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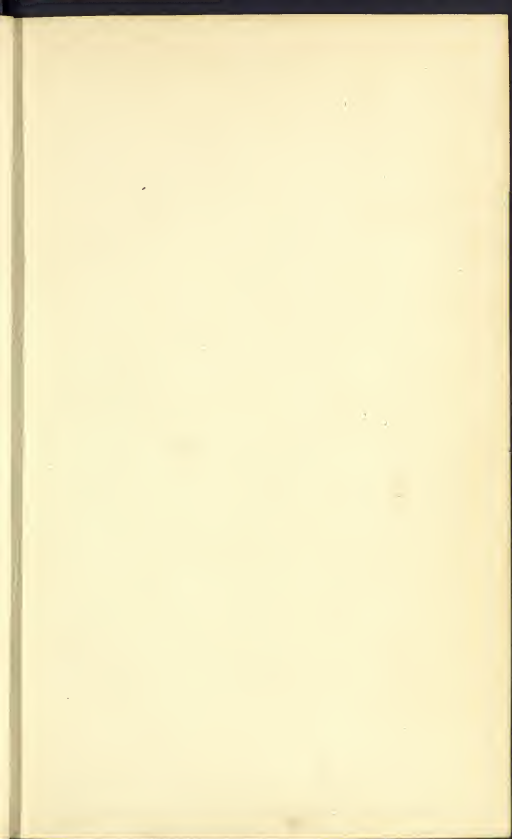
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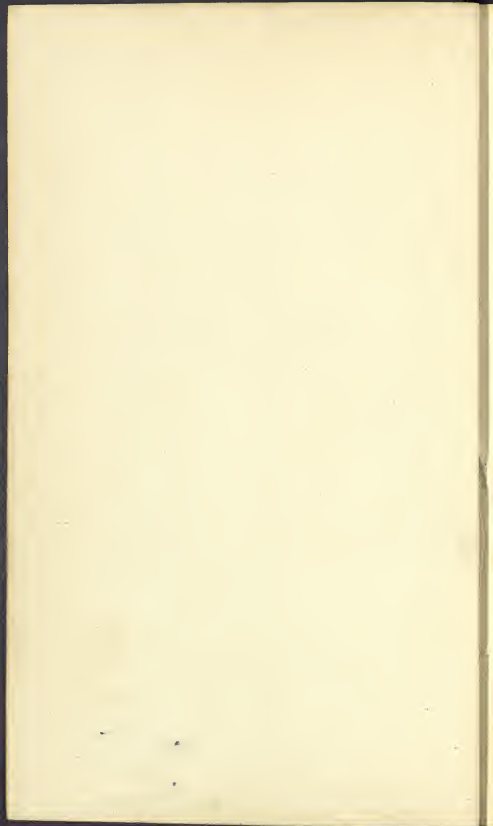


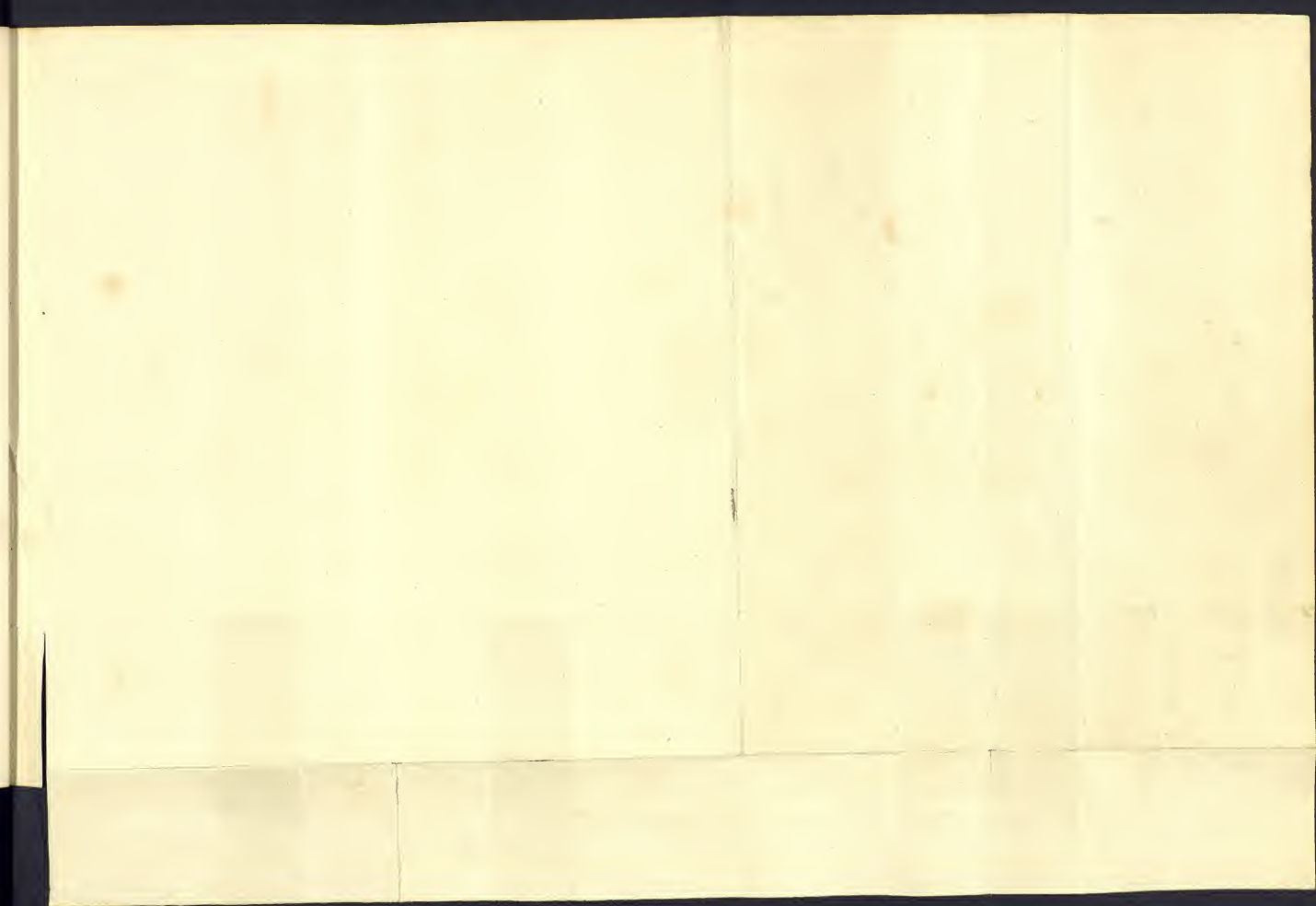
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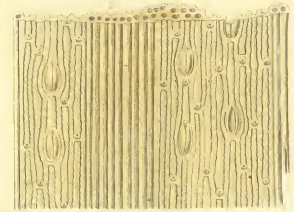
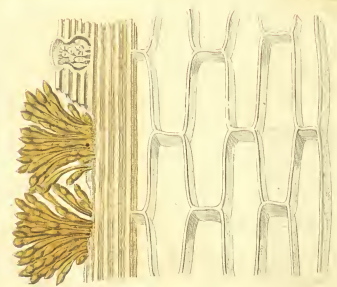
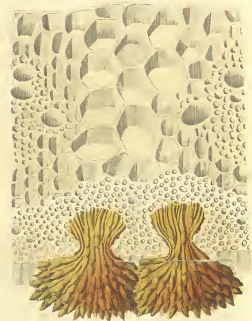
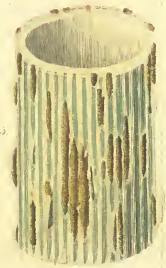
M. S. Thompson











Engraved for Sir Joseph Banks' Essay on the Blight in Corn

Published by H.D. Symonds, Edinborough Row, May 15 1805

Drawn by Francis Bauer Engraved by E. Bland



PRACTICAL DIRECTIONS  
FOR  
LAYING DOWN OR IMPROVING  
MEADOW AND PASTURE LAND,  
WITH AN ENUMERATION OF THE  
BRITISH GRASSES,

POINTING OUT SUCH SEEDS AS ARE OF THE MOST NUTRITIOUS PRO-  
PERTY, AND BEST ADAPTED FOR DAIRY PASTURE, HAY, GREEN  
FOOD, OR FOR FEEDING AND FATTENING STOCK:

WITH FULL INSTRUCTIONS FOR SOWING, AND THE BEST SEASONS FOR PERFORMING IT.

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By WILLIAM CURTIS,

*Author of the Flora Londinensis, Botanical Magazine, Lectures on Botany, &c. &c.*

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THE CAUSES OF THE DISEASES IN CORN, CALLED BY FARMERS  
THE BLIGHT, THE MILDEW, AND THE RUST;

By SIR JOSEPH BANKS, BART.

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Illustrated by numerous coloured Plates of Grasses.

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*Plate 1*

*Sweet Scented Vernal Grass*

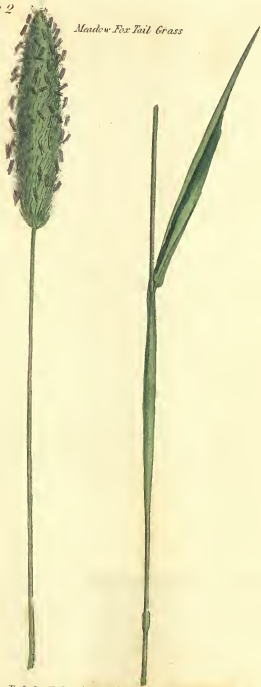


*Pub. by S. Curtis, Florist Walsworth May 31. 1804*



*Plate 2*

*Meadow Fox Tail Grass*



*Pub by T. Curtis, Florist Walworth May 31. 1804*





Smooth Stalked Meadow Grass



Pub. by S. Curtis, Florist, Walworth May 21 1804.



*Rough Stalked Meadow Grass*

Plate 4



Pub. by S. Curtis, Florist, Walworth May 31. 1804



Plate 5

Meadow Fescue Grass



Pub. by S. Curtis Florist Walworth June 30. 1804.



Plate 6.

*Crested Dogs Tail Grass*



Pub. by S. Curtis Florist Walworth June 1852





Plate 7

*Rough Cocks-foot Grass.*





## OBSERVATIONS,

&c. &c.

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THAT much of our meadow and pasture land may be rendered infinitely more valuable than it is at present, by the introduction of some of our best grasses, is an opinion which has long prevailed among many of the more enlightened agriculturists of the present age: and, while some of these have endeavoured to excite the husbandman to collect and cultivate seeds of this sort, by writings fraught with the soundest reasoning\*, others have attempted to

\* “ It is wonderful to see how long mankind has neglected  
“ to make a proper advantage of plants of such importance,  
“ and which in almost every country are the chief food of  
“ cattle. The farmer, for want of distinguishing and select-  
“ ing grasses for seed, fills the pastures either with weeds, or  
“ bad or improper grasses; when, by making a right choice,  
“ after some trials, he might be sure of the best grass, and in  
“ the greatest abundance that his land admits of. At present,  
“ if a farmer wants to lay down his land to grass, what does he  
“ do? He either takes his seeds indiscriminately from his own  
“ foul hay-rick, or sends to his next neighbour for a supply.  
“ By this means (besides a certain mixture of all sorts of rub-  
“ bish, which must necessarily happen), if he chances to have  
“ a large proportion of good seeds, it is not unlikely but that

B

attract him by the offers of well-directed pre-

“ what he intends for dry land may come from moist, where it  
 “ grew naturally, and the contrary. This is such a slovenly  
 “ method of proceeding, as one would think could not possibly  
 “ prevail universally: yet this is the case as to all grasses,  
 “ except the Darnel-Grass, and what is known in some few  
 “ counties by the name of the Suffolk-Grass (*Poa annua*);  
 “ and this latter instance is owing, I believe, more to the soil  
 “ than any care of the Husbandman. Now, would the farmer  
 “ be at the pains of separating once in his life, half a pint, or  
 “ a pint, of the different kinds of grass seeds, and take care to  
 “ sow them separately, in a very little time, he would have  
 “ wherewithal to stock his farm properly, according to the  
 “ nature of each soil, and might, at the same time, spread  
 “ these seeds separately over the nation by supplying the seed-  
 “ shops. The number of grasses fit for the farmer, is, I be-  
 “ lieve, small; perhaps half a dozen, or half a score, are all  
 “ he need to cultivate: and how small the trouble would be  
 “ of such a task, and how great the benefit, must be obvious  
 “ to every one at first sight. Would not any one be looked on  
 “ as wild, who should sow *wheat, barley, oats, rye, peas, beans,*  
 “ *vetches, buck-wheat, turnips,* and weeds of all sorts together?  
 “ Yet how is it much less absurd, to do what is equivalent in  
 “ relation to grasses?”—(STILLINGFLEET'S *Misc. Tracts*, edit.  
 “ 2, p. 365.)

“ Meadow and pasture land is oftener neglected than  
 “ ploughed ground, notwithstanding it generally admits of  
 “ a much greater proportion of improvement. The best  
 “ grasses cannot be collected at too great an expence; for I  
 “ have seen a small spot of land, in the middle of a large piece,  
 “ which was laid down twelve or fourteen years since, by Mr.  
 “ STILLINGFLEET, upon the estate of Mr. PRICE, of Foxley,  
 “ in Herefordshire, with some choice seeds, at the same time

miums\* ; but, hitherto, neither the writings of the one, however convincing, nor the premiums of the other, however alluring, have been productive of the desired effect. Ray-Grass still continues to be the only grass† the seeds of which can be purchased for the purpose of laying down meadow and pasture land; and how inadequate that grass is for such a purpose, is known to every intelligent farmer. Why, indeed, the *Lolium perenne*‡ should originally have been

“ when the remainder of the field was laid down with common seeds ; and this spot is considerably better than the rest : it not only appeared so to my judgment, but was allowed to be so by Mr. PRICE’s bailiff, who was well acquainted with its produce. From Mr. STILLINGFLEET’s experiments, and my own observations, I am clearly of opinion, that any person who has land cultivated for grass, may improve it, by this method of laying it down, to a much greater degree than he can in the common way.”—(KENT’s *Hints to Gentlemen of Landed Property*.)

See also ANDERSON’S *Essays on Agricultural and Rural Affairs*, 2 vols. 8vo, in which this subject, among a variety of others, is very copiously and ably handled ; and, on the perusal of which, one cannot but seriously lament, that many of the useful hints of the ingenious author are rendered abortive from his want of botanical information.

\* Society for the Encouragement of Manufactures, Arts, and Commerce.

† We have, indeed, been informed, that the seeds of the *Holcus Lanatus*, or *Meadow Soft-Grass*, gathered in great quantities in some parts of Yorkshire, is sold in several of the London shops under the name of Yorkshire Grass.

‡ Ray or Rye-Grass.

made use of, in preference to all the other grasses, cannot, perhaps, be satisfactorily accounted for: most probably it owes its introduction to accident, or to its being a common grass, the seeds of which were easily collected, rather than to its being preferred from any investigation of its merits compared with the others; however this may be, there appears to be no reason for excluding the others—for it would appear exceedingly improbable, that, of upwards of a hundred grasses\* growing wild in this country, the Author of nature should have created one only as suitable to be cultivated for pasturage or fodder.

Taking it for granted then, that there are other grasses, superior in many respects to the Ray-Grass, this question naturally arises—How comes it that they have not found their way into general use? To this it may be answered, improvements in any science, but more especially in agriculture, are slow in their advances; and, perhaps, no class of men adheres more pertinaciously to old prejudices than the farmer.

The difficulty of distinguishing the grasses from each other, has, no doubt, proved one grand obstacle: many of these plants are so much alike, that the most discerning botanist is often at a loss to know some of them apart: if so, how easily may the husbandman be deterred from the arduous task!

