totally misplaced ;

placed ; and a stable with a fine Doric portico, though at a distance it may appear a Grecian temple, yet, when we approach it, and discern the deception, it never fails to excite disgust.

This, however, does not preclude every idea of character or ornament, nor does it suppose that the stables of a nobleman are to assume the same appearance as those of his tenants : On the contrary, they may at all times be upon a larger scale, and finished with better materials ; and this alone will give them a degree of solidity and grandeur superior to the others :—or in many situations, perhaps, they may assume, with propriety, and a good effect, the character of ruins or Gothic buildings.

The principles which produce the leading characters being properly understood, the modes of changing them into others, naturally presents itself.

Thus, in a small place, the ground of which is naturally grand, the wood and
buildings

buildings can be put on in a light and airy manner. In a place naturally beautiful or picturesque, the wood can be put on in extensive forests, dark thickets, and broad masses; the buildings can be made of large dimensions; and all the other operations of art may so correspond, as to overcome the natural character, and make grandeur or magnificence the prevailing emotion.

These five qualities, *sublimity, picturesqueness, beauty, ugliness* and *deformity*, as I have already mentioned, are the grand leading expressions that abound throughout all nature. Although often, indeed, they are mixed in such an infinite variety of ways, that in some scenes it is difficult to say which prevails.

This circumstance, along with some others, has given rise to a number of other characters nearly as general as the former, which the operations of art can also heighten or destroy. Thus:

A certain degree of sublimity, accompanied with beauty, constitutes what is called *grandeur*; and a degree of picturesqueness, added to this, constitutes *magnificence*.— Where most of the materials of a scene are beautiful, with some degree of picturesqueness, as hay-ricks in a soft lawn, which is grouped with young limes, ashes and willows, it is called (by the French at least *) a *soft scene*.

Another degree of picturesqueness and beauty, as a rocky or stony scene upon a mountain, the top of which is perpetually covered with snow, is called a *severe scene*. One where the parts are few, as a cottage in the corner of a field, with few appendages or accompaniments, is called a *simple scene*; and so there are a great many others, as *cheerful, tranquil, solitary, wild, peaceful, verdant, rural, rustic, romantic, &c.*

There

* R. L. Gerardin.

There are also characters created by art, which may be intermingled with the former. Thus, a mansion may be placed in a *peaceful*, a *verdant*, or a *romantic* scene; and this mansion may be either a winter—or summer—or a principal residence, and assume the appearance of a palace, a castle, a cottage, &c.

According to the nature and purpose of the mansion, the rest of the place must be laid out. Thus:

In a principal residence, there should be scenes suited for every season of the year. In the pleasure-ground, there should be winter, spring, summer, and autumn gardens; and, throughout the rest of the place, as many pleasing scenes should be introduced as can be done consistently with its extent, &c.

In a summer residence, those scenes which are in perfection in the winter or spring months are rendered necessary; but the
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the others must be more abundant, and characteristic of the season.

LET any one contrast the foregoing observations with the practice of modern landscape gardeners. Whatever be the nature of the place to be improved, their operations are uniformly the same. The *ground*, in all the places mentioned, would without any distinction be cleared, levelled, and reduced to one uniform flow of surface,—fashioned

———‘ *all to one unvaried round,*

One even round that ever gently flows.’

In a word, such a heavy, featureless surface, as would be denominated ugly by any eye of the least natural taste.

The *water*, too, would be divested of every picturesque circumstance. The sides of the dells, the banks of the rivers or lakes, would be deprived of every tree and bush—

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levelled

levelled down and reduced to uniform, distinct serpentine sweeps, until they were brought as near to the appearance of a made canal as possible: and if any canal or pond was to be made from any spring or rill, it would be placed in the most conspicuous situation, formal, naked and glaring, like a long white sheet of linen extended on a bleaching green.

The savage grandeur of the *rocks* would be tamed—the most prominent abruptnesses or antiquated mossy spots would be pared off. If any bushes or roots hung over, they would be cut down; and afterwards, any intricate recesses that might remain, would be patched up with stones or turf, and all around would be made smooth and even. *

The *wood*, also, would be put on in a similar manner in each of the places. To
mark

* This I actually saw done in Perthshire two years ago. See also an instance in Price's *Essays*, vol. II. p. 228.

mark the property, and shut out the adjoining estate, a belt would form a boundary to the whole. Within this, the park would be spotted over with clumps, and dotted with single trees. Around, or on each side the mansion, the pleasure-ground would be made—the boundary a sunk fence—its contents, circular and oval patches of all sorts of shrubs—and, through among these, a deep-sunk serpentine gravel walk would lead you to the riding in this belt, where you must walk once round to see the temples and vistas, and then you have done.

From these operations, it is easy to see there can be no beautiful combinations, nor any marked expressions about such improved places. All of them, whatever be their natural character, are brought as near as possible to the standard which passes under the name of *English gardening*.

OF ORIGINAL, IMITATIVE, AND EMBLEMATICAL CHARACTERS.

THESE apply more to particular scenes or objects, than to whole estates or places.

The ORIGINAL are such as do not exist in nature, but which are designed by art, as *gardens, shrubberies, edifices, &c.*

The IMITATIVE include such as are copied from nature, as *water, lawn, dells, rocks, &c.*

The EMBLEMATICAL comprise such as, from *statues, urns or inscriptions*, allude to some well known subject in history or poetry.

GARDENS

may be divided into two kinds, ORNAMENTAL and USEFUL.

In *ornamental* gardens of every kind, the soil and situation should be good, and the surface of the ground beautifully varied. Their extent must be in proportion to the place they belong to. In general, they need not be large. In almost every kind, a few trees and shrubs should be introduced, to remove from the general view the appearance of insipidity, and to break it into separate scenes, one of which alone should be seen at a time, that the eye in going along may be induced to examine or admire the minute beauties of single objects.

It may be necessary to observe here, that in ornamental gardens, shrubberies, greenhouses,

houses, groups of flowers, &c. the same principles of arrangement that we find in natural forests should (in my opinion) be carefully followed; one kind being always made to prevail in one place, (as mentioned in Section IV. of the Observations on Planting.) The grouping—the harmony of forms—of tints, &c. should be attended to exactly in the same manner. The whole flower-garden or greenhouse should be arranged as near as possible to a *systema naturæ*—all the species of a genus connected together, not in a formal, distinct manner, but with a careless, natural appearance:—the extreme species of one genus gliding insensibly into those of the next, and these again partially intermingled with the succeeding, so that connexion and harmony may abound throughout the whole.

It is almost impossible to conceive the variety and interest that would be created by this mode of arrangement. If adopted
 even

even in the small extent of a greenhouse, it would render this scene as superior to its present appearance, as a beautiful picture is superior to a piece of canvass spotted at random with all the colours of the palette.

I may notice here, too, that those disgusting lines of separation at the edges of walks, and around groups and dug patches of flowers or shrubs, which abound so much every where, should be done away; the gravel of the walk, and the earth of the dug patches or groups ought to be kept on a level with the grass on the lawn; and both should blend and harmonize, and, in a natural, easy manner, glide insensibly into each other. *

Flower-gardens may either be *general*, adapted to every season of the year, or adapted to *particular* seasons only.

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* See some Observations of mine, on laying out the public squares of London, in the Literary Journal for January 1804.

1. A *general* flower-garden should contain such a variety of trees, shrubs, flowers, &c. as that a number of each will be in perfection every month of the year, particularly in the summer season. They should be placed in irregular groups and thickets, of different sizes, gliding into one another on smooth lawn, beautifully varied, and broken into small, confined scenes, by trees and shrubs of the most elegant sorts. Throughout the whole, smooth gravel walks should wind in a graceful, easy manner.