\* The word grasses is here understood in its strict sense.

There is another cause which may have operated against their introduction : grasses, as well as other plants, have been frequently recommended from a partial and limited observation of them, by persons who neither knew them well as botanists or agriculturists, or who have recommended them merely to gain by the credulity of the public.

But, perhaps, the chief reason has been, that persons who might be expected to make the improvements, have not had the means fairly put into their hands to make the experiment. Whether the method we have adopted on this occasion may be more successful than those of our predecessors, must be determined by the event. From the numerous applications made to me by a variety of gentlemen for grass seeds, it has appeared incumbent on me to do something which might gratify them, and render the public an essential service ; I wish, at least, to put it in their power to decide on a matter which has been long agitated, and from which I am far from being the only one that entertains the most sanguine hopes of its proving a great national advantage.

The grasses recommended will, I am confident, do all that our natural grasses can do : they are six of those which constitute the bulk of our best pastures ; most of them are early, all of them are productive, and they are adapted to such soils and situations as are proper for meadows and pastures.

But let no one expect them to perform wonders ; for after all they are but grasses, and, as such, are liable to produce great or small crops, according to particular seasons, or to the fertility or barrenness of the soil on which they are sown.

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## OBSERVATIONS

ON

## THE GRASSES RECOMMENDED.



## I.—ANTHOXANTHUM ODORATUM:

*Sweet-scented Vernal Grass.*—Tab. 1.

Next to the *Cynosurus caruleus*, or *blue Dog's Tail Grass*, this, of all our English grasses, comes first into blossom; it is therefore valuable as an early grass; it is valuable also for its readiness to grow in all kinds of soil and situation, being found in bogs, in woods (especially such as are of low growth, or have had the underwood cut down), in rich meadows, and in dry pastures. In point of crop it is not so productive as some, yet more so than others: cattle are fond of it, and it is well known to be the only English grass which is odoriferous: the agreeable scent of new-made hay arises entirely from this grass, hence its name of *odoratum*, or *sweet-scented*; the green leaves, when bruised, readily impart this perfume to the fingers, by which means the foliage may at all times be known; and persons not deeply skilled in botany, may distinguish it when in blossom, by its having only two threads or stamina to each flower.

Of the several grasses here recommended, it is the least productive in point of seed. In certain situations, and more especially in dry seasons, the leaves of this grass are apt to be blighted, from a disease which changes them to an orange hne, and which has proved highly injurious to the plants which we have cultivated.

## II.—ALOPECURUS PRATENSIS:

### *Meadow Fox-tail Grass.—Tab. 2.*

Produces its spike almost, and in some situations to the full, as early as the *Anthoxanthum*; hence it is equally valuable as an early grass; and, as it is much larger, and quicker in its growth, it is consequently much more productive. It shoots very rapidly after mowing, producing a very plentiful aftermath; and, where the land is rich, and two crops are not thought too much for it to bear, of all our English grasses this appears to be best adapted for such a purpose, and ought to form a principal part of the crop. Its foliage may appear coarse to some, but it should be remembered, that no grass can be productive that is not in some degree coarse: if mown early, just as it comes into bloom, though the leaves are large, the hay will not be coarse; in general, the great advantage arising from the earliness of this and the preceding grass is entirely lost at a distance from London, where hay-making com-

mences late, and where the husbandman seems to wait for a crop of general indiscriminate herbage, rather than of grass.

The *Meadow Fox-tail* is more confined as to its place of growth, growing naturally in a moist soil only; hence it is best adapted to improve very wet ground that may be drained of its superfluous moisture, or to form or meliorate meadows that have a moist bottom, and are not apt to be burnt up in dry summers. Its seeds are easily collected; but a great number of them, in certain seasons, are destroyed by a very minute orange-coloured *larva* or maggot, which feeds on the embryo of the seed, and most probably produces some small species of *musca*.

This grass is distinguished, in some degree, by the largeness of its foliage, and by its producing a soft spike on a long stalk, early in May. The *Meadow Cat's-Tail Grass*, or *Timothy Grass*, produces a spike somewhat similar, but rougher to the touch, and much later in the summer.

### III.—POA PRATENSIS:

#### *Smooth-Stalked Meadow Grass.—Tab. 3.*

The foliage of this grass begins to shoot, and to assume a beautiful verdure, very early in the spring, but its flowering stems are not produced so soon, by a week at least, as those of the *Alopecurus*: this trifling difference, however, in point of earliness of

flowering, does not prevent it from ranking, very properly, with the two preceding ; and, where early grassy pasturage is a desideratum, we are of opinion it cannot better be obtained than by a combination of these three. If erop be at the same time an object, the *Meadow Fox-Tail Grass* should predominate.

This grass rather affects a dry than a moist situation, and hence it keeps its verdure in long-continued dry weather, better than most others, but it will thrive in either ; will grow on the top of a dry wall, but much more luxuriantly in a rich meadow ; it is to be observed, however, that it has a root which creeps, like the *Couch-Grass* (*Triticum repens*), and is almost as difficult to extirpate ; it ought, therefore, to be cautiously introduced, where the pasturage is not intended to be permanent.

Of the trifling improvements which we flatter ourselves to have occasionally made, in some of the specific characters of the English plants, none have given us more satisfaction than those which relate to this species and the *Poa trivialis*, two grasses so very similar, as scarcely to be distinguished, even by the most discerning eye, at a little distance, and very obscurely characterised by LINNÆUS ; but which, by attending to two characters only in each grass, may now, in a moment, be distinguished with the utmost facility and certainty.

The *Poa pratensis* has a smooth stalk, the *trivi-*

*alis* a rough one, perceptible when drawn betwixt the thumb and finger, and which arises from little sharp points, visible when the sheath of the leaf, which covers the stalk, is magnified, *vide Tab. 4, fig. 1*; the *trivialis* has a long-pointed membrane at the base of the leaf, *fig. 2*; the *pratensis* a short blunt one, *Tab. 3, fig. 2*. These grasses differ specifically in a variety of other particulars, not necessary here to dwell on, and for which such as wish to be more particularly informed of, may consult the *Flora Londinensis*. We shall just mention one striking character of this grass; it never throws up any flowering stems or bents, but once in a season (May), while many other grasses, especially the *Ray-Grass* and *Dwarf-Meadow*, are putting them forth perpetually: from this peculiarity, joined to its hardness and verdure, it would appear to be a good grass for lawns or grass plats.

In dry soils, we have found the crop, from this grass, yearly to diminish in quantity, and to be at last very trifling, when its roots have matted together and exhausted the ground, which they seem very apt to do; in moist meadows this effect has not been so observable: upon the whole, this grass has rather sunk than risen in our estimation.

## IV.—POA TRIVIALIS:

*Rough-Stalked Meadow Grass.—Tab. 4.*

Similar as this grass and the preceding are in appearance, particularly in their mode of flowering, they differ very essentially in their qualities. While the *Smooth-Stalked Meadow Grass* is found chiefly in dry pastures, the *Rough-Stalked* principally occurs in moist meadows, or on the edges of wet ditches; it loves moisture, and a situation that is sheltered; hence, though there are few grasses more productive, or better adapted for hay or pasturage, it is a tender grass, and liable to be injured by severe cold, or excessive drought. In very wet ground, near the Thames, we have observed it grow very tall, while in poor land we have, on the contrary, seen it altogether as diminutive: it is, perhaps, no small recommendation to it, that it is a principal grass in that uncommonly productive meadow, near Salisbury, mentioned by STILLINGFLEET, and more particularly described in the *Memoirs of the Bath Agricultural Society*, vol. i, p. 94. Vide *Appendix*.

We may remark, that the seeds of the *Poa trivialis* and *Poa pratensis*, but more especially those of the former, are apt to be entangled, and adhere to each other, as if cobwebs had been intermixed with them, which makes it difficult to disperse them evenly in sowing.

## V.—FESTUCA PRATENSIS:

*Meadow Fescue-Grass.*—*Tab. 5.*

Of the several grasses here recommended, this comes the nearest, in its appearance, to the Ray-Grass, to which, however, it seems to us to be, in many respects, greatly superior, at least for the purpose of forming or improving meadows. It is larger, and more productive of foliage; it is strictly perennial, is very hardy, and will thrive, not only in very wet, but also in dry ground. We have found it growing in all situations, from the sand-pits at Charlton to the osier-grounds at Battersea; and it abounds in the very best meadows about London; in short; we know of no grass more likely to supply the deficiencies complained of in Ray-Grass; and yet it has not, that we know of, been particularly recommended. One quality it has, which bids fair to introduce it quickly into more general use; it produces more seeds than any of the others, which are easily gathered, and readily grow. In one respect it is inferior to the three first grasses—it does not produce its flowering stems earlier than about the middle of June, a fortnight or three weeks later than the *Meadow Fox-Tail Grass*; yet it cannot be considered as a late grass, as most of the *Agrostis* tribe, and the *Meadow Cat's-Tail Grass* (*Phleum pratense*), flower at least three weeks later. It must

be carefully distinguished from the *Festuca elatior*, or *Tall Fescue-Grass*, which is very similar, but much coarser.

VI.—CYNOSURUS CRISTATUS:

*Crested Dog's-Tail Grass.*—*Tab. 6.*

It is chiefly from the great character which this grass bears, as a favourite and wholesome food for sheep, and from its being found in our soundest and best pastures, that it is here recommended. It grows naturally in dry situations, and will not thrive in meadows that are very wet. It flowers about the same time as the *Meadow Fescue-Grass*, and is not very productive of foliage. As its flowering stems and heads are always left untouched by cattle, its seeds may easily be collected where the pasturage is fed.

*Additional Remark.*—Finding that this grass produces but little foliage, that its stems are wiry, and constantly refused by cattle; that, from its roots being fibrous, and penetrating to no great depth, it becomes, in dry summers, little better than an annual; we are induced to think less favourably of its intrinsic merit, and to consider it as greatly inferior to the other five.



Of the SIX GRASSES which we have now described, it will appear that the

*Meadow Fox-Tail*, and *Rough-Stalked Meadow Grass*, are the fittest for moist land.

*Meadow Fescue*, or *Sweet Scented Vernal*, is fittest for land either moist, or moderately dry.

*Smooth-Stalked Meadow Grass*, and *Crested Dog's-Tail*, are fitted for dry pasture.

In the more southern parts of this kingdom, we may in vain expect to clothe dry soils with the constant verdure of grasses; they will not stand the drought of hot parching summers: in such seasons, it is only plants which send down roots to a greater depth that can be expected to look green, or to be productive, as *Lotus corniculatus*, *Medicago falcata*, &c.

*The ORDER of their FLOWERING.*

1. Sweet-Seented Vernal.
2. Meadow Fox-Tail.
3. Smooth-Stalked Meadow.
4. Rough-Stalked Meadow.
5. Meadow Fescue.
6. Crested Dog's-Tail.

We could easily add many more grasses to this list, and those too which, perhaps, might be highly deserving of it; but we have our doubts whether, by recommending more, we might not increase the difficulty of introducing grass seeds, without any adequate advantage. We shall, however, just take the liberty of making a few practical remarks on such others of the English grasses, as, from twenty years' culture and observation, appear to us deserving particular notice.

AGROSTIS CAPILLARIS:

*Fine Bent-Grass.*

A very common grass on all dry heaths, in pastures, and by road sides, distinguished by its very finely divaricated panicle. A principal, and to us an insuperable, objection to this tribe of plants, is the lateness of their flowering, scarcely any of them coming into bloom till July. If any of them deserve culture, it is this species, as it is one of the earliest, and has fine and productive foliage.

This is the grass which, in many parts of the kingdom, forms the turf of our extensive pastures, downs, and sheep-walks; we have frequently observed whole acres covered nearly with it alone. For grass-plats and lawns, it seems likely to be the best of all our English species, being of ready growth, bearing the scythe well, producing fine foliage, and

resisting drought better than most. The foliage of *Agrostis fascicularis* is still finer, and would probably succeed better, for the same purposes, in moist soils.

AGROSTIS PALUSTRIS:

*Marsh Bent-Grass.*

As the *Agrostis capillaris* is very common in dry pastures, this abounds in wet meadows and marshes, where it frequently grows to a great height; its foliage, like that of the other, is fine, but it is liable to the same objection of lateness of flowering.

AIRA AQUATICA:

*Water Hair-Grass,*

Is, in point of sweetness, superior to all our other British grasses, and equal to any foreign one we are acquainted with, but not cultivatable, as it is entirely an aquatic.

ALOPECURUS GENICULATUS:

*Flote Fox-Tail Grass.*

Like the *Festuca fluitans*, agreeable to cattle, and productive, but affects situations too wet, in our opinion, for meadows.

## AVENA ELATIOR :

*Tall Oat-Grass,*

Is more frequently found on the confines of meadows, in hedge-rows, and hedges, than in meadows themselves, in which, however, it is sometimes found abundantly. It is early, very productive, and produces a very plentiful aftermath; in excellence it comes near to the *Alopecurus pratensis*, for which it may prove no bad substitute. Is cultivated abroad, *vide Annals of Agriculture*, vol. xii, p. 441. There is a variety of it with knobby roots, a troublesome weed in corn-fields in some parts of the kingdom.

## AVENA FLAVESCENS :

*Yellow Oat-Grass,*

Affects dry soils, is rather early, and tolerably productive; bids fair to make good sheep pasture.

## AVENA PUBESCENS :

*Rough Oat-Grass,*

Is tolerably early, hardy, productive, and of good verdure, but its foliage is uncommonly bitter.

## BRIZA MEDIA :

*Common Quaking-Grass,*

Affects chalky soils, but is not confined to them ; is moderately productive, and likely to form good sheep pasture.

## BROMUS MOLLIS :

*Soft Brome-Grass.*

What shall we say of this grass, concerning which such various opinions are entertained ? a grass which predominates in most of our meadows about London, in the spring, and which, if it were cut on its first coming into ear, would form the principal crop, and might, probably, make no bad hay ; but as, at this period, the general herbage is not considered as sufficiently forward, it is suffered to ripen, and shed its seeds before the meadow or pasture is mown, and thus is lost, or becomes of little value : in such meadows and pastures it is yearly renewed by its seed, for it is an undoubted annual. As an early grass, it might probably be cultivated to advantage, in the manner of rye ; at present we cannot but consider it as a weed, usurping the place and hindering the growth of better herbage.

## BROMUS ERECTUS:

*Upright Brome-Grass,*

Grows wild in chalky pastures, to which, as far as we have observed, it is altogether confined, and constitutes a considerable part of the grassy herbage. We have been induced to think less favourably of it, from seeing it grow wild, than when cultivated in a garden; it is, however, deserving of trial, especially as it is early.

## CYNOSURUS CÆRULEUS:

*Blue Dog's-Tail Grass.*

Earliest of all the British grasses, flowering a fortnight sooner than the *Sweet-Scented Vernal*, grows naturally on the tops of the highest limestone rocks in the northern parts of Great Britain; not very productive, yet may, perhaps, answer in certain situations, especially as a grass for sheep; bears the drought of summer remarkably well.

## DACTYLIS GLOMERATUS:

*Rough Cock's-Foot Grass.*

A rough coarse grass, but extremely hardy and productive; common in orchards and meadows, and rather early.

## FESTUCA OVINA :

*Sheep's Fescue-Grass.*

From observations made on this grass, where it has grown wild, and from cultivating it in a moist soil, the reverse of its natural one, we are induced to think differently of it from most writers.

LINNÆUS, if we are not mistaken, was the first who considered it in a favourable point of view: in his *Flora Suecica*, he thus speaks of it: "This grass is a principal food of sheep, who have no relish for such hills and heaths as are without it;" hence he calls it *ovina*. GMELIN, *Fl. Siber.* says, "That the Tartars choose to fix during the summer in those places where there is the greatest plenty of this grass, because it affords a most wholesome nourishment to all kinds of cattle, but chiefly to sheep."

It is possible, that, in the more elevated parts of northern Europe, this grass may differ somewhat in its appearance and produce from what it does with us: in the environs of London, it grows spontaneously on dry elevated heaths and commons; in such situations its produce is extremely trifling, its foliage hard and wiry, and its appearance, in dry summers, unpleasantly brown. In a rich moist soil the foliage retains its verdure, and becomes much longer, but still, being in its nature a small plant, it cannot be

productive—consequently has no pretensions to be considered as fit for a hay grass; it is, in fact, to the *Alopecurus pratensis*, what the *Daisy* is to the *Cichorium intybus*. In the cultivation of plants, it is well to bear the old maxim in mind, *nature will prevail*. If we force a plant on a soil or situation foreign to that in which it is *constantly* found, we deceive ourselves. Were the *Festuca ovina* to be sown in a rich moist soil, the grasses and other plants, natural to such a soil and situation, would quickly overpower it, and, in the space of a year or two, scarcely a blade of it would be discernible; or were we, for the sake of our sheep (taking it for granted that they are uncommonly attached to it, the reverse of which we have heard asserted by men of observation), to plough up our elevated heaths and downs, and sow them with this grass, the sheep would starve on them in dry summers. Where, then, is the boasted value of this grass? Mr. ANDERSON, it is true, has bestowed ten pages on its merits; but he surely errs (*humanum est errare*), when, after describing its leaves as little bigger than horse hairs, or swine's bristles, and seldom exceeding six or seven inches in length, he says, "That it is capable of affording an immense quantity of hay, promises to be one of the most valuable grasses our country produces, and to make a most valuable acquisition to the farmer."

It appears to us applicable only to the purpose of



making a fine-leaved grass-plot, that shall require little or no mowing. For this purpose it must be sown about the middle of August, in an open, not too dry situation, broad-cast, and that thickly, on ground very nicely prepared and levelled: when it has once got possession of the soil, it will form so thick a turf, as to suffer few intruding weeds, and may be kept in order with little trouble.

FESTUCA DURIUSSULA:

*Hard Fescue Grass,*

Affects such situations as the *Smooth-Stalked Meadow-Grass*, and *Sheep's Fescue*, all three being not unfrequently found on walls; it is common also on our downs, and in our meadows and pastures: according to situation, it varies much in size and breadth of leaf, as well as colour of its panicle, but in all situations is very distinct from the *ovina*.

It is early and productive, its foliage is fine, and of a beautiful green; hence we have thought it was of all grasses the fittest for a grass-plot, or bowling-green: but we have found, that though it thrives very much, when first sown or planted, it is apt to become thin, and almost disappear, after a while. From its natural place of growth, it appears to be a proper grass to unite with those intended for sheep pasture.

## FESTUCA ELATIOR :

*Tall Fescue-Grass.*

Very similar to the *Festuca pratensis*, yet specifically different; found naturally in marshes, in which it grows to a great height; is hardy, and very productive, but, we apprehend, too harsh and coarse for hay, yet may, perhaps, be a good grass for soils which cannot be drained of their too great moisture, are overrun with *Meadow-Sweet*, and such like weeds, or which are apt to be overflowed.

The seeds of this plant, when cultivated, are not fertile, hence it can only be introduced by parting its roots, and planting them out; in this there would be [no great difficulty, provided it were likely to answer the expense, which we are strongly of opinion it would, in certain cases: indeed, we have often thought that meadows would be best formed by planting out the roots of grasses, and other plants, in a regular manner; and, however singular such a practice may appear at present, it will probably be adopted at some future period: this great advantage would attend it, that noxious weeds might be more easily kept down, until the grasses and other plants had established themselves.

## FESTUCA LOLIACEA :

*Darnel Fescue-Grass.*

Found sparingly in good meadows near London, extremely similar to *Lolium perenne* in appearance, but taller and more productive ; its foliage is harsh, and, like the *Lolium perenne*, it runs too much to stalk : it is undoubtedly a distinct species, very hardy, tolerably early, of very rapid increase, yet not by creeping roots ; more deserving of trial than many which have been pompously recommended.

The seeds of this grass being in the same predicament as those of *Festuca elatior*, the plant can only be propagated in the same way.—A more particular account of *Festuca loliacea*, *elatior*, and *pratensis*, may be seen in the *Flor. Lond.*, fasc. 6.

## FESTUCA CAMBRICA :

*Welch Fescue-Grass.*

Somewhat like the *Festuca duriuscula* in appearance and qualities. I never could obtain any perfect seed from it at my gardens, Lambeth-Marsh or Brompton.

## FESTUCA FLUITANS:

*Flote Fescue-Grass.**Vid. ALOPECURUS GENICULATUS.*

## HORDEUM MURINUM:

*Wall Barley-Grass. Squirrel-Tail Grass.*

Common at the foot of walls, and by the sides of paths; seldom seen in meadows and pastures; yet, in some parts of the kingdom, is found amongst the hay, in sufficient quantity to prove highly injurious to horses—the awns, or beards of their ears, sticking into their mouths, and making them so sore that they are unable to eat—ought therefore to be known, that it may be avoided.

Our information respecting the *Squirrel-Tail Grass*, though from highly respectable authority, we have some reason to think may be incorrect as to the species;—shall leave it to some botanist, who may visit the Isle of Thanet\*, to determine whether it be the *Hordeum murinum*, *pratense*, or *maritimum*.

\* Where the evil occasioned by this grass is of so serious a nature, that we have known gentlemen, going to reside there for a short time, have their hay sent them from London.

HORDEUM PRATENSE:

*Meadow Barley-Grass.*

A taller and more delicate grass than the preceding, found generally in good meadows, and sometimes forming a great part of the crop; yet, as it is neither so early, nor so productive, as many others, and may possibly have the same bad quality as the foregoing, must be cautiously introduced.

HOLCUS LANATUS:

*Meadow Soft-Grass.*

A very common grass in all meadows and pastures; also in waste grounds, and woods newly cut down; is hardy and productive of foliage; flowers a month later than the *Anthoxanthum*: when its red panicle appears, the farmers consider their grass fit for mowing. Its foliage is soft and woolly; if not disliked by cattle on that account, may rank with some of the best grasses: if more early, would be more valuable.

HOLCUS MOLLIS:

*Creeping Soft-Grass.*

We are induced to think better of this grass, than when we figured and described it in the 54th No.

of the *Flora Londinensis*, having found that it will grow well in a sandy soil, and bear the drought of summer better than most others. Captain DORSET is of opinion, that it may be even cultivated advantageously in barren sandy soils.

LOLIUM PERENNE :

*Ray or Rye-Grass.*

Though the *Lolium perenne* may not possess all that is desirable in a grass, it is not therefore to be considered as of no value, and indiscriminately rejected. The complaint so generally urged against it, of its producing little more than stalks or bents, will be only found valid when the plant grows in upland pasture and dry situations: in rich moist meadows its foliage is more abundant, and it seems to be the general opinion of agriculturists that it is highly acceptable and nutritious to cattle. As its foliage is of rapid growth, and its flowering stems are continually shooting forth, it should never be sown to form a lawn, grass-plat, or bowling-green.

The produce of some turfs sent me by Mr. LOVE-DEN, and cut out of his best meadows, consisting chiefly of *Lolium perenne*, much yet remains to be known of this most common grass, which appears to vary, *ad infinitum*, even in its wild state. We have seen a variety of it with double flowers, and one with awns, both of which are very uncommon :

the spike, where the plant grows luxuriantly, is sometimes found branched. Seeds of this variety do not constantly produce the same: the battledoor variety is very common; in some pastures, and such as were not very moist, we have seen its stalks viviparous towards autumn; in some situations again we have seen it produce foliage chiefly, in others little besides flowering stems, and to prove almost annual.

As we have, in many instances, improved varieties of plants for agricultural and other purposes, so we think it highly probable that such might be obtained from this grass.

POA AQUATICA :

*Water, or Reed Meadow-Grass,*

Like the *Flote fescue*, is properly an aquatic, growing naturally in standing waters, or land that is periodically overflowed: in flat countries, which do not admit of being sufficiently drained, it is almost the only grass for hay and pasturage.

POA ANNUA :

*Dwarf Meadow-Grass.*

A grass common to every quarter of the globe; when cold does not prevent it, perpetually flowering and seeding, and that most rapidly; growing in

almost any soil and situation, varying in size, but never acquiring any great height; its foliage tender and grateful to cattle, but liable to be killed by winter's frost and summer's drought; the first to cover earth made bare, from any cause, hence frequent on the edges of paths, where its seeds being scattered, quickly vegetate, and where it is not overpowered by more luxuriant herbage; not flourishing from being trodden on, as Mr. STILLINGFLEET has supposed.

PHALARIS ARUNDINACEA:

*Reed Canary-Grass.*

The foliage of this grass is coarse, but very productive, and there is a sweetness in it which inclines one to think that it would be very grateful to cattle: where crop, or great quantity of fodder is the object, we would recommend the planting this grass, with *Festuca elatior*, in wet meadow-ground.

PHLEUM PRATENSE:

*Meadow Cat's-Tail Grass,*

Affects wet situations, is very productive, but coarse and late; has no excellence, that we are acquainted with, which the *Alopecurus pratensis* does not possess in an equal degree.



## TRITICUM REPENS:

*Creeping Wheat-Grass, vulgo Couch-Grass,*

Well known to farmers and gardeners as a most troublesome weed: how far its early foliage may recommend it for pasturage, we shall not presume to determine.

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*DIRECTIONS*

FOR

## SOWING THE GRASS SEEDS.

If a piece of ground can be had that is neither very moist nor very dry, it will answer for all the seeds; they may then be sown on one spot: but if such a piece cannot be obtained, they must be sown on separate spots, according to their respective qualities, no matter whether in a garden, a nursery, or a field, provided it be well secured and clean. Dig up the ground level, and rake it; then sow each kind of seed thinly in a separate row, each row nine to twelve inches apart, and cover them over lightly with the earth; the latter end of August, or beginning of September, will be the most proper time for this business. If the weather be not uncommonly dry, the seeds will quickly vegetate, and the only attention they will require will be to be carefully weeded in about a fortnight from their coming up. Such of the plants as grow thickly together may be thinned, and those which are taken up transplanted, so as to make more rows of the same grass.

If the winter should be very severe, though natives, as seedlings, they may receive injury; there-

fore it will not be amiss to protect them with mats, fern, or by some other contrivance.

Advantage should be taken of the first dry weather in the spring, to roll or tread them down, in order to fasten their roots in the earth, which the frost generally loosens; care must still be taken to keep them perfectly clear from weeds. As the spring advances, many of them will throw up their flowering stems, and some of them will continue to do so all the summer. As the seed in each spike or panicle ripens, it must be very carefully gathered, and sown in the autumn, at which time the roots of the original plants, which will now bear separating, should be divided and transplanted, so as to form more rows. The roots of the *Smooth Stalked Meadow-Grass*, in particular, creeping like *Couch-Grass*, may readily be increased in this way; and thus, by degrees, a large plantation of these grasses may be formed, and much seed collected.

While the seeds are thus increasing, the piece or pieces of ground, which are intended to be laid down, should be got in order. If very foul, perhaps the best practice (if pasture land) will be, to pare off the sward, and burn it on the ground; or, if this practice should not be thought advisable, it will be proper to plough up the ground, and harrow it repeatedly, burning the roots of *Couch-Grass* and other noxious plants till the ground is become per-

fectly clean: some cleansing crop, as potatoes, turnips, tares, &c. may contribute to this end.

By this means, the ground we propose laying down will be got into excellent order, without much loss; and being now ready to form into a meadow or pasture, should be sown, broad-cast, with the following composition:

*Meadow Fox-Tail*, one pint; *Meadow Fescue*, ditto; *Smooth-stalked Meadow*, half a pint; *Rough-Stalked Meadow*, ditto; *Crested Dog's-Tail*, a quarter of a pint; *Sweet-Scented Vernal*, ditto; *Dutch Clover* (*Trifolium repens*), half a pint; *Wild Red Clover* (*Trifolium pratense*), or, in its stead, *Broad Clover* of the shops, ditto. For wet land, the *Crested Dog's Tail* and *Smooth-stalked Meadow* may be omitted, especially the former.—Vid. *Observ. on Cynosurus crist.* and *Poa prat.*

Such a composition as this, sown in the proportion of about three bushels to an acre, on a suitable soil, in a favourable situation, will, I am bold to assert, form, in two years, a most excellent meadow; and, as all the plants sown are strong, hardy perennials, they will not easily suffer their places to be usurped by any noxious plants, which, by manure, or other means, in spite of all our endeavours, will be apt to insinuate themselves; if they should, they must be carefully extirpated, for such a meadow is deserving of the greatest attention; but, if that at-

tention cannot be bestowed on it, or if, in process of time, weeds should predominate over the crop originally sown, the whole should be ploughed up, and fresh sown with the same sort of seeds, or with a better composition, when such shall be discovered; for I have no doubt, but, at some future time, it will be as common to sow a meadow with a composition, somewhat like this, as it now is to sow a field of wheat or barley.

If the object of the agriculturist be the improving of a meadow merely, not the laying it down, then, after eradicating as much as possible all noxious plants, let some old rotten dung be thinly spread over the meadow, in the beginning of September, at which time the worms\* throw up great quantities of earth, which contributes greatly to prevent the growth of moss, as well as affords fresh soil for the roots of plants to shoot into, and for seeds to vegetate in: bush-harrow it, and sow on it the same composition of seeds, but in a smaller quantity. If the meadow be very rich, the dung will be less necessary.

\* The natural diggers and dingers of land, worm-casts being nothing more than the dung of the worm.

AN  
**ENUMERATION**  
 OF  
**THE BRITISH GRASSES.**

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**GENUS I.**

AGROSTIS. BENT GRASS (*a*).

- |   |   |                         |
|---|---|-------------------------|
| 1 | Spica venti. <i>L.</i> 110. <i>H.</i> 30. <i>R.</i> 405.              |                         |
|   | n. 17.....  | *Bearded.               |
| 2 | Stricta ( <i>b</i> ).....   | *Upright.               |
| 3 | Fascicularis ( <i>c</i> ). <i>Cunina</i> . <i>L.</i> ? <i>H.</i> var. |                         |
|   | can. a. ....  | *Tufted-Leaved.         |
| 4 | Setacea. <i>H.</i> var. <i>can.</i> γ <i>Fl. Lond. Fasc.</i> 6.       | *Sheep's-Fescue-Leaved. |
| 5 | Alba ( <i>d</i> ). <i>L.</i> 111 .....                                | *White.                 |

(*a*) I have experienced more difficulty in ascertaining the several species of this genus, than all the others put together: ten of them, now growing in my garden at Brompton, continue constant to their characters. The *minima* is no *Agrostis*, though here continued as such, but a distinct genus.

(*b*) We have changed the name of *rubra*, by which we have heretofore distinguished this species, for that of *stricta*, it being more perfectly upright than any of the other perennial species.

(*c*) *Tenuifolia* ed. 2. Have changed this name for the more expressive one of *fascicularis*, the stalks in autumn producing leaves in bundles.—Vid. *Scheuchz. Specif. Descr.*

(*d*) We used to regard the *alba* and *palustris* as one and the same species, but we have lately found them to be very distinct. In the *alba*, the branches of the panicle, which is for the most part of a pale hue, close after blowing; in the *palustris*, they remain spread out:—the seed of *palustris* is twice the weight of that of *alba*.