In such a garden, the greenhouse and stoves for exotic plants and trees may be placed. In summer, those that are reared in the greenhouse may be dispersed throughout the garden; and the pots being sunk in the earth, the plants will appear as natives;* or they may be arranged in a situation by themselves, and retain their own character; and, during this season, the house may be filled

* As at Lord Harcourt's.

filled with balsams, cœxcombs, amaranths, and other tender annuals.

In this garden, a few elegant seats, both covered and uncovered, may be introduced; but no grottoes, urns, busts nor temples,* which have all their proper places in ornamental scenery, but which are too romantic, melancholy or magnificent, for the beauty and repose of this scene.

2. *A winter garden* should contain such trees, shrubs, plants, &c. as are in perfection, or retain their verdure during this season, such as most of the evergreen tribe; and several flowering plants, as aconite, christmas-rose, &c. They should be grouped and arranged in a natural manner, and a dry gravel walk should be conducted throughout the whole. This garden should be placed near the mansion, in order that it may be conveniently and comfortably approached in
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* As at Lord Harcourt's.

the winter months : and in it also the conservatory should be placed.

3. *A spring garden* should contain all those deciduous shrubs and trees that blossom or put forth leaves the most early in the spring, such as the almond, mezerion, fringe tree, &c. &c. All the early-blowing flowers, both of the bulbous and fibrous-rooted kinds, as the narcissus, crocus, iris, cowslip, auricula, hepatica, &c. The walks should be of gravel, and little or no lawn should appear.

This garden may contain a house for heaths, auriculas, and such early-flowering plants. It should be placed near the former one, and connected with it and the mansion by a comfortable gravel walk, that they may be approached at any season. The soils of both should be light and dry, the situations well exposed to the sun, and sheltered from the northern blast.

4. *An autumn garden* should contain such a collection of ornamental plants and trees as are in perfection at this season;— such as most annual flowers when late sown; many herbaceous plants, as aster, *solidago*, &c.; and several trees and shrubs that continue long in perfection, as the honeysuckle, rose, acacia, &c.

5. *A garden of bulbous roots*, in form and design, may be somewhat different from any of the above. The general form ought to be regular. It may be a square, a circle, or oval, divided into compartments, and each of these laid out into beds of three or four feet broad. Here may be grown the different varieties of tulips, hyacinths, ranunculuses, anemones, &c. each in their proper soil, &c. * It may contain a stove for the *Ixias Amaryllis*, and such like exotic bulbs.

7.

* See Maddox's Directions. Hill's Eden, &c.

7. *Gardens* may also be made solely for the purpose of cultivating any single family, genus, or species of plant or shrub, as a garden of roses—of annual flowers—of pinks and carnations—of double flowering plants and trees—of variegated kinds only, &c. :— or of ferns—of grasses—or of the vegetables, natives of any particular country, as those of America, Siberia, the Alps, &c.

8. *A botanic garden* may contain a large collection of all, or several of the different families of vegetables, arranged either by the sexual or the natural systems of Linnæus, or by the natural system of Jussieu, or any other author.

9. *An ancient British flower-garden* may be laid out with straight lines and wilderness work. See James's Gardening, Le Meagre's Book of Designs, &c. Switzer.

10. *Modern British flower-gardens* are of two kinds ; 1. Those laid out into beds fringed on the edge with box, pink, or gentian, &c. as at Blenheim *, Raith †, and most places ; or, 2. Those laid out into patches and clumps and lawn, as at Nuneham ‡, Eglinton §, Callean Castle, &c.

11. *A Chinese garden.* See Chalmers' Oriental Designs.

12. *A Grecian garden.* See Moor's Letters, Elian's Various History, Athenæus, &c.

13. *Roman and Italian gardens.* See Cato *De Re Rustica*, Virgil, Pliny's Epistles, &c.

14. *A Dutch garden.* See Justice, James, &c.

15.

* Oxfordshire.

† Fifeshire.

‡ Oxfordshire.

§ Ayrshire.

15. *French gardens.* See Quintinius, Le Notre, &c.

These scenes are not only pleasing of themselves, but, when introduced in a pleasure ground, by their contrast with other scenes, and with one another, they add greatly to the variety of that species of ornamental scenery.

THE KITCHEN GARDEN,

though more a scene of convenience than ornament, may be mentioned here in a general way. It ought to be situated at a convenient distance from the mansion, commonly adjoining to the stable offices. The soil ought to be good, deep, and somewhat moist. The exposure should be to the south, and the whole should be well sheltered all around by
wood,

wood, placed at such a distance as not to shade any part from the sun.

The walls of kitchen gardens are generally made straight; but, in England, some are made serpentine, which, as it allows them to be made very thin, is a saving in the article of brick, and gives a greater surface of wall on a given length, for a given sum. In some exposed situations where these walls are used, the trees suffer more from the wind than in the common kinds; * but in all sheltered spots they seem to answer very well.

The common style of walks in a kitchen garden I do not object to; only, their edgings, in place of being made of ornamental plants or box, should be made of strawberries, hyssop, sage, parsley, or any plant that will be really useful. Box, I think, ought to be used only in nursery gardens, and edgings

* As at Dunkeld.

ings of flowers only in parterres, or some kinds of flower-gardens.

Dwarf standards trained in the same manner as gooseberry bushes, I think better than espaliers. In the quarters, tall standards may be planted, which have a good effect in magnifying the apparent extent, in softening the wind, and sheltering the garden. No plant, tree or shrub of any kind, which are planted principally for ornament, ought to be admitted on any pretext. Every thing ornamental is foreign to the character of a kitchen garden; and not only proves cumbersome, and adds to the expence of cultivating it, but distracts the eye, and injures the general effect.

Here, the pinery, vinery, and all the fruit and forcing houses, hotbeds, &c. should be placed; but not the greenhouse or plant-stoves, or any hot-house intended principally for rearing ornamental productions. It would be foreign to the nature of these remarks

marks to describe any of the improvements which I have contrived for hothouses; such as a new mode of constructing the furnaces, and conducting the flues, by which one third, and often three fourths of the fuel commonly used is saved. Also a new and very economical mode of steaming hothouses (without boilers or any expensive article) by means of a small portable machine; and also an entire new mode of ventilation during the winter and spring months, from which several important advantages are derived. These, with several other improvements on hothouses, I mean to take an opportunity of communicating to the public in a separate work.

THE ORCHARD

may either be adjoining the garden, or at some distance from it. After the trees are

S grown

grown up, it has the best effect when under pasture. In most places, fruit-trees of different kinds may be advantageously introduced throughout the general plantations, or in groups or thickets in the park or pleasure-ground. By adopting this method, the profits from the fruit produced would be very considerable in most situations.

EDIFICES.

THOUGH a landscape composed of little more than wood and lawn, may be perfectly natural ; yet there is a degree of monotony in the continual repetition of such scenery. But nature has provided two other materials, *water* and *rocks* ; and art has added a third, *edifices*, which relieve and give spirit to the sameness of mere earth and
vegetation.

vegetation. Water is a brilliant and captivating object, which instantly attracts the eye. Houses, rocks, roads, and even broken ground, are objects on which it may repose itself; and spires, towers and temples are, perhaps, next to trees, the noblest ornaments of a country. Edifices of every kind have a powerful and striking effect upon the eye; and the 'great point, not merely in improvements, but in all things that are designed to affect the imagination, is to mix, according to circumstances, what is striking with what is simply pleasing.'