- 6 Palustris..... \*Marsh.  
 7 Capillaris (*c*). *R.* 404. 10. *Huds. var.*  
*polymorp. a.*..... \*Fine-Panicled.  
 8 Repens (*f*). *Dodon. Pempt.* p. 558.  
*Gramen*..... \*Couchy.  
 9 Lobata (*g*). ..... \*Lobed.  
 10 Littoralis. .... Sea-Side.  
 11 Minima. *L.* 111. *H.* 32. *R. Indic.*  
*Pl. dub.*..... \*Least.

## GENUS II.

## AIRA. HAIR-GRASS.

- 1 Aquatica. *L.* 112. *H.* 33. *R.* 402. 3.  
*Fl. Lond.*..... \*Water.  
 2 Cæspitosa. *L.* 112. *H.* 34. *R.* 403. 5. \*Turfy.  
 3 Flexuosa. *L.* 112. *H.* 34. *R.* 407. 8. \*Heath.  
 4 Montana. *L.* 112. *H.* 35. .... \*Mountain.  
 5 Canescens. *L.* 112. *H.* 36. *R.* 405. 16. \*Grey.  
 6 Præcox. *L.* 112. *H.* 36. *R.* 407. 10.  
*t. 22. f. 2. Fl. Lond.*..... \*Early.  
 7 Caryophyllea (*h*). *L.* 112. *H.* 36. *R.*  
 407. 7. .... \*Silver.

(*c*) Frequently found awned.

(*f*) Like *capillaris*, but larger in every respect; root powerfully creeping; the common couch of the farmer.

(*g*) Finding this maritime species noticed originally by us on the Devonshire coast, not confined to sandy soils, we have changed the name of *arenaria* for that of *lobata*, the panicle being more obviously divided into lobes than any of the other species: it comes very near to *alba*.

(*h*) For what purpose could Mr. STILLINGFLEET give a figure of this insignificant annual?

## GENUS III.

## ALOPECURUS. FOX-TAIL GRASS.

- 1 Pratensis. *L.* 108. *H.* 27. *R.* 396. 1.  
*Fl. Lond.* ..... \*Meadow.
- 2 Agrestis. *L.* 108. *H.* 27. *myosuroides*,  
 ed. 1. *R.* 397. 1. *Fl. Lond. myosuroides*.  
 ..... \*Field.
- 3 Geniculatus. *L.* 108. *H.* 27. *R.* 396. 2.  
*Fl. Lond.* ..... \*Flote.
- 4 Bulbosus. *L.* 108. *H. var. Geniculatus*  
*β.* *R.* 397. 3. *t.* 20. *f.* 2. .... \*Bulbous.
- 5 Monspelienis. *L.* 109. *H.* 28. *Alop. aristatus*  
*R.* 396. 4. .... \*Bearded.

## GENUS IV.

## ANTHOXANTHUM. VERNAL-GRASS.

- 1 Odoratum. *L.* 73. *H.* 11. *R.* 498.  
 § *Fl. Lond.* ..... \*Sweet-Scented.

## GENUS V.

## ARUNDO. REED-GRASS.

- 1 Phragmitis. *L.* 123. *H.* 53. *R.* 401. 1. \*Common.
- 2 Calamagrostis. *L.* 123. *H.* 54. *R.* 401. 2. \*Wood.
- 3 Epigejos. *L.* 123. ? *H.* 54. *R.* 401. 3. \*Small.
- 4 Arenaria. *L.* 123. *H.* 54. *R.* 393. 1. \*Sea.

## GENUS VI.

## AVENA. OAT-GRASS.

- 1 Elatior. *L.* 121. *H.* 53. *R.* 406. 3, 4.  
*Fl. Lond.* ..... \*Tall,



- 2 Pratensis, *L.* 122. *H.* 52. *R.* 405. *t.* 21.  
*f.* 1..... \*Meadow.  
 3 Pubescens, *L.* 122. *H.* 52. *R.* 406.  
*t.* 21. *f.* 2..... \*Rough.  
 4 Flavescens, *L.* 122. *H.* 53. *R.* 407.  
*5. Fl. Lond.*..... \*Yellow.  
 5 Nuda, *L.* 122. *H.* 52. *R.* 389. 6.... \*Naked.  
 6 Fatua, *L.* 122. *H.* 52. *R.* 389. 7.... \*Bearded.

## GENUS VII.

## BRIZA. QUAKING-GRASS.

- 1 Media, *L.* 115. *H.* 38. *R.* 412. 1... \*Common.  
 2 Minor, *L.* 115. *H.* 38. *R.* 412. 2.... \*Small.

## GENUS VIII.

## BROMUS. BROME-GRASS.

- 1 Mollis, *L.* 119. *H.* 48. *polymorphus.*  
*R.* 413. *Fl.* 5. *Lond.*..... \*Soft.  
 2 Secalinus, *L.* 119. *H.* 49. *polymorphus.*  
*var. γ. R.* 414. 8..... \*Lob.  
 3 Squarrosus, *L.* 119. *H.* 49..... \*Corn.  
 4 Erectus, *H.* 49. *R.* 413. 2..... \*Upright.  
 5 Diandrus, *H.* 50. *Fl. Lond.*..... \*Diandrous.  
 6 Sterilis, *L.* 120. *H.* 50. *R.* 412. 1.  
*Fl. Lond.*..... \*Barren.  
 7 Giganteus, *L.* 120. *H.* 51. *R.* 415. 11.  
*Fl. Lond.*..... \*Tall.  
 8 Hirsutus, *L.* 119. *asper. H.* 51. *nemo-*  
*ralis, R.* 415. 10. *Fl. Lond.*.... \*Hairy.  
 9 Arvensis (*i*), *L.* 120..... \*Field.

(*i*) We have a grass growing in our garden, but which has not yet flowered, communicated to us by Mr. DICKSON, under this name.

- 10 *Racemosus*. *L.* 120..... \*Smooth.  
 11 *Multiflorus* (*k*). *Weigel. Observ.* 2. *t.* 1.  
     *f.* 1..... \*Many-Flowered.  
 12 *Coytæi* (*l*)..... \*Coytes.

## GENUS IX.

## CYNOSURUS. DOG'S-TAIL GRASS.

- 1 *Cristatus*. *L.* 116. *H.* 59. *R.* 398. 2. \*Crested.  
 2 *Echinatus*. *L.* 116. *H.* 59. *R.* 397. 5. \*Rough.  
 3 *Cæruleus*. *L.* 117. *H.* 59. *R.* 399. 4. \*Blue.

## GENUS X.

## DACTYLIS. COCK'S-FOOT GRASS.

- 1 *Glomerata*. *L.* 116. *H.* 43. *R.* 400. 2. \*Rough.  
 2 *Maritima*. *H.* 43. *Cynosuroides*. *R.*  
     393. 4..... Sea.

## GENUS XI.

## ELYMUS. LYME-GRASS.

- 1 *Arenarius*. *L.* 125. *H.* 56..... \*Sea.  
 2 *Geniculatus*..... \*Elbowed.  
 3 *Caninus*. *L.* 125. *H.* 58. *Triticum ca-*  
     *ninum*. *R.* 390. 2..... \*Dogs.

(*k*) Found by us last summer in Battersea-Fields.

(*l*) Found wild in Wales, by my friend Dr. COYTE, of Ipswich, author of the *Hortus Gippovicensis*, who sent me seeds of it, which have for many years produced the same plant, without any variation, in my Garden at Brompton. It is very nearly related to *Bromus mollis*, and might be mistaken for a dwarf variety of that plant: its spiculæ are much larger in proportion, and the groove in the middle of them much deeper, and more conspicuous.

## GENUS XII.

## FESTUCA, FESCUE-GRASS.

- |                    |  |                |
|--------------------|--|----------------|
| 1 Bromoides        | L. 118. H. 46. R. 415. 13.                   | *Barren.       |
| 2 Myurus.          | L. 118. H. 46. R. 415. 12.                   | *Wall.         |
| 3 Ovina.           | L. 118. H. 44. R. 410. 9...                  | *Sheeps.       |
| 4 Nana.....        |  | *Dwarf.        |
| 5 Glaucescens..... |  | *Glaucouscent. |
| 6 Glauca.....      |  | *Glaucous.     |
| 7 Duriuscula.      | L. 118. H. 44. R. 413. 4.                    |                |
|                    | t. 19. f. 1.....                             | *Hard.         |
| 8 Cambrica.        | H. 45.....                                   | *Welsh.        |
| 9 Decumbens.       | L. 119. H. 47. R. 408. 11.                   | *Decumbent.    |
| 10 Pratensis.      | H. 47. var. <i>fluitans</i> . $\gamma$ . R.  |                |
|                    | 411. 16. <i>Fl. Lond.</i> .....              | *Meadow.       |
| 11 Elatior.        | L. 118. H. 47. R. 411. 14.                   |                |
|                    | <i>Fl. Lond.</i> .....                       | *Tall.         |
| 12 Loliacea.       | H. 47. var. <i>fluitans</i> . var. $\beta$ . |                |
|                    | <i>Fl. Lond.</i> .....                       | *Darnel.       |
| 13 Fluitans.       | L. 119. H. 46. R. 412. 17.                   |                |
|                    | <i>Fl. Lond.</i> .....                       | *Flote.        |
| 14 Pinnata.        | H. 48. R. 392. $\xi$ .....                   | *Spiked.       |
| 15 Rubra.          | L. 118. H. 45.....                           | Purple.        |
| 16 Glabra.         | <i>Lightfoot Fl. Scot. App.</i>              |                |
|                    | p. 1085.....                                 | Smooth.        |
| 17 Uniglumis.      | H. 55. <i>Lolium bromoides</i> .             |                |
|                    | R. 413. 3. t. 17. f. 2.....                  | *Sea.          |
| 18 Sylvatica.      | L. 120. <i>Bromus pinnatus</i> .             |                |
|                    | H. 48. R. 394. $\xi$ .....                   | *Wood.         |

## GENUS XIII.

## HORDEUM. BARLEY-GRASS.

- 1 Murinum. *L.* 126. *H.* 56. *R.* 391.  
     1. *Fl. Lond.* ..... \*Wall.
- 2 Maritimum. *H.* 57. *Marinum.* *R.* 392.3. \*Sea.
- 3 Pratense. *H.* 56. *R.* 392.3. .... \*Meadow.
- 4 Sylvaticum. *H.* 57. *L.* 125. *Elymus*  
     *Europæus.* *R.* 392. 4. .... \*Wood.

## GENUS XIV.

## HOLCUS. SOFT-GRASS.

- 1 Mollis. *L.* 905. *H.* 440. *R.* 404. 15.  
     *Fl. Lond.* ..... \*Creeping.
- 2 Lanatus. *L.* 905. *H.* 440. *R.* 404.  
     14. *Fl. Lond.* ..... \*Meadow.

## GENUS XV.

## LOLIUM. DARNEL-GRASS.

- 1 Perenne. *L.* 124. *H.* 55. *R.* 395. 2. \*Perennial or Ray-  
     Grass.
- 2 Temulentum. *L.* 124. *H.* 55. *R.* 395. 1. \*Annual.
- 3 Arvense (*m*). .... \*Field.

(*m*). Received from Mr. DICKSON, who informs me that it is found wild in the corn-fields, in some parts of Scotland. It has the perfect habit of a *Lolium*, but is deficient in the character of that genus, the calyx being constantly bivalve.

## GENUS XVI.

## MELICA. MELIC-GRASS.

- 1 Uniflora. *H.* 37. *nutans.* *R.* 403. 6.  
*Fl. Lond.*..... \*Single-Flowered.
- 2 Nutans. *L.* 112. *H.* 37. *montana.*  
*R.* 403. 7. *Fl. Lond.*..... \*Mountain.
- 3 Cærulea. *L.* 113. *H.* 33. *Aira cærulea.*  
*R.* 404. 8. *Fl. Lond.*..... \*Blue.

## GENUS XVII.

## MILIUM. MILLET-GRASS.

- 1 Effusum. *L.* 109. *H.* 29. *R.* 402. 1. *Fl.*  
*Lond.*..... \*Wood.
- 2 Lendigerum. *L.* 109. *H.* 28. *Alopecurus*  
*ventricosus.* *R.* 394. 4..... \*Corn.

## GENUS XVIII.

## NARDUS. MAT-GRASS.

- 1 Stricta. *L.* 102. *H.* 22. *R.* 393. 2.... \*Small.

## GENUS XIX.

## PANICUM. PANIC-GRASS.

- 1 Viride. *L.* 105. *H.* 24. *R.* 399. 1. *Fl.*  
*Lond.*..... \*Green.
- 2 Verticillatum. *L.* 105. *H.* 24. *R.* 394.  
3. *Fl. Lond.*..... \*Whorled.
- 3 Crus-galli. *L.* 105. *H.* 24. *R.* 394. 2.  
*Fl. Lond.*..... \*Loose.

- 4 Sanguinalis. *L.* 106. *H.* 25. *R.* 399. 2.  
*Fl. Lond.*..... \*Cock's-Foot.  
 5 Dactylon. *L.* 106. *H.* 25. *R.* 399. 1. \*Creeping.

## GENUS XX.

## POA. MEADOW-GRASS.

- 1 Aquatica. *L.* 113. *H.* 38. *R.* 411. 13.  
*Fl. Lond.*..... \*Water or Reed.  
 2 Alpina. *L.* 113. *H.* 39. *var.*..... \*Alpine.  
 3 Glauca ..... \*Glaucous.  
 4 Trivialis. *L.* 113. *H.* 39. *R.* 409. 3.  
*Fl. Lond.*..... \*Rough-Stalked.  
 5 Pratensis. *L.* 113. *H.* 39. *R.* 409. 2.  
*Fl. Lond.*..... \*Smooth-Stalked.  
 6 Nemoralis. *L.* 115. *H.* 40. *angustifolia* \*Wood.  
 7 Compressa. *L.* 115. *H.* 41. *R.* 409.. \*Flat-Stalked.  
 8 Annua. *L.* 113. *H.* 42. *R.* 408. 1.... \*Dwarf.  
 9 Maritima. *H.* 42. *R.* 409. 6..... \*Sea.  
 10 Retroflexa. *L.* 115. *distans?* *H.* 34.  
*var. Aira aquat.*..... \*Reflexed.  
 11 Rigida. *L.* 114. *H.* 42. *R.* 410. 8. *Fl.*  
*Lond.*..... \*Hard.  
 12 Cristata. *L.* 115. *H.* *Airu cristata.* 33.  
*R.* 396. 3..... \*Crested.  
 13 Loliacea. *H.* 43. *R.* 395. 4..... \*Darnel.  
 14 Procumbens. *Fl. Lond.*..... \*Procumbent.  
 15 Angustifolia. *Linn.* p. 113..... \*Narrow-Leaved.  
 16 Elatior (*n*)..... \*Tall.  
 17 Tenuiflora (*o*)..... \*Slender-Flowered.

(*n*) From Scotland.

(*o*) Found by us last summer in Battersea-Fields: like *Nemoralis*, but distinct.

## GENUS XXI.

## PHILEUM. CAT'S-TAIL-GRASS.

- 1 Arenarium. *L.* 108. *H.* 23. *Phalaris*  
*arenaria.* *R.* 398. 4... .. \*Sea.
- 2 Pratense. *L.* 107. *H.* 25. *R.* 398. 1.. \*Meadow.
- 3 Nodosum. *L.* 108. *H.* var. *pratens*... \*Bulbous.
- 4 Alpinum. *L.* 108..... \*Alpine.
- 5 Paniculatum. *H.* 26..... \*Branched.

## GENUS XXII.

## PHALARIS. CANARY-GRASS.

- 1 Phleoides. *L.* 104..... \*Cat's-Tail.
- 2 Canariensis. *L.* 103. *H.* 23..... \*Birds.
- 3 Arundinacea. *L.* 104. *H.* 23. *R.* 401. 1. \*Reeds.

## GENUS XXIII.

## ROTBOELLIA. HARD-GRASS.

- 1 Incurvata. *L.* 124. *H.* 441. *Ægilops*  
*incurva.* *R.* 395. 3..... \*Sea.

## GENUS XXIV.

## STIPA. FEATHER-GRASS.

- 1 Pennata. *L.* 121. *H.* 29. *R.* 393. 3.. \*Long-Awned.

## GENUS XXV.

## TRITICUM. WHEAT-GRASS.

- 1 Junceum. *L.* 127. *H.* 58. *R.* 391. 4... \*Rushy.
- 2 Repens. *L.* 127. *H.* 57. *R.* 390..... \*Creeping or Couchy.

All those grasses which have an asterisk before their English names, in number one hundred and fifteen, are at present growing in my Botanic Garden, *Brompton*.—*L.* refers to the 14th Edition of the *Systema Vegetabilium* of LINNÆUS, published by Professor MURRAY, *Gottingæ*, 1784.—*H.* refers to the second Edition of Mr. HUDSON's *Flora Anglica*.—*R.* to the third Edition of Mr. RAY's *Synopsis*.—And *Fl. Lond.* to the *Flora Londinensis*, in which the grasses so referred to are figured of their natural size.

In this Catalogue there are twenty-eight more species enumerated than in STILLINGFLEET, and thirty-one more than in the last edition of Mr. HUDSON's *Flora Anglica*: we have little doubt but some of these will prove varieties, as *Aira* 4, *Festuca* 12, and *Poa* 7: and some have perhaps no right to appear in a British list, as *Avena* 5, and *Phalaris* 2.

We are far from considering this Catalogue as complete; but, if it has no other use, it may excite others to make it so: though the word *complete* can but seldom be applied with propriety to any part of Natural History, as new subjects are perpetually discovered which often make it necessary not only to add to, but to alter, names and descriptions that have been long established.



## Appendix.

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IF we examine our meadows, pastures, and downs, we shall find them pretty much in a state of nature, and, excepting those pastures which of later years have been sown with Ray-grass and Clover, full of an indiscriminate mixture of plants, some of which afford good, others bad food; some good crops, others scarcely any crops at all. That I may not be thought to speak at random on this subject, I shall here mention a few facts to corroborate what I have asserted.

My very worthy and much esteemed friend, THOMAS WHITE, Esq. with a view to ascertain the produce of several downs and commons, fed on by sheep, procured from each of those undermentioned, in Hampshire and Sussex, a turf, which, though not more than six inches in diameter, and chosen indiscriminately, produced, on being planted in my garden, as follows :

### TURF FROM SELBORN-COMMON.

*Plantago lanceolata.*

*Agrostis capillaris.*

*Avena flavescens.*

*Dactylis glomerata.*  
*Festuca duriuscula.*  
*Poa annua.*  
*Cynosurus cristatus.*  
*Trifolium repens.*  
*Crepis tectorum.*  
*Achillea millefolium.*  
*Galium verum.*  
*Hypochæris radicata.*  
*Hieracium pilosella.*  
*Thymus serpyllum.*

TURF FROM OAKHANGER.

*Trifolium repens.*  
*Holcus lanatus.*  
*Poa annua.*  
*Agrostis capillaris.*  
*Agrostis palustris.*

TURF FROM DEORTUN.

*Ranunculus repens.*  
*Lolium perenne.*  
*Holcus lanatus.*  
*Prunella vulgaris.*  
*Festuca duriuscula.*  
*Agrostis palustris.*  
*Trifolium repens.*  
*Crepis tectorum.*  
*Achillea millefolium.*

## TURF FROM GLYND-HILL.

*Medicago lupulina.**Achillea millefolia.**Poa pratensis.*

## TURF FROM THE SAME.

*Avena flavescens.**Festuca duriuscula.**Festuca ovina.**Hieracium pilosella.**Agrostis capillaris.**Trifolium repens.**Thymum serpyllum.*

## TURF FROM SHORT HEATH.

*Festuca bromoides.**Aira præcox.**Juncus campestris.**Poa annua.**Agrostis capillaris.*

## TURF FROM MOUNT CABRON.

*Rumex acetosa.**Daucus carota.**Medicago lupulina.**Poterium sanguisorba.**Festuca duriuscula.**Avena flavescens.*

## TURF FROM RINGMER DOWN.

Linum catharticum.  
 Scabiosa columbaria.  
 Ornithopus purpusillus.  
 Avena flavescens.  
 Festuca duriuscula.  
 Trifolium repens.  
 Hypochæris radicata.  
 Crepis tectorum.  
 Lotus corniculatus.  
 Juncus campestris.  
 Hieracium pilosella.  
 Festuca ovina.  
 Thymum serpyllum.  
 Poa pratensis.

*Flor. Lond.*

It is, perhaps, no small recommendation to the *Poa trivialis*, that it is a principal grass in that uncommonly productive meadow near Salisbury, mentioned by STILLINGFLEET, and more particularly described in the *Memoirs of the Bath Agricultural Society*, vol. i, p. 94.

The account given of the extraordinary fertility of this meadow excited our curiosity, and induced us to request a gentleman residing near the spot to

favour us with six small turfs, cut up in different parts of the said meadow, and which being planted in our garden, Lambeth-Marsh, produced as follows :

## TURF 1.

*Poa trivialis.*  
*Ranunculus acris.*  
*Triticum repens.*  
*Agrostis palustris.*

## TURF 2.

*Poa trivialis.*  
*Alopecurus pratensis.*  
*Triticum repens.*

## TURF 3.

*Poa trivialis.*  
*Agrostis palustris.*

## TURF 4.

*Poa trivialis.*  
*Triticum repens.*  
*Peucedanum Silans.*

## TURF 5.

*Poa trivialis.*  
*Alopecurus pratensis.*  
*Agrostis palustris.*  
*Avena elatior.*  
*Triticum repens.*

This experiment proves, in a great degree at least, what we long before suspected, that the extraordinary fertility of this meadow arose not from any new grass peculiar to it, but from several unusual circumstances concurring and favouring, in an uncommon degree, the growth of certain well-known grasses; especially the *Poa trivialis* and *Agrostis palustris*.

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## HINTS

RELATIVE TO

*The IMPROVEMENT of MEADOWS.*

It appears to us, that, in the herbage of a good meadow, there must be a combination of

*Produce,*  
*Bateableness,* and  
*Early Growth.*

## PRODUCE.

This, in most cases, is the Agriculturist's grand object—and no wonder, since it is the quantity chiefly which enables him to pay his rent, and support his cattle: to obtain this, the judicious husbandman spares no expense in labour or manure; but it does not follow, that produce is to be attended to solely, or that, for its sake, we are to cultivate *Rough Cock's-Foot-Grass*, *Meadow-Sweet*, and such coarse plants.

Grasses, which have been recommended for being remarkably grateful to cattle, as the *Sheep's Fescue-Grass*, or for the sweetness of their foliage merely, if they are found to be deficient in the grand article

of produce, will never answer the farmer or grazier's purpose, since to be a good meadow it must be productive.

Cattle, in regard to food, doubtless have their particular likings\*, in which it may be necessary sometimes to indulge them: but this practice must not be carried too far; for, as the farmer cannot afford to feed his ploughmen on pigs and poultry, neither can he indulge his cattle, in general, with the finer or more delicate hay or herbage. By the bye, we do not know but that the most productive grasses may also be the most nutritious, or that cattle will not as eagerly eat the herbage or hay made of the *Meadow Fox-Tail-Grass*, as of the *fine Bent (Agrostis capillaris)*, and *procumbent Trefoil (Trifolium procumbens)*.—Moreover, cattle are known frequently to thrive on food to which they

\* How inadequate we are to judge of the likings of animals, the following fact may serve to shew:—my garden at Brompton was, in the spring of 1789, infested by one or more hares, for several months, who did considerable damage to many of my plants; but the one by which their depredations were first discovered, was the *Juncus niveus*, the blossoms and flowering stems of which they cropped; and, neglecting or slightly touching a vast number of other plants, even the *Agrostis cornucopiæ* of WALTER's *Flor. Carol.*, to which animals have been reported to be much attached, and another sweeter grass, both growing just by, nightly resorted to, and ate the *Juncus* to the very ground.—Of the British grasses, the hare has preferred the *Poa procumbens*.



are habituated by necessity, though at first they could scarcely be prevailed on to touch it.

Persons, in making experiments, are very apt to conclude too hastily, from the appearance which a plant assumes, on its being first planted or sown. The most insignificant vegetable will often make a great shew, when its fibres have fresh earth to shoot into; but the trial comes, when the object of our experiment has been in a meadow or pasture several years, when its fibres, from long growth, are matted together, and it meets with powerful neighbours, to dispute every inch of ground with it; if it then continue to be productive, it must have merit. We see that *Lucern*, when left to itself, is soon overpowered. If we sow *Broad-leaved Clover*, which is most undoubtedly a perennial, the first year we shall have a great crop of *Clover*; let this field be left to itself, and the *Clover*, like the *Lucern*, will yearly diminish, not because it is a biennial, as some have supposed, but because plants hardier, or more congenial to the soil, usurp its place: this shews, then, that at the same time that we introduce a good plant, that plant must also be a powerful one, able to keep possession, and continue to be productive.

#### BATEABLENESS.

The word *bateable* is altogether agricultural, perhaps provincial, and used to express cattle's thriving on the food they eat.

This is, undoubtedly, of great consequence, and it is to be regretted that our knowledge of bateable herbage is so limited. Of those plants which have been cultivated, we are able to speak with some certainty: it is well known that *Clover*, *Lucern*, *Saintfoin*, *Tares*, and several other plants, have a tendency to fatten cattle; but what grasses, or other plants, which have not been subjected to a separate cultivation, have this particular tendency, remains to be ascertained by experiment.

As leguminous plants in general are found to agree with cattle, we may reasonably conclude that a certain quantity of them must be proper in pastures.

Certain pastures are found to be more bateable than others; but whether this arises from situation, or their particular produce, remains also to be discovered.

We should be thankful to any nobleman or gentleman for turfs cut up in pastures remarkable for this quality, or the contrary, that we might ascertain their produce at least.

#### EARLY GROWTH.

The farmers and graziers of this country unitedly complain of the want of early herbage in the spring; those plants, therefore, which are found to put forth early foliage, and to be grateful to the cattle, are deserving of great attention. As far as grasses are

concerned, the *Sweet-scented Vernal*, the *Meadow Fox-Tail*, the *Smooth* and *Rough-Stalked Meadow-Grass*, will effect all that can be expected from those of British growth; much, very much, however, will depend on seasons: if the winter be very severe, or north-easterly winds prevail in the spring, grassy herbage will be backward. To counteract the bad effects of such seasons, our pastures should be warmly situated, not drenched with moisture, sheltered by thick hedges, and divided into small enclosures; in short, a set of enclosures should be formed for this very purpose, where there is a prospect of its answering.

Where early pasturage is the desideratum, other plants, as well as grasses, may deserve a place among them, as *Rib-wort*, or *Rib-Grass* (*Plantago lanceolata*), *Dandelion* (*Leontodon taraxacum*), *Broad-leaved Clover* (*Trifolium pratense*), with many others.

As early herbage is valuable for pasturage, it is not less so for hay: by the middle of May at furthest, a meadow of this sort would be fit for mowing, and the second hay-making might commence by the time that hay-making usually takes place in the country.

We have sometimes thought, but, perhaps, the idea is too speculative, that we ought to have two sorts of meadows—one for hay, the other for pasture; that our hay meadows should consist en-

tirely of grasses, and chiefly for this reason, that the hay would, on that account, be much sooner made, an object of consequence at all times, but more so when the process commences in May. In June and July the more powerful heat of the sun is able to exsiccate the thick leaves and stalks of the more succulent plants; but, in the necessary prolongation of this business, the grasses must materially suffer.

## AQUATIC GRASSES.

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 ADDENDA, 1812.
 

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*The following description of certain Aquatic Grasses is extracted from the Flora Londinensis of the late Mr. CURTIS.*

FESTUCA FLUITANS. FLOTE FESCUE-GRASS.

FESTUCA. *Linn. Gen. Pl.* TRIANDRIA DIGYNIA.  
*Raii Gen.* 27. HERBÆ GRAMINIFOLIÆ FLORE  
 IMPERFECTO CULMIFERÆ.

FESTUCA panicula ramosa erecta, spiculis subsessilibus, teretibus muticis. *Linn. Syst. Veg.* p. 102. *Fl. Suec.* p. 32.

POA locustis teretibus multifloris, glumis floralibus exterioribus truncatis, interioribus bifidis. *Haller Hist.* p. 219. n. 1453. v. 2.

POA fluitans. *Scopoli Fl. Carn.* p. 73.

GRAMEN aquaticum fluitans, multiplici spica. *Bauh. Pin.* 2.

GRAMEN aquaticum cum longissima panicula. *J. Bauhin II.* 490. *Raii Syn.* p. 412. Flote-Grass.

GRAMEN fluviatile. *Ger. emac.* 14. *Park.* 1275. *Hudson Fl. Angl.* p. 38. *Æder. Fl. Dan.* t. 237. *Schreber Gram.* tab. 3. *Stillingfleet Misc.* tab. 10.

**RADIX** perennis, in limum profunde penetrans.

**CULMUS** pro ratione loci pedalis ad tripedalem, basi repens surculosque promens, dein suberectus, vaginis foliorum ad paniculam usque amictus.

**VAGINÆ** foliorum compressæ, subancipites, striatæ.

**FOLIA** latiuscula, lævia; *surculorum* erecta, carinata, breviuscula, *caulina* longiora, planiuscula, flaccida, aquis tempore hyberno prostrata.

**PANICULA** longa, inclinata, nonnunquam subspicata, sæpius vero ramosa, ramis nunc cauli adpressis nunc distantibus, ut pinxit CL. SCHREBERUS.

**SPICULÆ** tenues, teretes, unciæles aut sesquiunciales, 9 ad 12 floræ, rachi adpressæ.

**CALYX**: **GLUMA** bivalvis, valvulis inæqualibus, membranaceis.

**COROLLA** bivalvis, valvulæ longitudine æquales, calyce majores, *inferiore* majore, concava, lineata, nervis apicæ sæpe coloratis, apice mem-

## TRANSLATION.

**ROOT** perennial, striking deep into the mud.

**STALK** according to its place of growth, from one to three feet in length, creeping at bottom, and sending forth young shoots, afterwards nearly upright; covered with the sheaths of the leaves as far as the panicle.

**SHEATHS** of the leaves flattened, two-edged, and striated.

**LEAVES** rather broad and smooth, those of the young shoots upright, keel-shaped, and shortish; those of the stalk longer, flattish, weak, and hanging down, in the winter season lying flat on the water.

**PANICLE** long, generally inclined or bending down a little, sometimes forming a kind of spike, but most commonly branched; the branches sometimes pressed to the stalk, sometimes diverging from it in the manner represented by SCHREBER.

**SPICULÆ** slender, round, an inch or an inch and a half long, producing from 9 to 12 flowers, pressed to the stalk.

**CALYX**: a **GLUME** of two valves, which are unequal and membranous.

**COROLLA** of two valves, which are of an equal length and bigger than the calyx, the *lower valve* largest, concave, and nervous; the nerves

brancea, obtusiuscula, sæpius erosa; *superiori*  
 lanceolata, compressa, bicuspidata.