In landscape gardening, the most important consideration is to accommodate the building or edifice to the character of the scene to which it belongs, so as it may heighten the effect, and give additional force and expression to this particular character. 'It is a common case with garden buildings to be strangely incoherent in themselves, and unconnected with the places they occupy.

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Such are roothouses in rosaries, hermitages, and cottages 'richly ornamented, and those rustic seats which are marked with a formal vulgarity by way of rudeness.' *

MR PRICE'S *Observations on Architecture, Buildings, Statues, Old Gardens, Terraces, Urns, Fountains,* and other such *Decorations* near the house, are in my opinion so excellent, that I cannot do better than refer my reader to them. For my own part, I shall ever esteem myself singularly happy (however opposed I may be by 'the common herd of improvers') in professing myself his profound admirer and disciple.

WALKS

* Mafon's Essay, p. 93.

WALKS AND ROADS.

THE formal, stiff, and harsh edges of made walks, is one of the most striking deformities in garden scenery. Though every other part of the scene should be perfect,—or though they lead through a natural copse or an unfrequented dell,—their kept edges and formal manner powerfully distract the scenery. Indeed, the wilder, or more natural the scene which the walk passes through, the more anxious is the gardener to shew his labours, either by the frequent addition of fresh gravel, when mosses, weatherstains, or any such picturesque appendages begin to appear; or with the scythe and paring irons divesting their edges of the intricacy which vegetation, during a flight relief from his

S 3 operations

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operations, has a continual tendency to produce.

Walks and roads should always be accommodated to the scenery which they pass through. In smooth kept lawn, the breadth should be nearly uniform throughout—the direction natural ;

*' The milkmaid's careless step has through
yon pasture green,
Impressed a kindred curve ; the scudding hare
Draws to her dew-sprènt seat, o'er thymy
beaths,
A path as gently waving. '—MASON.*

The edges should blend with the lawn on each side, so as exactly to correspond, in appearance, with a foot-path across a field of close-bitten pasture.

In wilder scenery, or even where a few trees or bushes are loosely scattered over a lawn, the sweeps or turns of the walk should
be

be more abrupt, and its breadth may vary in a considerable degree. A group of shrubs, or a single tree, may sometimes break it in two, where the breadth must be divided, and, each narrow course taking nearly the same direction, in a short time they may meet in one track, and assume the former breadth. Some beautiful examples of this kind of walk we find in woody banks or commons.

In thickets or woods, whether of natural trees and undergrowth, or of exotics, as in the shrubbery, the edge of the walk should be totally annihilated on both sides, and bounded only by the irregularity of the lowest growths. Such walks as these were once made by Mr Shenstone at the Leasowes, where they were admired by every man of taste; but they were too simple, (although infinitely more rich and varied than trim garden walks), and did not contain a sufficient display of art to be imitated

by groundworkers, who judge of every thing by parts, and with reference to the mere mechanism of their art.

WATER.

THIS very pleasing attribute may be in several forms, all of which are highly interesting: as in those of a *river, rill, lake, pool, spring, fountain, cataract, gentle fall, &c.*

Excellent examples of all of which kinds, with their appropriate scenery, are to be found in nature; and Mr Price has shewn, in the fullest manner, how easily these may be imitated by art.

The nakedness and formality of English-made waters is disgusting and unnatural in the last degree. See Mr Knight's Poem,

DELLS,

DELLS.

A HOLLOW winding *dell* or *dingle*, containing a burn or rill shaded with wood, and its banks diversified by various coloured earths, roots and stones,—or, in dells of a grander character, by bold, perpendicular or projecting rocks, overhung with huge trees, bushes, ferns and creepers, grouped and combined in an infinite diversity of ways,—the stream interrupted by the rocks, forming roaring cataracts, foaming cascades, or gentle falls,—and in some places where the dell widens into a valley, spreading itself into a lake, all varied and heightened by the usual appendages, make what I consider to be among the most enchanting kinds of natural scenery.

When a place is fortunate enough to have such a romantic chain of scenery as this, it should

should seldom or never be touched by the hand of art. It may happen that some improvement may be made, by shewing, in a partial manner, rocks, roots or stones, that are perhaps totally concealed, by augmenting a natural cascade, or by supplying ivy, or some other creepers or evergreens, &c. ; but little more can be attempted with propriety.

The principal operation that in any case can fall to be done in such a scene, is where it may be requisite to lead through a walk, road or approach, either to observe its beauties, or lead to some other part of the place. The difficulty of executing either of these will be great to those who think of nothing but undulating sweeps, shaven lawns, and serpentine gravel walks ; but by those accustomed to admire this kind of scenery, the operation will easily be accomplished. *

Many

* Mr Morris's roads and walks at Piercefield are a striking proof of this.

Many dells of the most exquisite kind occur in Scotland and Wales. At ——— in ———, one of the finest fort was treated lately in the most barbarous manner. The approach to the house was with great propriety led through this scene ; but, in place of a natural-like road, the most formal, high-finished gravel walk that can be imagined was carried stiffly along its banks, while all the wood was thinned—all the undergrowth, creepers, ferns, &c. were cut down, and every inequality of surface taken away. Even some noble perpendicular rocks, overhung with large trees and their edges, varied by roots, bushes, and other intricate concealments, were totally bared, and the line of separation every where defined by a cut edge of turf-work, upon the top and sides, exactly similar to that of the gravel walk : all the old surface of the rocks, which were beautifully varied by mosses, weatherstains and plants springing from their

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crevices,

crevices, was hewn off. This fresh, even surface, destroyed all the intricate concealments, and every circumstance corresponding with the situation ; while the ground in front of it, and all around, was neatly laid with turf, and made smooth and even. Thus, the grandeur and picturesqueness of these rocks were totally destroyed, and the whole mass made little better, in appearance, than an upright bank of red-coloured earth.

The stream, too, which runs in this dell, was deprived of almost every beauty, particularly that of intricacy and shade, by reducing its edges to regular curves, and sloping the banks ; and in places intended to be most seen, it was turfed neatly down to the brink of the water.

*‘ Shaven to the brink our brooks are taught
to flow,*

Where no obtruding forms or rushes grow.’

KNIGHT.

Every

Every thing being smoothed and levelled, and the approach cut out and covered with red ashes, still more glaring than gravel, tender shrubs, larches and flowers, were planted in clumps and patches, where the natural growths had been just rooted up, and (childlike) a number of fantastic-looking stones, which happened not to be far distant, were brought and regularly distributed (for to group them was a thing they had no idea of) in the most conspicuous places along the road, and particularly along three bridges, by way of parapet. It deserves to be remarked, however, on the other hand, that these bridges, were it not for this circumstance, are very well executed, and, in style, are properly adapted for this kind of scenery.

This dell, at present, has an appearance which may give a fertile imagination some idea of what it has once been ; but, had any lover of nature seen it previously to the commencement of these operations, about five
years

years ago, it would fill him with the deepest regret to see it to-day,
 ‘*Fresh from the improver’s desolating band.*’

KNIGHT.

The flower-garden, and almost every other operation of art at ———, in which ornament is the principal consideration, is equally unnatural and out of character. Mr ———, in my humble opinion, has thrown away a great deal of money in counteracting nature, and literally deforming his place. And as all this is finished from the plan and directions * of a very generally employed landscape gardener of the present day, Mr ———, for whom (though I use
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* Some improvers, when employed to give their opinion respecting the mode of laying out any place in connexion with a general plan, give their ideas more fully in writing, illustrated by drawings. This manuscript Mr Repton calls a *Red Book*. I have adopted a similar practice; only, I have styled my red books *Reports* or *Treatises* on the improvements proposed for any estate.

this freedom with his works) I have the highest regard. It fully coincides with all which I have written respecting modern English gardening and its professors.