**STAMINA:** FILAMENTA tria capillaria, ANTHERÆ  
 flavæ aut purpurascens, oblongæ.

**PISTILLUM:** GERMEN ovatum, STYLI duo su-  
 bulati, reflexi, STIGMATA ramosissima.

**NECTARIUM** glandula squamiformis, cordata,  
 horizontalis, ad basin germinis.

**SEMEN** oblongum, nitidum, olivaceum, bicorni-  
 culatum, nudum.



## TRANSLATION.

towards the top frequently coloured, at top membranous, rather blunt with uneven points, the *upper valve* more pointed, flat, and bifid.

**STAMINA**: three **FILAMENTS** very slender, **ANTHERÆ** oblong and yellow, or purplish.

**PISTILLUM**: **GERMEN** ovate; **STYLES** two tapering and bending back; **STIGMATA** very much branched.

**NECTARY** a small heart-shaped squamiform gland, placed horizontally at the bottom of the germen.

**SEED** oblong, shining, of an olive colour, with two little horns, and naked.

In speaking of the *Bromus mollis*, we had occasion to remark the great variety of appearance to which the grasses were subject from soil and situation, and this observation is equally applicable to the *Festuca fluitans*.

This grass appears to thrive best in still waters, or gently running streams, where its numerous fibres penetrate easily into the mud: in such situations it becomes very luxuriant. The leaves are large, tender, and sweet, and the panicle becomes very much branched; but in meadows, where it is deprived of its natural quantity of water, it becomes in every respect less, and the panicle is frequently changed to a simple spike. When it has nearly done flowering, the branches of the panicle generally project from the main stalk, so as to form an acute angle. In every situation, whether the panicle be large or small, the spiculæ are always pressed close to the stalk or branches of the panicle; and this circumstance, joined to the length and roundness of the spiculæ, sufficiently characterize this species: if it should not, however, its parts of fructification afford at once a most pleasing and satisfactory distinction. Vide *fig.* 6, 9, 10.

We have often had the singular pleasure of observing this grass, soon after being gathered, expand its glumes, and expose its delicate yellow stamina, and still more delicate pistilla; and in this expanded state each spicula puts on a very different face, and

seems to invite the student to its investigation; and would he wish to become acquainted with the structure of this useful tribe of plants, he cannot select one more proper for his purpose, as it may be found in almost every watery ditch, flowering from the beginning to the end of summer, and has all the parts of fructification which are peculiar to the grasses, large enough to be distinctly discerned even by the naked eye, and so exposed as to be visible without the trouble of dissection.

Modern botanists seem much divided whether they should consider this as a *Poa* or *Festuca*. As it does not appear to us, that we should in the least advance our favourite science by altering its generic name, we have continued that of LINNÆUS, although we are by no means satisfied with his generic characters of the grasses in general; and are persuaded that future observations, and a more accurate attention to the minute parts of their fructification, will place those genera in a much clearer point of view than has yet been done by any author.

Professor CÆDER, in his *FLORA DANICA*, and the celebrated SCHREBER, in his *AGROSTOGRAPHIA*, have both given a figure of this grass. As we have not seen it growing either in *Denmark* or *Germany*, we cannot say that their figures do not express its particular mode of growth in those countries; but they do not convey to us its habit or manner of growing here. In both their figures the panicle is

represented quite upright, whereas with us it is always more or less inclined. This, however, is a matter of no great moment : a deviation from nature, in the representation of the minute parts of the fructification, is a matter of much greater consequence ; and we are sorry to find that Mr. SCHREBER, whose knowledge and accuracy can seldom be called in question, has not been sufficiently attentive to all the parts which characterize this species. He has represented the styles as branched or feathered quite down to the germen ; whereas they are evidently *naked at bottom, and much branched at top only*. The singular squamula or seale, at the base of the germen, he has properly noticed ; but the *two little horns* at the top of the seed, which are the remains of the styles, and which in a peculiar manner distinguish this important seed, he does not remark. In the *Flora Danica*, the styles are likewise feathered down to the germen, and the *squamula* at the base of the germen wholly omitted.

This grass is found to be of considerable importance in the œeconomy of nature.

The *Phalœna festuca*, or *Gold-Spot Moth*, to which LINNÆUS, with great propriety, adds the epithet of *pulcherrima* (vid. *Fauna Suecica*, p. 311. *Albin*, pl. 84, lit. E. F. G. H.) is said by him to feed on this particular species : with us, however, it is always found on a different grass, *viz.* the *Poa aquatica*, or *large water Poa*. Its history, with

the particular manner of finding it, will be given under that grass.

From the observations of late writers, it appears that several sorts of cattle are remarkably fond of this grass, particularly kine and hogs; and that in the spring-time they are frequently enticed into bogs, by endeavouring to get at its sweet young shoots, which appear earlier than those of most other grasses.

“Professor KALM, in a journey through part of Sweden, observed the swine to go a great way into the water after this grass, the leaves of which they eat with great eagerness. On this, he was tempted to try if they would eat the same grass dried: he accordingly had small bundles of it gathered, dried, and cast before them: the consequence was, they ate it seemingly with as much appetite as horses do hay; hence he concludes that, by cultivating this grass, *wet and swampy places* might be rendered useful, and a great deal of corn, &c. saved.”

He who introduced the method of feeding hogs in summer time on clover, deserved very well of his country; and if the hay of this grass would keep them in heart during the winter, it might prove a very valuable discovery.

Mr. KENT, in his *Hints to Gentlemen of Landed Property*, lately published, considers this a most valuable grass, and assures us (p. 34) it is to be improved above all others, and at a less expence,

merely by flooding (p. 54). He informs us, that flooding destroys *all weeds*, and enriches the lands to a very high degree (p. 56). He says, as rolling and pressure *bring* the *annual Meadow-Grass*, so flooding immediately *begets* the *flote fescue*. These assertions of Mr. KENT bespeak neither the philosopher nor the accurately practical farmer; they contain an exaggerated account of improving pasture land by a particular process, but shew a great want of that minute attention which so important a subject required.

From a long residence in *Hampshire*, we well know that the meadows in that county are considerably improved by flooding them, that is, stopping the water when there happens to be an unusual quantity, from violent or long continued rains, and by means of trenches, or gripes, conveying the surplus water so as to overflow them entirely, if possible; but we deny that by this process *all weeds* are destroyed, the use of *manure* superseded, or that *flote fescue grass* is immediately *begotten*. Although it is a constant practice with the farmers to flood their meadows in the winter, it is no less a constant practice, with such as wish to have good crops of grass, to manure them with dung or ashes. Flooding can no otherwise destroy weeds than by altering the soil in which they grow; and if it destroys one set of weeds, it must certainly favour the growth of another. If those plants which thrive best in a dry

situation, be destroyed by the alteration which now takes place in the soil, those which are fond of a moist situation will proportionally flourish. If the *flote fescue grass* were immediately produced by flooding, we should find all those meadows which have undergone this operation to contain nothing but this kind of grass, whereas the richest and best meadows in *Hampshire* contain scarcely a single blade of it. The fact is, this grass will not flourish in meadow land, unless you convert it into a kind of bog or swamp; and, I believe, few landed gentlemen will think this an improvement, or thank Mr. KENT for giving them such a hint.

Mr. STILLINGFLEET informs us, "that Mr. DEANE, " a very sensible farmer, at *Ruscomb*, in *Berkshire*, " assured him, that a field always lying under water, " of about four acres, that was occupied by his father " when he was a boy, was covered with a kind of " grass that maintained five farm-horses in good " heart from April to the end of harvest without " giving them any other food; and that it yielded " more than they could eat. He, at my desire, " brought me some of the grass, which proved to be " the *flote fescue* with a mixture of *marsh bent*.— " Whether this last contributes much towards fur- " nishing so good pasture for horses, I cannot say: " they both throw out roots at the joints of the stalks, " and are therefore likely to grow to a great length. " In the index of dubious plants, at the end of RAY'S

“*Synopsis*, there is mention made of grass, under  
 “the name of *Gramen caninum supinum longissi-*  
 “*um*, growing not far from *Salisbury*, twenty-four  
 “feet long. This must, by its length, be a grass  
 “with a creeping stalk; and that there is a grass  
 “in *Wiltshire*, growing in watery meadows, so va-  
 “luable that an acre of it lets from ten to twelve  
 “pounds, I have been informed by several persons.  
 “These circumstances incline me to think it must  
 “be the *flote fescue*; but whatsoever grass it be, it  
 “certainly must deserve to be inquired after.”

It may not be improper to add, that the account  
 of the extraordinary long grass above mentioned was  
 taken by Mr. RAY from the *Phytographia Britan-*  
*nica*, which mentions the particular spot where it  
 grew, *viz.* at Mr. TUCKER’S, at *Maddington*, nine  
 miles from *Salisbury*; it is also remarked, that *they*  
*fat hogs with it.*

As it is now above a century since this inquiry  
 was first made, is it not surprising that no succeed-  
 ing botanic writer should have acquired satisfac-  
 tory information concerning it? I am promised  
 specimens of the roots and seeds.

Upon the whole, from the observations which we  
 ourselves have made on this grass, and from what  
 is to be collected from authors, it appears, that, if it  
 be cultivated to any advantage, it must be in such  
 meadows as are *naturally very wet and never drained.*

The quickest, and perhaps the best, method of



propagating it would be by transplanting the roots at a proper season ; and if the soil prove suitable, from the quickness of its growth, and its creeping stalk, it would soon exclude most other plants, and produce a plentiful crop.

In foreign countries, the seed of this grass seems to be an object of more importance than the grass itself: the following is the substance of what Mr. SCHREBER has said concerning it (vid. *Beschreibung der Graser*, p. 40.) “The seed has a sweet and “pleasant taste, particularly before it comes to its “full growth, whence the plant has acquired the “name of *Manna-Grass*. Ducks and other water- “fowl feed on it with much eagerness: LINNÆUS “has remarked, that the water-fowl are very well “acquainted with the method of collecting these “seeds. It has been observed, likewise, that fish “are fond of it; and that trout in particular “thrive in those rivers where this grass grows in “plenty, and sheds its seeds; but it is not only for “birds and fish, but also for man, a palatable and “nutritious food, and has for many years past been “known at gentlemen’s tables under the name of “*Manna-Grout*.

“The *Manna-Grass* is of two kinds; the one, “*Panicum sanguinale*, or *Cock’s-foot Panic Grass*; “the other, *Festuca fluitans*, which we have now “described. The former is cultivated in several “parts of *Germany*, and its seed somewhat resembles that of millet; the latter is collected in great

“ abundance from the plant as it grows wild, in  
 “ *Poland, Lithuania, the New Marche,* and about  
 “ *Frankfort,* and other places in *Silesia,* as also in  
 “ *Denmark and Sweden,* and hence exported to all  
 “ parts.

“ The common method they make use of to  
 “ gather and prepare this seed in *Poland, Prussia,*  
 “ and the *Marche,* is as follows: At sun-rise, the  
 “ seed is gathered or beat from the dewy grass into  
 “ a horse-hair sieve, and, when a tolerable quantity  
 “ is collected, it is spread on a sheet, and dried  
 “ fourteen days in the sun: it is then thrown into a  
 “ kind of wooden trough or mortar, straw or reeds  
 “ laid between it, and beat gently with a wooden  
 “ pestle, so as to take off the chaff, and then win-  
 “ nowed. After this, it is again put into the mor-  
 “ tar, in rows, with dried marigold-flowers, apple,  
 “ and hazel-leaves, and pounded until the husk is  
 “ entirely separated, and the seed appears bright;  
 “ it is then winnowed again, and when it is, by this  
 “ last process, made perfectly clean, it is fit for use.  
 “ The marigolds are added with a view to give the  
 “ seeds a finer colour. The most proper time for  
 “ collecting them is in July. A bushel of the seed  
 “ and chaff yields about two quarts of clean seed.

“ When boiled with milk or wine, they form an  
 “ extremely palatable food; and are most commonly  
 “ made use of whole, in the manner of *Sago,* to  
 “ which they are in general preferred.”

In the month of October last, I discovered, in a

watery ditch, which runs through a meadow not far from Kent-Street Road, an uncommon appearance in some of the seeds of this grass; and, on a further examination, I found whole panicles, the seeds of which were affected in a similar manner: instead of being of their natural size and colour, they were enlarged to a very great degree, assumed externally a blackish colour, and were more or less incurvated. Struck with the novelty, as well as oddity of the appearance, I conjectured, at first, that it was a disease occasioned by some insect: I examined it more attentively, but could not find the least cause to suppose that an insect had been concerned in it. The surface of some of these seeds was rough, and chopped; they were light as to weight, internally of a whitish colour, insipid in their taste, but not disagreeable. Having, a little before this, been favoured with a sight of some *horned Rye*, it now occurred to me, that this was the same disease which had been said to affect the *Rye* only, and further inquiry confirmed my conjecture.

As this singular disease of the *Rye* has first been noticed by the French, and as some very uncommon circumstances have attended it, it cannot fail of proving acceptable to our readers to lay before them the substance of what they have said concerning it. In the *Histoire de l'Academie Royale des Sciences* there is an account given of a particular species of gangrene or mortification which attacked many per-

sons in some particular provinces of *France*. “ It  
 “ began generally at the toes, and sometimes spread  
 “ as high as the thigh. Out of fifty people there  
 “ was but one that was attacked with this disease  
 “ in the hands; and what was equally remarkable,  
 “ there were no females affected with it, except  
 “ some little girls.

“ It appears that this singular malady attacked  
 “ only the lower sort of people, and that too in  
 “ years of scarcity; that it proceeded from bad  
 “ nourishment, and principally from eating bread  
 “ made of a certain black and diseased corn called  
 “ *Ergot*, from the grains assuming somewhat of  
 “ the form of a Cock’s Spur. Vid. *fig.* 12.

“ The manner in which this singular monstrosity  
 “ of the corn is produced, is thus related by Mon-  
 “ sieur FAGON:—

“ There are certain mists which prove injurious  
 “ to the corn, and from which the greatest part of  
 “ the ears of the Rye defend themselves by their  
 “ beards. In those, however, which this hurtful  
 “ humidity can strike and penetrate, it rots the skin  
 “ which covers the grain, blackens it, and alters the  
 “ substance of the grain itself: the juices which  
 “ form the seed, being no longer kept within their  
 “ ordinary bounds by the skin; are carried hither in  
 “ too great an abundance, and, amassing themselves  
 “ irregularly, form this monstrous appearance.

“ He observes (erroneously), that it is *only in Rye*

“ that the *Ergot* is to be found ; that the poor people  
 “ do not separate this grain from that which is good ;  
 “ that it was only in such particular seasons as fa-  
 “ voured the growth of the *Ergot* that this disease  
 “ was prevalent ; that the country people, after eat-  
 “ ing bread made of this bad corn, perceived them-  
 “ selves as if drunk, and after this the mortification  
 “ generally took place ; that in some provinces,  
 “ where there was but little of this *Ergot*, this spe-  
 “ cies of disease was not known.

“ From the observations made by the farmers of  
 “ that country it appears, that this bad species of  
 “ grain is produced in the greatest abundance in  
 “ such land as is wet and cold, and particularly in  
 “ rainy seasons. The poultry refused it when given  
 “ them ; nevertheless, if by accident they had eaten  
 “ it, they did not appear to be hurt by it. When  
 “ sown (as might be expected), it did not vegetate.”

A kind of mortification, very similar to the above  
 described, was observed in this kingdom some years  
 ago ; it affected the same kind of people, and on  
 inquiry it was found that they had fared very hard,  
 and that the bread which they had eaten was made  
 of the *tailings* or *screenings* of corn ; but it was  
 not ascertained whether it contained any of the  
*Ergot* or not.

From the insipid taste of this corn, as well as  
 from its not proving fatal to poultry, it seems ex-  
 ceedingly probable that it is not in itself noxious,

any otherwise than as it affords no nourishment ; and that those people who have eaten of this corn have, in fact, been abridged of a proportionate quantity of food ; hence, from an impoverished state of the fluids, and a weak action of the vessels, this species of mortification might easily be induced.

#### REMARKS (FIFTH EDITION).

Since Mr. CURTIS's time (he died about the year 1800), it seems to have been generally decided to consider the *fluitans*, or *flote-grass*, as appertaining to the genus *Poa*. The *poa fluitans*, or *flote poa grass*, however nutritious or useful it might prove as cattle food, has been found so perfectly aquatic as to be unsusceptible of naturalization and culture upon any soil, even upon bog, where on the approach of drought the grass would perish. The black and diseased corn called *Ergot*, from the grains assuming something of the form of a cock's spur, was, in all probability, so affected by atmospheric blight, bearing analogy with the *ear-cockle*, or distorted grains of wheat.

*Dactylis glomeratus*, *Rough Cock's-foot*, p. 23. Mr. CURTIS represents this as a coarse, hardy, early, and productive grass, but has not included it in the superior species. It has been heretofore generally decried for its coarseness, its presumed want of nutritive properties, and the neglect of cattle. Similar opinions still prevail among certain of our ablest and

most intelligent cultivators, on the plea, that all the ends proposed by the culture of this grass may be obtained from others of our numerous and well known superior species.

On the other hand, the *rough cock's-foot* has, of late years, become a favourite object of culture, as a separate grass, with some eminent and extensive farmers, on account of its certainty of growth, early use, abundant quantity, and accommodation of itself to almost all sorts of soils. It is necessary, as with all coarse grasses, to feed or cut early, and most particularly on rich and moist soils; with which precaution, the *cock's-foot* being young, tender, and juicy, is said not only to be very nutritious, but well affected by all sorts of cattle. Its second product is to be depended upon for quantity.

ROGERS PARKER, Esq. of Munden, Herts, a gentleman of great intelligence on these subjects, is supposed to have taken the lead, some ten or twelve years since, in the culture of *cock's-foot*, from seed purchased of Mr. GIBBS, seedsman to the Board of Agriculture, who had then collected a considerable quantity in bulk. Mr. PARKER mixed a small quantity of *curled dog's-tail* with the *cock's-foot*, which produced extraordinary crops\*.

\* An improved perennial *Ray-Grass* has been produced of late years, which is said to vegetate earlier and seed later than the old *ray*; also to produce luxuriantly and preserve its verdure in the dog-days: the seed is sold at GIBBS'S, in London.

T. W. COKE, Esq. of Holkham, continues to grow great quantities of the *cock's-foot* grass, and takes every opportunity of recommending it in the strongest and most unreserved terms.

*Agrostis Stolonifera*. *Creeping bent grass*. *Red Robin* (Suffolk.) *Surface Couch*, or *Quitch*, known by various other provincial appellations in England, and held to be a troublesome weed, on certain descriptions of arable soils; in Ireland, denominated *fiorin*, or *butter grass*. Bears affinity to the *doub*, a grass of high repute in India.

Dr. RICHARDSON has, of late years, in Ireland, discovered great and valuable properties in the *fiorin* grass, and upon his authority the following account of it rests.

DESCRIPTION and HABITS.—Long strings with lively green sprouts issuing from them, at right angles, at a few inches distant from each other; the

The Editor embraces this opportunity of returning his very cordial thanks to Mr. GIBBS for his readiness to communicate information on all occasions, and for the free access allowed to his nursery at Brompton, where may be seen the most extensive and best collection of natural and artificial grasses at this time in England, amounting to upwards of five hundred different species and varieties. In this pursuit, Mr. GIBBS, faithfully answering the intentions of the Board of Agriculture, has been indefatigable for a number of years.

*Bunias Orientalis*, a broad-leaved foreign grass of great bulk and nutritious qualities, formerly recommended by Mr. YOUNG, is cultivated by Mr. GIBBS at Brompton, and at present under experiment by various stockfeeders.



strings vary in length, from one to ten feet ; in summer always green ; sometimes part of them have a dull blood-red shade, whence probably the grass got the name of *red-robin*. Most of the strings whiten in winter, when not covered up by their own mat, or by water, when they preserve their green colour : the whiteness is confined to the envelope ; peel that off, and the small interior tube is always found to be of a lively green.

*Fiorin* has scarcely any root ; the slightest catch of the earth is sufficient for its existence and nourishment, is indifferent to the extremes of wet and drought, most luxuriant in the former ; indifferent as to high or low grounds, insensible to cold, and of great value under Indian heats ; can bear great privations of air and sun ; its roots to be found under privations which no other grass can bear, scarcity of soil, loss of the sun's rays and want of free circulation of air ; situations, where these prevail, to be searched for *fiorin* strings, by the planter ; such as sides of commons, beaten gravel roads, in shallow hungry soils ; the north sides of all walls, where the green sod comes close up to the wall ; and at the contact of the sod and the wall. *Fiorin* is nearly the only grass, in church-yards protected from cattle, north wall : to find it, thrust down the fingers between the green sod and the wall, and claw up whatever grassy substance is found, which will generally

be *fiorin*. So found by Mr. DICKINSON, M.P. for Somerset, in that county. Thrives in plantations under the trees, which should be stocked with it, no other grass being fit for such a shaded situation—the practice general in Ireland. Does not injure young plantations by rising high like other grasses, but lies flat on the ground. *Fiorin* hay composed exclusively of the strings, essentially different from all other hay, which is composed of leaves and stalks, dead matter; hence *fiorin* hay retains life during many months, and will vegetate, which adapts it to preservation, or hay-making in the winter season. To be found on the summits of the highest mountains in Ireland, and will grow on the top of a garden wall; merits trial on barren sands.

Not an aquatic, but amphibious. In very wet places, generally mixed with the *festuca fluitans* (manna grass), and the *aria aquatica* (water hair grass), both so strongly resembling it, that they would sometimes mislead, and both so decidedly aquatic, that drought is fatal to each of them. The situations we are led to by its amphibious nature, are such as are exposed to the alternations of wet and drought; the bottom of ditches wet in winter and dry in summer, winter drains, irrigator's conduits, &c. will afford an inexhaustible stock of roots and strings. In a late letter to the *Farmer's Magazine*, Dr. RICHARDSON assumes that Nature is determined

and actually *attempting* to clothe every acre with *fiorin*; and that she would succeed, were it not for the sturdier rivals of quicker growth that interfere.

**CULTURE.**—*Fiorin* is never raised from the seeds, which are small, light, and slow of growth, and apt to be choked and overpowered by the stronger grasses and weeds. It is planted by laying down the strings. These strings laid on a raw surface, especially if rich, any time from the 10th of September to the 1st of April, and lightly sprinkled with earth or compost, so as nearly to cover them, will surely vegetate and clothe the surface. Between April and September, the growth of weeds is more rapid than that of *fiorin*, and will require much attention to secure their extirpation; in this period, too, other grasses will rise and embarrass. Every other grass to be weeded out. The first or second week in October, the proper season for mowing *fiorin*. Irrigation profitable.

**QUANTITY per acre.**—Quantity from five to ten tons of dry and well cured hay. Dr. RICHARDSON warrants the *fiorin* grass and hay to be superior to all other species, and that animals prefer it to all other. His quantity per acre, in 1808, was above 16,000 lbs. or 8 tons; in 1810, above 18,000 lbs. or 9 tons of choice hay to the English acre. He remarks somewhere, that the hay, when weighed, was rattling dry.

*Fiorin* grass has been cultivated in Scotland, by

Mr. MILLAR of Dalswinton, and in the vicinity of Edinburgh, during several seasons past, and, as far as the results have yet transpired, with a promising degree of success; also by Dr. PRING in Wales.

In England, Lord ROUS is a principal cultivator of the *fiorin* grass, and the Editor begs leave to return his public and most respectful acknowledgements to the noble Lord, for his polite attention and ready communication of the following particulars in a letter dated January 17th from Henham Hall, on the coast of Suffolk. His Lordship has three acres of good established *fiorin*, in its second season, planted in rows a foot apart, from strings purposely collected: only about half an acre of it has yet been cut, for the use of planters. Eleven acres more were strewed over with *fiorin* in October and November last, according to the method recommended by Mr. FARISH, in his pamphlet, of the success of which Lord ROUS expresses himself somewhat doubtfully, but observes that a good deal of it has taken root at the joints.

As far as Lord Rous's experiments have proceeded hitherto, he is ready to confirm Dr. RICHARDSON's good opinion of this grass. It has been eaten greedily by every animal to which it was offered, and his Lordship's blood mares and racing colts will follow him in the paddocks for a mouthful of *fiorin*, for which they will reject both the best pasture they may be upon and the best hay. It is, however, for

cows and sheep, from October to April, that Lord Rous looks to the *fiorin* grass for its principal use, and recommends it to be cut green, a waggon load at a time, like lucerne or tares, and given to them dried in the air, without the expense of its being regularly made into hay. His Lordship expects to be able, in the course of the next winter, to give a more ample and decisive account.

The Earl of HARDWICKE, President of the Cambridgeshire Agricultural Society, has lately offered premiums for the culture of *fiorin* grass. In the advertisement of the Society, it is stated, that *fiorin* produces an immense crop of green winter food for milch cows, cattle, sheep, and young horses; that, for working horses, it is better to make it into hay in the winter, as it dries easily, and is not injured by the weather, nor heats in the cock; that it produces from six to eight tons per acre: planted in autumn, it will be fit to cut the following Christmas; may be gathered for planting from the sides of roads and ditches. It is not explained whether these accounts refer to Ireland, or that such degree of success with this grass has been actually experienced in England.

On the other hand, late accounts from the West of England are said not to be favourable to the culture of this grass. The Editor's own experiments, upon a small scale, have not turned out successful. A sample of well made *fiorin* hay was universally condemned, with one exception, by the dealers and

consumers in London, to whom it was shewn. Neither cows nor horses shewed any predilection for the hay or the grass itself; some rejected the hay.— Fresh strings from a two year old plantation originally from Ireland, planted in September last, in foot rows, upon a tilth of perfect cleanness, produced only twenty or thirty blades of *fiorin* to the yard square, which have since declined. The above two year old plantation, although of a perfectly healthy and luxuriant appearance, has never exhibited any sign of that vast quantity, which, from the experience in Ireland, we have been taught to expect; probably not of so great a bulk as we might reasonably have looked for, in the same time, from other grasses. Nor does Nature seem to evince the same determination, in this country, as Dr. RICHARDSON supposes her to have done in Ireland; for although natural *fiorin* is indubitably to be found in most parts of England, it is by no means universal or superabundant.— Neither is the partiality in animals for *fiorin*, green or dry, so conspicuous here, as it is found to be in the sister island. Upon Lord SOMERVILLE'S Cobham estate, Fair-mile, the cattle and sheep have been invariably observed to pass over the patches of natural *fiorin* grass, leaving it untouched. As far as it may be allowable to judge from very slender experience, *fiorin* grass appears, to the present writer, comparatively light and innutritious; but he is still inclined to adhere to his former opinion, that, from

its winter habits, it may have its use as cutting grass for that season and early spring; subject, however, to a comparison, for quantity and quality, with our usual kept grasses. Such comparison, probably, might not be unprofitable even in Ireland, the heat of present enthusiasm being a little moderated. It was surely a most unfortunate judgment which identified *fiorin* with couch; they are grasses of different *genera* and indicative appearance. Couch produces a spike like rye—*fiorin* branches; the roots are totally dissimilar. Nor is the celebrated *Orcheston*, Wiltshire grass, an *agrostis*, or *fiorin*, but the bulk of it of the genus *poa*.

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ADDITIONS  
TO THE  
 SIXTH EDITION.

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**IT** may be apprehended that the death of the celebrated Dr. RICHARDSON will give a fatal blow to the reputation of his *fiorin* grass. In the interim, we are left in our usual state of admiration at the great things which may be achieved, and the credit which may be obtained, by the enthusiastic energies of an individual. To speak impartially, however, it is equally difficult to refuse our assent to the repeated splendid accounts of *fiorin* produce and quality in Ireland, as to shut our eyes to its almost universal failure in this country, as well with respect to real value, as productiveness. Here, we find none of that predilection in animals, for *fiorin* grass, which Dr. RICHARDSON never failed to meet at every turn in Ireland, nor those superior crops, or that facility of culture: doubtless the strongest prejudice would be insufficient to induce us to reject such splendid advantages, could their existence be ascertained. A superabundant gramineous product, at that very season of the year when grass is in the greatest request, would be too great a temptation. It must yet not be concealed, that an individual English cultivator or two have published successful accounts of *fiorin* husbandry. The latest with



which we are acquainted, is from a gentleman of Bucks, who has cut three or four tons per acre of that grass, in the course of the autumn and winter, and found it of great use in support of his live stock. It is unnecessary to dilate further on this subject at present, since actual experiment alone can, granting it hath not already, determine the real worth of *fiorin* grass. It is held by experimenters not to be more productive in quantity, when at best, than *sainfoin*.

The excrescence called *ergot* or cock's-spur, frequent upon the Continent, which Mr. CURTIS discovered upon the panicles of the *flote* or water-grass, and which he had supposed peculiar to rye, appears to be common to the aquatic grasses and to corn. A few years since I found it upon wheat the produce of *Prussian* seed, but have never heard of its appearance upon English corn. The circumstance ought to induce a caution in the use of foreign seed.

Of late years, INOCULATION OR TRANSPLANTING may be deemed the chief novelty which has occurred in the management of grass land. This practice, hitherto perhaps confined to the county of Norfolk solely, was there first introduced by Mr. JOHN BLOMFIELD, of Warham, in the spring of 1812. He was a highly respectable tenant of Mr. COKE, of Holkham, and, we believe, the same eminent drill-cultivator who persisted in the use of eighteen inch rows for wheat, to the end of his life.

It has been disputed, whether or not the practice

of transplanting grass had been recommended in former times; but granting such to have been the fact, it might as well have occurred to Mr. BLOMFIELD, as to a predecessor. It is, moreover, a curious fact, that Mr. CURTIS, also, had a similar plan in contemplation, in the very same year when Mr. BLOMFIELD was making his experiment. This appears from the observations of the former (p. 24) on the seeds of the tall fescue-grass, which, when sown, rarely prove fertile; whence he advises parting and transplanting the roots; adding his opinion that, in certain cases, the expense would be refunded. On the point of transplanting sward generally, his opinion is remarkable in this place.—“We have often thought that meadows would be best formed by planting out the roots of grasses and other plants in a regular manner; and, however singular such a practice may appear at present, it will probably be adopted at some future period: this great advantage would attend it, noxious weeds might be more easily kept down, until the grasses and other plants had established themselves.” In fact, the transplanting of grass is merely doing that upon the large scale, which has been practised upon the small, for lawns and grass plats. I first noticed Mr. CURTIS’s plantation of grasses, Lambeth Marsh, where I then resided, in the year 1777, and had myself a few experimental patches. These experiments I pursued after the year 1800, through several successive years, taking notes thereon.