THE SHRUBBERY.

'Curs'd be the shrubbery's insipid scenes.'

This line, and those which follow in Mr Knight's poem, I apply to all modern shrubberies.

But if the arrangement and grouping of the trees, shrubs and flowers, were such as I propose (See Sect. IV. on Planting, and Gardens, p. 261), and the walks made in the natural manner there recommended, the shrubbery would be a highly interesting scene.

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THE PLEASURE GROUND.

THE intention of this is to furnish agreeable and varied walks as near the house as possible. It may be a collection of all the kinds of scenes which I have mentioned, and of many others properly arranged, and connected by walks leading through the whole, in such a succession, that the contrast of the past with the succeeding may support the character of each, and at the same time preserve congruity; for the great art in uniting a number of scenes in a pleasure-ground, lies in the nice distinction betwixt incongruity and contrast.

Here may exist scenes grand, gloomy, romantic, soft, solitary, simple, &c. each of which may be heightened by appropriate buildings,

buildings, as temples, grottoes, hermitages, root-houses, cottages, &c. The different kinds of gardens, also the various water-scenes, and an infinite diversity of wood and lawn, will naturally be introduced in the pleasure-ground; in the open scenery the walk should direct the eye to views of portions of distant country; and after it has been conducted through about one half of the whole pleasure-ground, it should lead to a prospect-tower, where, after having already examined so much of the parts, we may take a general prospect of the whole estate. This tower will have an excellent effect in many respects. Among other things, it will excite curiosity to examine the rest of the parts of the pleasure-ground; and as the walk that led hither returns to the mansion by a different course, it affords an agreeable opportunity of doing so. It is easy to conceive how different this would be from the monotony, sameness, and formality of almost all modern pleasure-grounds.

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made equal, if not superior to what this farm was, at a very trifling expence ; and I think there cannot be a more pleasing and profitable mode of laying out a small place.

Secondly, *Aration and pasture together*, or what is called commonly, but improperly, convertible husbandry. So much ornament cannot be bestowed here with propriety. The shrubbery introduced by Mrs Southote at Woburn, has been justly reprobated as incongruous with ploughed fields and corn crops. Nor would Mr Shenstone's mode of varying the fences and conducting the walks answer ; because much ground would be lost, and the proper character of arable fields destroyed.

The beauty of this kind of farm will consist in the proper cultivation of the soil, so as that the richest crops may be produced—in the symmetry of the divisions and the cut hedges—the general neatness and order of all the rest—and in seeing the several operations

perations of feed-time, hay-time, corn-harvest, &c. going on at these proper seasons.

CONCLUSION.

ALTHOUGH a considerable part of the OBSERVATIONS ON PLANTING refer to ornament, as well as the foregoing remarks, yet, as I profess to differ in my ideas on this subject from all other improvers, at least as far as I know from the writings of some of them, (as Marshall, Repton, &c. and the works of others throughout the country), and may have hinted at the difference, and referred to Price's Essays and Knight's Poem for the rest, it may be said, by some readers, that my own observations are too barren of practical directions. In answer to such, I would just observe, that the improvements which I propose to make in the art are almost wholly copied from nature; and her variety is so

great, that an enumeration of the different cases would be endless, and would, perhaps, after all, be more apt to confound than instruct. 'Didactic writers are most successful if they can induce their readers to think for themselves.'

The easiest, and the most complete way, in my opinion, to get a practical knowledge of the art of landscape gardening, is, after a liberal education, first to acquire a tolerable knowledge of agriculture, gardening, botany and architecture, particularly gardening and botany. Secondly, To study the principles, and follow the practice of landscape painting. Then to read Price's Essays, Knight's Poem, D'Ermeonville's Essay, Gilpin's Works, Shenstone's Remarks, and several other books on this subject. Next, to visit and make sketches from the most romantic parts of the country. After this time, we may suppose the artist has acquired a just relish for nature, and a correct idea
of

of the general principles of painting, combined with his practical knowledge of the materials of real landscape. Now (and not before, lest his taste should be vitiated) he may visit all the best improved places, to acquire a just notion of convenience in laying out a place. He may then be placed as assistant to a practical landscape-gardener; and after he has been there a short time to study the business-part of the art, he may commence for himself.

Such a course of education would lead a landscape-gardener and planner of improvements to think for himself. His guides at all times would be NATURE and UTILITY; and in every case which might occur in the course of his practice, he would blend them together in such a way as would best accord with the character, situation, and the given circumstances of each particular place or scene.



OBSERVATIONS

ON

A NEW MODE OF
GAINING AND EMBANKING LAND
FROM RIVERS OR THE SEA.

IN CHINA, TWO OF THEIR FINEST PROVINCES ARE
GAINED FROM THE SEA. WHAT HAVE NOT THE
DUTCH DONE BY DAMMING OUT ITS FURY?

BERNE SOCIETY'S ESSAYS.

KNOWLEDGE IS POWER.

LORD BACON.



OBSERVATIONS

ON

A NEW MODE OF EMBANKING LAND FROM THE SEA.

THE art of gaining land from the sea, or of embanking land already gained, (but liable to be frequently or occasionally overflowed by extraordinary tides), seems but little understood in Great Britain. Few embankments have been made, and those few generally constructed by men ignorant of the principles upon which their *strength* and *duration* depend. It is not my intention, however, to investigate the numerous reasons that have contributed to the failure or insufficiency of particular
particular

particular embankments: these are severely enough felt by the individuals who have constructed them. I shall briefly point out the general causes of failure—the proper forms of embankments, and the materials which compose them—and shew also a new method which I have invented of preserving them from the sea while building. By means of this invention, embankments may be safely constructed in situations where they could not otherwise be attempted; and thus, an immense quantity of land may be *gained* from the sea in places where it is at present thought impossible.

It deserves to be remarked, here, that there is a wide difference betwixt *preserving* land already partially left by the sea, and actually *gaining* land from the bottom of the ocean. What is generally termed *embanking*, in our island, applies entirely to some sea-dikes which have been made in order to exclude the swells of rivers in the time of floods,

floods, or to defend low lands near the sea from extraordinary tides. To gain, and preserve dry, a large portion of the bed of the ocean, and turn it to the purposes of agriculture, is a thing which has scarcely been thought upon, and never yet practised in Great Britain. I trust the observations which follow will shew the propriety and practicability of attempting this object ; and I trust the embankments which I am about to execute for some gentlemen will in two or three years put it beyond all doubt.

SECTION I.

OF THE CAUSES OF THE FAILURE OF
EMBANKMENTS.

THE general causes of failure are two. The first cause concerns the *form* of the embankment; and the second the *materials* with which it is constructed.

1. With respect to *form*. They are generally made too narrow at the base, in proportion to their height; by which means, the side next the sea is too upright (as is represented in Plate IX. fig. 1.) Hence, it is unable to withstand the weight of the sea in
high

high tides, which, it must be remembered, press laterally as well as downwards. Another very bad consequence of this form is, that the tides, in ebbing or flowing, act a longer time on one place, than if the slope were more gradual; and, consequently, they have a much greater tendency to break or damage the surface of the bank.

Most part of the embankments that have been constructed in England are of this form, more or less varied, and the materials generally of earth or turf. Bays or creeks are the most favourable situations for this kind. There, if they endure until the sea leaves sand or mud against them, so as to form a gradual slope next the sea, (shewn by the dotted line *a a*, fig. 1.) they may answer very well; but in the situations where they are commonly placed, the sea is very frequently making breaches in them, which are with much difficulty filled up; and if this
work

work be for a very short time neglected, the whole embankment is broken down.

2. With respect to the *materials*, it is of little consequence what the body of the embankment is constructed with, provided those used on the surface next the sea be of the proper kind.

Where the slope next the sea is such as shewn in fig. 1., no material, that is not equal in effect to close-jointed pavement, will be complete. Earth, turf, sand, shells, gravel or common causeway, are all liable to be damaged by the beating of the tide. Causewaying is much inferior to a good coat of gravel. Even although the slope were considerable, still it does not resist the action of the sea. The water enters at the crevices—sinks down among the stones—loosens the clay or earth below—part of it is divided
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and carried off every tide—vacuums are formed below—one small stone sinks from the rest—a larger succeeds (which gives more room for the operation to go on)—some of the surface-stones follow—and the sea, now rushing in with violence, soon displaces the rest, and ruins the embankment.

This is almost always the case with heads thrown across rivers, or causewayed banks, made to preserve bold shores apt to be washed away or undermined by the action of water. For they have seldom been properly built with mortar, and pointed with strong cement, or built with ashler very neatly jointed, either of which are sufficiently durable.

Notwithstanding these general censures on embankments, there are particular exceptions, which answer the purpose in the completest manner. Those made of earth, in some places in England, are 100 feet broad,

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and

and only 12 or 14 feet high; and these have always been proof against the tides. Some quays are built with mortar made from powdered unburnt limestone and coarse sand, and pointed with puzilana earth; and these resist the sea like solid rock. But the general errors which I have noticed, have been sufficient to raise numberless objections against the propriety of making embankments, and have (very properly indeed) deterred many from attempting to gain land from the sea.

Another great obstacle, although those already noticed were removed, is the difficulty, and consequently the expence of constructing them. The ebb and flow of the tide follow each other so rapidly, that workmen have but a very few hours every day to proceed with their operations, which both loses much of their time, and injures the work as it is going on. I may add, too, that this circumstance always prevents the
embankments

embankments from being extended so far into the sea as they might be, and thus often prevents many thousands of acres from being gained. But these and other evils, I hope, will speedily be removed, from the use of the barrier which I have invented, and the modes of construction which I recommend.

SECTION I.

OF THE MOST SECURE NATURAL SHORES
AND BANKS OF RIVERS, AND THE CAUSES
OF THEIR SECURITY.

IN examining the sea shore, or the banks of rivers, we uniformly find, that the least liable to be damaged are such as have a gentle, easy slope from the bed of the sea or river to the top of the shores (as Plate IX. fig. 2. *a.*), or such as are composed of solid perpendicular rocks (as fig. 3.); both which kinds I shall consider separately.

1. The *sloped banks* on the sea-shore are
least

least liable to accident from the surge and high tides, when they are covered with a coating of sand or gravel. Those on rivers are best defended from extraordinary floods when they are uniformly covered with close pasture grass to the edge of the water.

The *strength* of these banks depends upon the length of the slope,—their *durability* on the uniformity of its surface,—one part not being rougher or harder than another.

From the *length of the slope*, the river, as it increases or decreases, and the tides, as they ebb and flow, act but a short time on one part of their surface. The greater the weight of water on the bank, the more it is pressed down, and the firmer it is rendered.

From the *uniformity of the surface*, the water acts with the same power on one part as on another. Were a few stones or bushes distributed on it, the water would form eddies round them, each of which would soon become a large hole. If the surface be

harder in one place than another, a similar effect will be produced.

2. Bold, perpendicular, rocky shores are always backed by earth or other rocks (as represented in the Section, fig. 3.); and it is evident, that their *strength* consists in the resistance of this accumulation of materials, not in their disposition, as in the other kind. Their *durability* consists in the compactness and uniform texture of the rocks on the side next the sea. If it be full of clefts, or if some parts of it be of a softer nature than others, the sea in time will enter these, and break down the bank more or less, according to these circumstances.

SECTION II.

OF THE MODES OF IMITATING THESE FORMS
BY ART, OR OF IMPROVING UPON THEM.

1. IN many places in almost every sea-coast, we see shores of the first kind (fig. 2. *a.*); and it will not be denied, that if a trench were cut down behind one of them, as represented in this figure by the lines *bb*, the bank or shore, though now detached as it were from the land, would be equally strong and capable of resisting the pressure of the sea as before. This being granted, it follows, that if this bank or mound were moved and placed two or three miles from

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shore,

shore, within the bed of the sea, as at *c*, it would be as strong as ever, and no more liable to be broken down by the water, than when in its former situation ; and that, here, it will as completely guard the sea from the intermediate space of two or three miles, as it formerly preserved it from the bottom of the trench *d*, of three or four feet wide.

2. Shores of the second kind, fig. 3. more or less perfect, abound in most sea-coasts. The cause of their strength and duration has been already noticed. They cannot be wholly imitated with advantage ; but excellent hints may be taken from them for defending bold, abrupt, broken shores composed of earth, or of earth and rocks mixed. It will at once occur, that building a perpendicular wall of good stone, against broken abrupt shores, will make them nearly as strong and durable as the natural ones, which

which are composed of perpendicular, solid rock (See fig. 4.)

Walls built thus are of great use in defending abrupt sea-shores. They are not so generally applicable to rivers; because there, the water, in time of floods, requires room to spread; and this is the great use of sloping their banks;—but this mode, by confining it on every side, would only tend to make it do more damage than before. There may be cases, however, where it is desirable to defend one part of the banks of a river without sloping them, or to defend one bank at the expence of that opposite; and here it may be used with propriety,—although piers properly made in such places are often more complete, and always more economical.

Betwixt these two kinds of banks, which are natural, art may contrive one, which shall answer some of her purposes better than either.

1. In place of collecting such a quantity of earth or other materials as will be necessary to form a bank similar to fig. 2. it may be more economical to make one such as fig. 5. (Plate IX.) ; the side next the sea forming an angle with the base of 45 degrees. This will bear all the weight of water that can possibly be put on it, equally well with fig. 2. only the action of the tides would break the surface of the side next the sea, which we may contrive to prevent, by coating that side with the durable material in the natural kind, fig. 3., or, in other words, paving it with flagstone or bricks.

2. Betwixt this and the first natural kind, a great variety may be contrived, differing only in the degree of slope next the sea ; that which has the greatest slope, as fig. 2., being coated over with sand or gravel ; that which has the least slope, as fig. 5., coated over with pavement ; and the intermediate
slopes

slopes coated with materials between the two extremes, as coarse gravel, chalkstone, brick, &c.

In nature, we see the great power of projecting points on the sea or rivers, either upon a great scale, as promontories defending bays and inlets, or upon a small scale, as rocks, roots or stones, defending parts of the banks of rivers, by throwing the current to the opposite side. This naturally leads us to the idea of piers, which are of great use in defending embankments. They may generally be made and coated over with the same material as the embankment itself; but often composed of brushwood fastened to stakes with a much better effect. Often a simple fence of rude wicker-work, (called in many places stake and rice) three or four yards long, will be sufficient. Stone embankments often form eddies below them; but fences of brushwood cannot have this effect. They
have

have the same mild effect in checking the rapidity of water, that a hedge has in softening a current of air.

Indeed, in some very sandy shores, embankments may be made entirely of wicker-work. Three or four rows may be made of different heights, and the intervals betwixt them filled with furze, brushwood, or straw, &c. (See Plate IX. fig. 6.) These materials would retain the sand as the tide passed through; and in a very short time an embankment would be made in the form of the dotted line *ff*, which should then be planted with the *elymus arenarius* to bind it, and at extraordinary tides it would continue to attract more, until at last it was raised above their reach. I know several places where from twenty to fifty thousand acres could be gained by this mode in a few years!!

Whatever kind of embankment is constructed, proper sluices and tunnels, with valves

valves next the sea, should be placed here and there according to circumstances, to allow the water collected within to pass off, and to admit the sea at pleasure, either for the sake of depositing sand or mud to raise the surface of the land gained, or to flood the soil, in order to produce salt, merse, &c. &c.

SECTION III.

OF THE MATERIALS WITH WHICH EMBANKMENTS ARE CONSTRUCTED.

THE perpendicular kind of embankment, fig. 4., for defending abrupt shores as already mentioned, is simply a wall, which may be good brick-work, rubble-work, or ashler. The mortar used should be of the strongest kind, and they should, generally speaking, be pointed with puzzana earth, or Roman cement. *

The sloped embankments may be made of common earth, clay, mud, stones, or a mixture of these; or any materials which will

* Prepared by Parker & Co. London.

will form into a solid, compact mass. The side next the sea of such as fig. 2., which forms an angle of twenty degrees, or any side forming an angle betwixt that and thirty-five degrees with the base, may be covered with sand, sea-shells or gravel, from the natural shores ; or stones may be broken of uniform sizes, about three pounds weight each, and used in the same way ; or, should either of these not be had in sufficient quantity, it may be covered with mats of reed, straw or bark *, which require to be renewed frequently ; or, it might be defended by a fence of brushwood placed upright all along the bottom of the bank, and of the same height, which tends to break the force of the waves ; or the whole face of the bank might be covered with brushwood, either in bundles or as wicker-work, or neatly laid on and fixed down with long poles and strong hooks, as shewn Plate X. fig. 7. It might
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* As is done in Holland.

be caufewayed with ftones and mofs—or mofs might be fspread on the bank, and then covered with wicker-work—or mofs might be wrought into the wicker-work, and then thefe moffy covers neatly laid on and pinned down, which mode would laft a very long time *—or by a thoufand other ways, fome of which would require no attention, as gravel, ftones, &c.—or by others that would require conftant attention and occasional renewal, as ftraw, matts, brushwood, &c.

The fide next the fea, of fuch as fig. 5. Plate IX., which forms an angle with the bafe of forty-five degrees; and all the variety of flopes betwixt that, and thofe where the flope may form an angle of thirty-five degrees, may be covered with flagftone, jointed with powdered, unburnt limestone, puzilana

* Plants of mofs in their living ftate are meant here; fuch as the fphagnum, bryum, hypnum, &c.—not mere peat.

puzilana earth, or Roman cement: or, if flagstone cannot be had, clay may be found, and bricks of proper kinds may be made, and used in the same manner as stone.

In the slopes betwixt forty and thirty-five degrees, it will often be more economical to cover with stones about six or eight pounds weight, laid on eighteen or twenty inches deep; or with a bed of moss of three inches, or peat-moss * of six inches thickness, laid on the bank, and then a covering of similar stones of only six or eight inches thick: or these stones may be causewayed, or laid in strong clay, and their surface painted or plastered over with lime, or strong cement of any kind that will harden quickly, and endure the action of the tides and the air, which will operate upon it alternately, &c.

Cases may occur where it will be most economical to cover the side next the sea with

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wood,

* That kind called the flow-moss will answer best.

wood, such as the larch, or any other wood, covered with iron plates and laid flat in a river, and then set on the blocks, pushed and landed, and then being laid on, will answer as completely as pavement during a certain time, although these materials will fail a great deal sooner. In some cases it may be requisite to cover it with a metallic substance, as zinc-lead, or tinned copper plates: or by a great variety of other ways, of various rates of expence, and different degrees of duration.

Sections

Fig. 1.



Fig. 2.

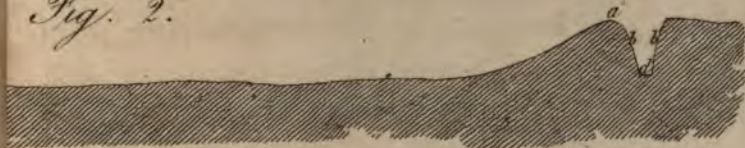


Fig. 3.

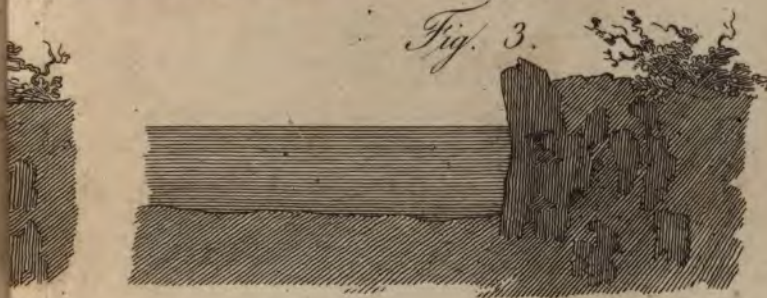


Fig. 6.



Flamb Sculp

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SECTION IV.

OF PRESERVING EMBANKMENTS FROM THE SEA WHILE THEY ARE CONSTRUCTING, SO AS THE WORKMEN MAY GO ON WITH THE WORK, INDEPENDENT OF THE EBBINGS OR FLOWINGS OF THE TIDE.

THE inconveniences which arise from the sea retarding the progress of building embankments, have been already noticed; and the bad consequences pointed out, as increasing expence in the first instance, and, in effect, preventing many thousands of acres of valuable land from being gained. I proceed, now, to describe the barrier by which all these disadvantages may be removed.

Let triangular trusses of wood, such as

Plate X. fig. 8. be prepared and placed at low water, furrounding a part of the foundation of the proposed embankment, in the form shewn (fig. 9.) where the trusses are placed as the dotted lines *cc*, &c. the hypothenuse or sloping side of the trusses fronting the sea all round, which side is next to be covered with boards, say about five feet broad, twenty long, composed of deals neatly joined; and one board is placed upright from *a* to *b*, fig. 8. to prevent the spray from coming over: or, the trusses being placed and fixed upright by cross rafters, the whole may be laid over with single deals, without being closely joined, and then covered with oiled canvass or pitched sailcloth neatly fastened on, and cemented at the joinings with a composition made of tar and clay: and this will be a more economical mode.

The barrier being thus constructed and placed, it is evident that, as the tide flows, the water will surround it; and the higher it rises on it, provided it does not rise higher than

than a , which ought to be made fifteen or sixteen feet high (about the general height of spring tides), it will only press it down the more, and render it firmer than it would be if only half of it were covered with water.

If the embankment is to be made of clay or earth, or the same materials upon which it is founded, a space must be enclosed of sufficient width to allow these to be dug out from the land side of the bank, as in fig. 9. ; or, if it is to be wholly built of stone, or any distant material, these may be laid down beside or upon the spot to be built on, before it is surrounded by the barrier.

When the length of wall contained within one of these enclosures is finished, the barrier must be moved along, so as to take in another space, which must be built upon as before. The barrier must then be again taken down and replaced, &c. ; and so on, until the whole line of embankment is finished.

The original expence of this barrier may

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be from one hundred pounds to four hundred pounds, and it may be moved and replaced for twenty or thirty shillings each time ; and as the wood of which it is made will generally be of considerable value after the bank is finished, the total expence of this barrier will not be so great as at first sight may be imagined.

By means of this barrier, it is evident that embankments may be made as far out as the sea retires ; and, even beyond that, buildings of any kind may be constructed within it with ease and safety. The only additional expence, when the barrier was placed *among* water, would be that of pumping it out, which could easily be accomplished by a windmill, or any other such simple contrivance.

But cases may occur, where almost no other embankment can be made but one composed

composed of these trusses and planking. There are many thousands of acres of valuable shelly sand and mud, on the coast of England, that in its present state could not properly bear the weight of any heavier bank or building, but which could easily bear the weight of this. Such sands might be gained by the barrier alone for a very trifling expence; and, after being gained a few years, they would become sufficiently dry and hard to bear the weight of any species of permanent bank or mound.

The trusses and planking, in this case, should be well pitched. Two piles should be driven into the sand, under the spot intended for each truss. One plank should be laid across these; and then several thinner planks laid on, in a direction parallel to the embankment; and upon these last the trusses should be placed exactly above the piles. The use of the piles is to prevent the embankment (or barrier) from being moved a-

way, or by any accident floated; and the use of the thin planking is to prevent it from sinking into the sand with the pressure of the sea. The whole of this work could easily be finished from flat-bottomed boats.

In this way, many sand-banks and shoals of mud that are at present dangerous nuisances, might be rendered useful pasture, meadow, salt merse, reed *, or flag † grounds,

A barrier of this kind might easily be constructed across rivers, to collect the whole body of water, and raise it to any height, for the purposes of machinery. It might be so contrived, as, with very little trouble, to be lowered in times when the water was abundant, and raised in seasons when it was
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* The *arundo*, used by weavers, and for roofing;

† The *typha* or *cats-tail*, used by coopers.

more scarce; and in times of great floods, by having hinges on the bases of the trusses, and also on the lower edge of the sloping side of the barrier (as at *c* in fig. 8. Plate X.), the whole might be laid flat over on the channel of the river, and would thus be no obstruction to the flood. Again, as this flood went off, the barrier might be raised at pleasure.

This scheme, if adopted, would save a vast of money frequently thrown out for heads or dams for driving machinery; * and it would answer the purpose much more completely, by giving the full command of all the water contained in the river.

PIERS or QUAYS for defending the banks of rivers, or altering their current, might also be constructed of this kind of barrier at a trifling expence; and they would have
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* As at Stormontfield in Perthshire, where 60l. would have saved 6000l.

this advantage over a stone one, that they might be easily moved from one situation to another when it might be found necessary.

In many cases, also, where piers, quays or harbours are to be built for the use of shipping, &c. by surrounding the whole with a barrier of this kind, a very considerable proportion of the expence would be saved.

Indeed (the nature of this barrier being properly understood) it is applicable to a vast number of useful purposes, which the fertile mind will easily foresee. As for those whose ideas are contracted, and whose incredulity resists every new scheme, it is needless to say any thing. What has already been advanced will appear abundantly speculative.

SECTION V.

OF THE EXPENCE OF MAKING EMBANKMENTS.

ALTHOUGH the expence of embanking is considerable, it is not near so great as is generally imagined. It is, however, impossible to say any thing perfectly exact under this head, unless certain *data* were given; but, from the various calculations and estimates which I have made for various places of the island, * I find that a dike of earth covered with gravel or sand, such as fig. 2. Plate IX. will cost from threepence to eightpence per cubic yard;—such as are of a more steep slope, say from thirty-five

* Partly for my own information, and partly for proprietors, as Lord Keith, the Earl of Selkirk, &c.

five to forty-five degrees, and covered with pavement, from sixpence to one shilling per cubic yard; the kind, fig. 4., from ten pounds to twenty-five pounds, per rood of thirty-two yards. The barrier recommended for soft grounds, which, at first gaining from the sea, will not bear the weight of a wall, may be from ten to thirty shillings per lineal foot. The one composed of brushwood, or stake and rice, from sixpence to five shillings per lineal foot.

In the design and estimate I made for Lord Selkirk, upwards of 5000 acres of mud (which in two or three years would equal the best carse land) were proposed to be gained for 50,000l. ; and were it not for a large river, the Bladenoch, which intersects this shore, the sum necessary would not exceed 30,000l. This case, however, is not near so favourable as many shores which I have seen.

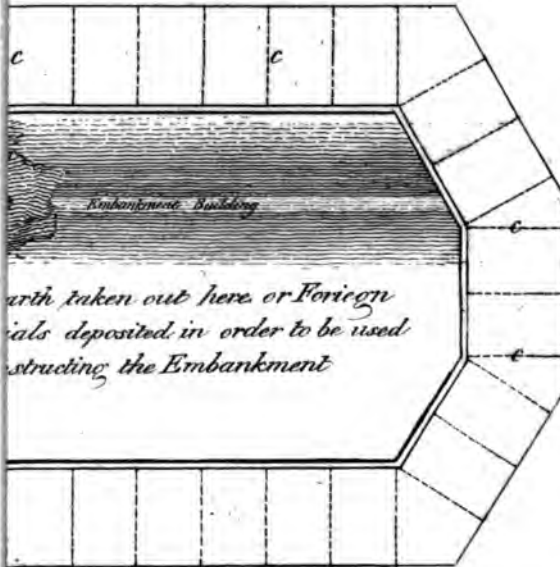
- Section.

Fig. 8. - Sect.



PLAN of the BARRIER

designed by J. Loudon



F. Lamb. Sculp

no. P. 332.

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SECTION VI.

OF THE MANAGEMENT OF LAND GAINED FROM THE SEA.

THE principal difficulty, here, will be to keep off the water of the rills or rivers that may come from the surrounding lands, and to deliver to the sea the surface water collected from the land gained ; but these objects can be easily accomplished by the following means.

It will frequently happen that a river will run through the grounds to be embanked. This is the most expensive and difficult case which can occur ; but it is only necessary to carry an embankment along each side of
it

it to the sea; and there, where it intersects the other line of embankment, to place a flood-gate *, which shall prevent the tide from entering, except when it may be necessary to admit vessels, and which shall allow the water of the river to pass into the sea.

Small rills and springs may either be turned along the margin of the land gained, and let out at one end of the embankment, where it joins the land, or led the most convenient way to one or more of the valves or flood-gates which it is necessary to make in all embankments for excluding the water within.

The water collected on the surface of the land gained, will generally be let off by the flood-gates or valves already mentioned; but where the embankment is extended into the water, this cannot be the case, as the level of the sea will generally be above the level
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* Such a gate may be seen at Linn, Norfolk.

of the land. In this case, windmills for driving pumps must be placed at proper distances, according to the particular case. Perhaps, in general, one small windmill driving four pumps, will be sufficient for draining 1000 acres. This will not cost above thirty or forty pounds.

By making a small embankment of two or four feet high some distance within the large one, all the water collected betwixt that and the original shore would be accumulated, and it might be led in a raised canal in the same level to a flood-gate in the outer embankment. This would leave very little water to be drawn up by the pump; and, in this way, though 20,000 acres were gained, one windmill only would be necessary. *

In many cases, and indeed in most cases, in place of a windmill, the rills or springs collected

* As I proposed in the Design, &c. for Wigton Bay.

collected within might easily be made to turn a water-wheel, which would be a more permanent thing than to depend entirely on the wind.

Or the sea, at the flow of the tide, might easily be made to enter a basin, and, at the ebbing, it might drive a draining-wheel: or a great many other methods might be successfully adopted.

Thus, in land gained from the sea, there cannot be any difficulty in preserving it from water, from whatever quarter it may come.

When the land to be gained is covered (more or less) with stones, these should be put in flat-bottomed boats at low water; and when the tide floats them, they should be rowed to the proposed line of embankment, and then dropt. This mode of conveyance will generally be found the most economical with all the solid and distant materials.

When the ground is sandy or poor above, and clayey, or reckoned of a better quality

quality below, it may be trenched (with the plough) of such a depth, as to turn up the good; and bury the bad soil. * If the soil be thin, and even rocky, it may still be rendered valuable. The most rocky parts may be covered five or six inches with soil, and the whole sown either with meadow grass, to be flooded with fresh water, and kept as meadow; or with other grasses, as the *juncus bulbosus* †, &c. and kept as salt marsh.

When mud of a good quality and considerable depth is gained, it may in some cases be desirable to summer-fallow it for one or more seasons after it is embanked. At other times, it may be better to sow it with rapeseed for the first season, and to summer-fallow it the next, as preparatory for a corn crop, &c.

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* This case occurred at Aberlady, East Lothian.

† The grass that generally composes salt marsh pasture.

No kind of land can be gained from the sea but what is of great value, from this single circumstance, that it can be flooded most generally by fresh water and by the sea at all times. By flooding, the most barren sand or rock with only an inch or two of soil, will bear excellent pasture. Indeed, much of the sand that is often reckoned barren and useless, is mixed with broken shells, and, upon examination, will be found to contain two or three parts in ten of calcareous earth. Most of the large rocks within salt water mark are so fragile on the surface, as to be easily penetrated by the roots of grasses, and more particularly after they have been exposed a year or two to the action of the air alone. I do not mean, here, the large detached stones that

that we often meet with within water-mark;
these I suppose either buried in the ground,
or boated off as before mentioned.

SECTION VII.

CONCLUSION.

WITH respect to the quantity of land which might be gained from the sea or rivers, by embanking in the above way; I have only to say to individual proprietors adjoining shore lands of every description, that nothing more is necessary than to observe how far out the sea ebbs at the lowest spring tides, and they may safely conclude that it is in their power to gain and preserve every inch of land uncovered by the water at that time, and that such land, when gained, will be of equal, if not superior value, to the best parts of their
their

their estates. With respect to the quantity which might be gained throughout the whole island, I could not exactly say; but I think it cannot be less than three millions of acres. I have said little, in the foregoing pages, respecting the modes of defending the banks of rivers, or altering their course; but if the general principles noticed be properly applied, many great advantages will arise to proprietors. I know some estates that lose, from the encroachments of rivers, several acres annually, which five or ten pounds, judiciously and timeously applied, would completely prevent. The advantages that arise from placing proper flood-gates on the mouths of rivers which the tide enters, are very great, as may be seen in several places in England. *

In embanking land from rivers, one great advantage is, the deepening of their

Y 3

course

* See Marshall's Management of Landed Property.

course, by which vessels of a larger size than formerly may be admitted to traffic in them. This is a well known fact, and it is of considerable importance.

It may be observed, that as embankments are made here and there on the shores of rivers or the ocean, the spaces betwixt these will thus become as bays; and quantities of shells, mud, sand or gravel, will soon be deposited there by the tide; so that these, however unfit for being embanked at first, will in the course of years be as fit as natural bays and creeks are at present. Thus, many rivers which, in their present state, are eight or ten miles wide at their junction or influx with the sea, may, in the course of years, be only two or three furlongs.

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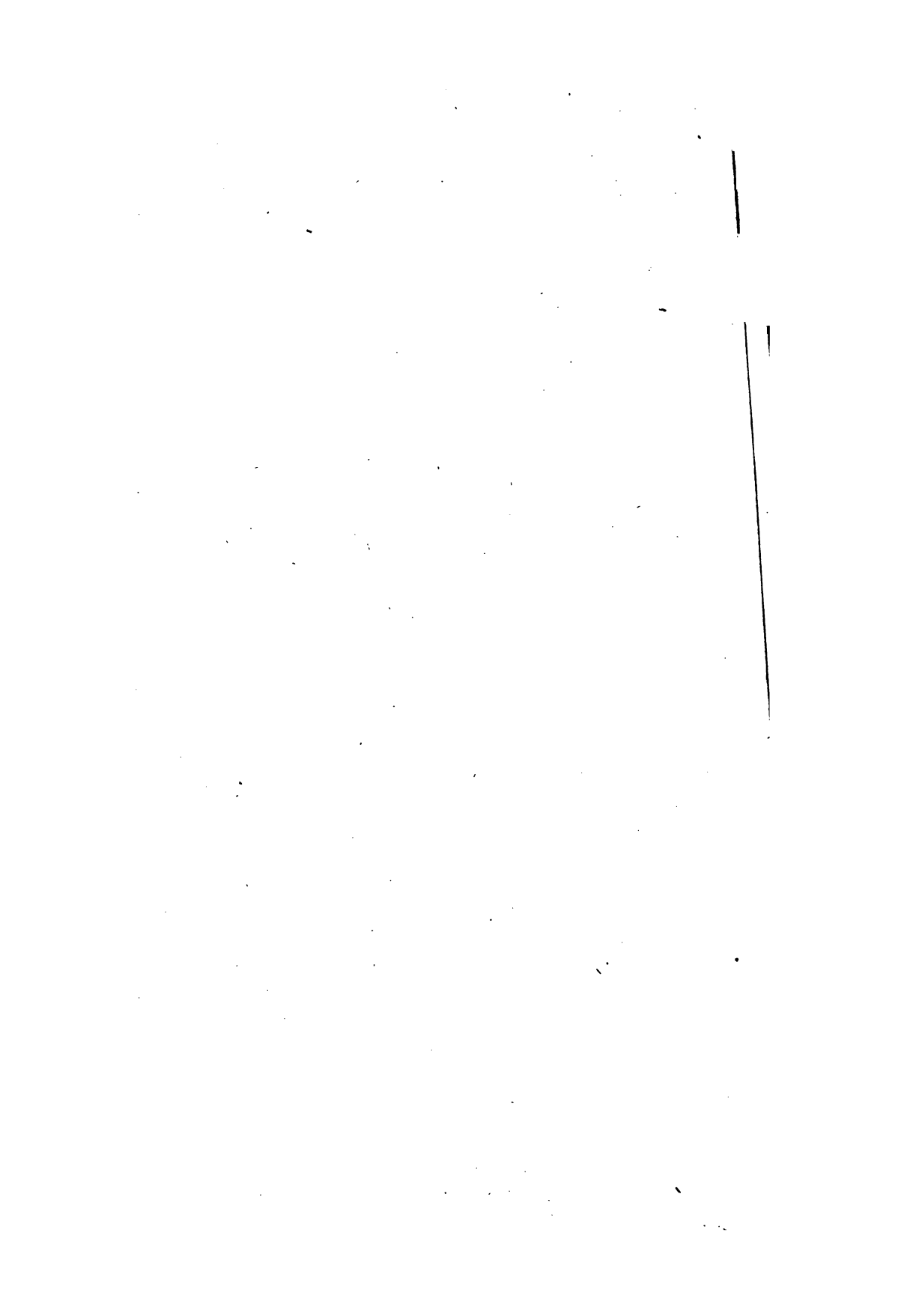
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