The few Norfolk cultivators who have hitherto adopted this plan, declare themselves satisfied with its profitable result, and their visitors admire the level and flourishing appearance of the newly manufactured meadow. Nevertheless, it is not to be expected that a plan attended with so much expense of money, time, and labour, should ever become general, even in the best of times. Farmers have never been very ready to lay down their land to permanent grass according to the ancient and less expensive mode of sowing the seeds; a mode, which besides will generally be preferred on good grass land, where, under proper management, a sward is raised without difficulty. On thin soils, the sub-soil also being unfavourable to the propagation of edible grasses (such in general is the character of the soil of Norfolk), the case is different; and on those, if on any, transplantation must be advantageous. On such soils, it has been experienced that although the best and freshest grass-seeds will perish, at least fail to produce a sufficient sward, the roots will flourish and succeed to as great a degree as can reasonably be expected, the nature of the land considered. Allowing so much, it will then remain to be determined, whether temporary leys and the artificial grasses may not be the most profitable husbandry for poor soils. To the heavy expenses of taking up and relaying the sward, must be superadded, at any rate, some con-

siderable damage to the land from whence it was taken ; unless, indeed, the latter should be in a situation of decay to render the breaking it up desirable; under which circumstance, it is but too probable that the new plantation would consist of at least as much useless and pestilent rubbish as of valuable herbage. Should it be held eligible to cut turf from a good meadow, there can be no doubt of the necessity of some substantial superinduction, and even of a fresh seeding, by way of making amends for the substance withdrawn.

In March 1812, Mr. BLOMFIELD commenced this system, transplanting turf upon six acres of land, which had grown a crop of barley in the preceding year, no seeds being sown with the corn. The land was perfectly clean and in good heart, the barley having followed a crop of turnips eaten upon the ground. This first attempt being successful, he immediately proceeded upon the same plan, until he had completed to the extent of forty-two acres of transplanted turf pasture, around his farm-house, forming, in the space of two years, a perfect matted surface of indigenous grasses upon a weak and gravelly soil, on which it would have been impracticable to produce the like, if at all, in so short a time, by sowing the seeds. The plan was, in course, patronized by Mr. COKE, who encourages every useful discovery, and who is one of the greatest and most

indefatigable patrons of the primitive profession of the culture of the earth, that any age or nation has witnessed.

The following instructions for transplanting turf are chiefly drawn from a republication of the plan by Mr. BLAKIE, the Steward at Holkham, where it has been extensively and successfully practised:— Arable land intended to be laid down to permanent pasture, by the method of transplanting the turf, should previously be made thoroughly clean, either by an entire summer fallow, the land being foul, or by a turnip fallow, when in better condition. The operation of transplanting may be successfully performed either in the autumn or spring; but the latter season is probably most safe, from the expectation of warm rains and genial weather. Succeeding drought or frost are most inimical to the roots of the new-laid turf. Both the autumnal and spring seed seasons interfere with this operation, whence the beginning of November and of March may be stated, generally, as the earliest periods in which it can be practically commenced. Turf does not pare well when too dry, but requires to be moistened by rains.

Particular attention should be paid to the nature and condition of the land from whence the turfs are to be taken. The situation should be as near as possible to the field to be planted. The more level the surface, and the more free from stones, the bet-

ter; and it is necessary to examine minutely the particular grasses of which the herbage is composed, which may be done in the following manner: Let several small patches of turf be turned up with the common spade, in different parts of the field; should these patches be composed of running rooted plants, such turf should be rejected, as probably consisting of the *triticum repens*, *holcus mollis*, *agrostis repens*, and others of equally worthless description. It is scarcely necessary to advise the rejection of those parts of the sward which are overrun with weeds.

The most eligible turf is that composed of fibrous rooted plants, such as some of the *poas* and *fescucas*, the *cynosurus cristatus*, *anthoxanthum odoratum*, *dactylis glomeratus*, *lolium perenne*, *alopecurus pratensis*, *trifolium*, &c. These plants generally enter into the composition of that styled by farmers, a *good, clean, sweet, old turf*; a description, no doubt, the most desirable of all others.

A paring plough is, obviously, the most proper tool for cutting off the turf required, but a good shift may be made with a common steady wheel-plough, having the coulter and share well sharpened. The turf should be cut about two and a half inches thick, and seven, eight, or nine inches wide, according to the nature of the surface, the gauge of the plough, and width of the wing of the share: it is occasionally cross-cut into short lengths, previously to the operation of

paring, which can only be effected when the land is free from stones. This cross-cutting is done by a scarifyer with scymeter lines, the convex edges being made very sharp and faced to the work, and the implement heavily weighted, so as to press the tines to a proper depth. Cross-cutting facilitates the operation of dividing the turfs into small pieces, but it gives more trouble and consequently increases the expense of filling the carts. The heaps should be moved to their destination, if possible, in broad-wheeled carts, and dragged out and placed in straight lines at regular distances, in the same manner as dung heaps, and after the rate of fifty single-horse cart-loads to the acre. It is then chopped into pieces of about three inches square, and spread with shovels regularly over the ground. A scarifier with round or square tines, about one inch and a half diameter, and set about seven inches and a half apart, or four tines in a yard, is drawn regularly over the field, and again crossed at right angles, which obliterates the cart-wheel tracks, levels the ground, and marks out the distances for placing the turfs or plants; but this operation of scarifying is necessarily omitted when the ground is wet. It is, however, a considerable advantage when the scarifier can be used, as it not only marks out the distances accurately, but it makes openings for the reception of the plants at the angles where the tracks of the tines cross each other.

The turfs being spread, and the ground marked out by the scarifier, the state of the weather also admitting, women and children are then employed to place them, one piece in each intersection formed by the tracks of the scarifier; and as they place the pieces, they should press the roots to the earth with their feet. The calculation of one piece of turf to each point of intersection, is formed on the supposition that the number of plants corresponds with the number of squares; should it not be so, the operators must place them thicker or thinner accordingly.

One acre of turf, divided into pieces, and placed as described, will plant nine acres of arable, as will appear from the following calculation:—one acre of turf cut into pieces of three inches square, will produce 696,960 plants.

One acre of arable marked into squares, of nine inches to the side of the square, or eighty-one square inches, and one plant to each square, will require 77,440 plants; consequently, one acre of turf will plant nine of arable; each plant will stand six inches apart, and occupy nine square inches of space, the blanks in each square being seventy-two square inches for each plant to fill up.

Although the above be the most common, and thought to be the most proper size for the plants, and distance for them to be set apart; yet it may not be always convenient to allow so large a pro-



portion of turf for plants to the acre. In that case, either the size of the plants may be reduced, or the distances apart extended.

Suppose the size of the plants to be reduced from three to two and a half inches square, one acre of turf will then produce 1,003,622 plants; and an acre of arable land marked out as before, in squares of nine inches to the sides of the square, or eighty-one square inches, one piece of turf being placed upon each square, the number of plants to the acre will, of course, be the same as before: but there will be a sufficient number of pieces of turf to plant twelve acres, three roods, thirty-three perches, and a fraction. The plants will stand six inches one-half apart; each plant will cover six and a quarter square inches, and the blanks will be nearly seventy-five square inches, to be filled up by the extension of the plants.

Again, suppose the tines of the scarifier are set only three in a yard, the arable field will then be marked out in squares of one foot; and suppose the pieces of turf to be three inches square, the number of plants produced from an acre of turf will be, as in the first example, 696,960: and if one piece of turf be placed upon each square foot, there will be 43,650 plants to the acre, and one acre of turf will plant sixteen acres of arable; each plant covering nine square inches of surface, will have to extend over one hundred and thirty-five square inches of blank before the turf be united. Calculations of

this description might be made to an indefinite extent, but the preceding are sufficiently explanatory.

The above directions presuppose that the whole of the turf is intended to be taken from a piece of pasture, previously to its being broken up by the plough, in order to a course of corn crops; on the other hand, should it be desirable to preserve the field still in permanent grass, in such case a sufficiency of turf plants must be left for the purpose, and the following process adopted:—

The gauge of the paring plough may be set at nine inches, as before directed; but the wing of the share should be turned up at six inches, and being made very sharp will cut the turf on that side, while the coulter, also made sharp, will cut the turf on the other side, and the flat of the share will turn the turf out six inches wide, leaving ribs of grass, three inches wide, uncut. The cut turf being removed, the plough, set at the same gauge, is then drawn across the field at right angles, to its former direction; and cross-cutting the previously uncut ribs, will leave patches of grass three inches square, in each angle; consequently the same number of plants to the acre, as before stated in the first calculation for transplanting.

After the turf shall have been removed, the field should have a good top dressing, not less than thirty or forty cartloads per acre of compost manure or good vegetable mould: should the natural turf be

deficient in any particular favourite species of grass, the seeds of those plants should be sown at a proper season, after the top dressings have been spread, and the land should be repeatedly and well rolled. The turf will soon unite, and, in many instances, will be found materially improved, particularly so where the turf had been hide-bound or mossed.

The turf may also be taken out of the grass-field in narrow ribs, about three inches wide, leaving three inches uncut; then with a top dressing of compost, and the ground thoroughly well rolled, the sod soon unites, and the herbage will be greatly improved.

An implement for the purpose of cutting turf into narrow ribs, may be very easily constructed; but it should not be attempted to cut out too many ribs in one process, as, from the natural inequality of the surface, the turf would not be pared off so regular, as when a few rows only are attempted at one operation. The model of an implement of this description, and of every other required in transplanting grass, and generally for agricultural purposes, will be most successfully sought at the great annual festival of Holkham.

In the operative part of transplanting, caution has already been given to press the roots of the plants well into the ground; for should those be left exposed to the frosts and vicissitudes of the winter season, they would be greatly injured, and many of them perish.

The whole process requires the utmost expedition, particularly when conducted in the autumn: as frosts may then be nightly expected, no greater quantity of turf should be cut, carried and spread in the day, than it is probable can be planted before night. At all times, no greater extent of this operation should be undertaken, than can be completed in a perfect and husbandlike manner; for the duty being performed in a loose and slovenly way, both lands will suffer. The work being properly executed, it is averred, on practical authority, that success is certain.

Should unfortunately, at the time of planting, the land be too dry and hard for the common pressure with the feet, the roller must be immediately used. And if frost, or other cause, should forbid the use of the roller, a pavier or carpenter's wooden rammer is the best substitute; with one of which, a labourer will complete a considerable breadth of this work in a day.

The plantation being completed according to art, no live stock of any description should be admitted upon it, until after the grasses shall have perfected and shed their seeds; indeed, perhaps, not even until the third season. It has long been the fashion to talk of the mischief of the scythe, but the havoc made by sheep and other stock with the roots of grasses has not been so much observed; and this is of more particular consequence upon land which does not exhibit grass as its best and most abundant production.

If the new turf be found deficient in any of the valuable grasses, or of the natural and perennial clovers, white or red, their seeds should be sown in April, those plants being too tender for an earlier sowing. Afterwards, the land being neither too wet or dry, it should be repeatedly rolled at proper intervals, with a heavy roller, which will cause the plants to branch and extend, instead of running up into tufts, as it otherwise generally will. Rolling must be discontinued on the grasses becoming high, and the approach of the flowering season, and resumed towards the autumn. This necessary operation of rolling grass land, is most regularly and skilfully performed in the hay districts of Middlesex. Should there be a good swathe in the first season, the new pasture may be once mowed for cattle food or hay, after the seeds shall have become so ripe that they will be shaken out by the operation upon the land. This practice, at any rate, for the first season, is more safe than turning in stock to eat off the lattermath, as allowed by the authority here quoted. The probable mischief, by tearing up the new laid turfs, and injury to the roots of the grass, is far greater than the probable benefit from the small quantity of manure left by the cattle, and more especially should the weather prove wet. The expense of carting a few loads of compost, as a substitute, would be well repaid.

It is said most truly, there are five principal ob-

jects to be attended to, in the management of grass land ; namely, *draining, manuring, harrowing, rolling,* and *weeding* : to which may be added a sixth, of far more consequence than it is usually deemed—beating and spreading the dung of cattle. Land sodden with stagnant water can never produce sweet and nutritious herbage : without manure, hay-making will impoverish the best meadow. Rolling will preserve an even surface, and consolidate the roots below. *Bush* harrowing, or *tine* harrowing, when necessary, will separate and spread the grasses, and destroy or prevent the accumulation of moss. Weeding may well be placed last, since it generally stands last in the recollection of a farmer ; but weeds, in proportion to their quantity, detract just so much from the value of the herbage.

There can be no doubt of the preference due to the spring season for transplanting grass ; but should particular convenience alter the case, and the autumn be chosen, a crop of turnips may be drawn and stored, to make room for the turfs. The land being light, scarification will bring it into sufficient tilth, without the necessity of ploughing. Could a mild and not too moist winter be insured, no part of it would be improper for this business, which, however, should not, if possible, be protracted in the spring, beyond the month of March.

A premium having been offered by T. W. COKE, Esq., at his sheep shearing, for grass transplantation,

the following account of the attendant expenses was delivered in by Mr. HENRY BLYTH, a claimant in 1816:—

	A.	R.	PER.
Extent of grass land pared for plants . . . .	1	2	18
Ditto of arable planted with the above . . .	11	0	15

## EXPENSES.

	£	s.	d.
Ploughing or paring the above grass land, at 10s. per acre . . . . .	0	16	1½
Carriage of 600 loads of turf, 50 days work for one horse, at 3s. per day . . . . .	7	10	0
Lads driving carts, one boy 14 days at 1s. 2d. per day, and one ditto 4 days at 10d. . . . .	0	19	8
Scarifying 11 acres 15 perches of ground covered with turf cut in pieces, at 2s. 6d. per acre . . . . .	1	7	8½
Labourers filling, cutting, spreading, and planting the turf on the above arable land, at £1 10s. per acre . . . . .	16	12	9½
Total Expense, £	27	6	4
Ditto, per acre, £	2	9	2½

A very important observation follows. To the foregoing estimate ought to be superadded, the expenses incurred by the clear summer fallow of the arable land, with the year's rent, poor's rate, and taxes for the year; together with the charge for restoring to its pristine state the old pasture from which the turfs were taken.

With respect to double cropping the young pastures, by planting corn or pulse upon them, on strict and fair calculation, it will probably appear, that such measures are generally delusive; that one crop must inevitably impede the other, often injure it, and that one good crop may be of more value than two middling ones.

The *Dactylis glomerata*, or rough cock's-foot grass, still maintains that reputation which it had acquired under the auspices of Mr. COKE and other eminent practical cultivators. The old objections have been experimentally and practically obviated, and this grass may now be safely and profitably cultivated upon any proper soil; in fact, on many where no other grass will succeed equally well; either alone or mixed with white clover, sometimes with timothy and other grasses. Cock's-foot is, however, too coarse for hay.

The *Lolium perenne*, or perennial ray grass (for there is also an annual of this variety), is an ancient grass, and one of those, the seed of which has been preserved the earliest and in the largest quantities. It has, nevertheless, suffered greatly in character, these many years past, as the most exhausting crop of all the gramineous tribes. There may probably be some prejudice in this case. But granting it an exhauster, is not that circumstance necessarily a proof of its solid nutritive powers?—and if so, does it not repay the expense of the requisite superin-



duction to recruit the soil? It is, perhaps, the most substantial of all the grasses, and being of an absorbent and astringent quality, the most safe for sheep in a rotting season. It is early, and will grow on all soils, and on many, a crop of rye grass and clover may be obtained, where no other would succeed. Many presumed improvements have been made in the rye grass, by individuals who have cultivated the seed to a great extent, for sale. Doubtless, granting the objections made to this grass to be valid, no one will continue to cultivate it, but on the score of necessity; in the present times more especially, since all the known valuable seeds may be procured in abundance.

*Phleum pratense*, meadow cat's tail or timothy grass, has been separately cultivated, in various parts, to a considerable extent. Perhaps, this grass has greater merit than Mr. CURTIS (p. 30) seems disposed to allow. It is adapted to moist or wet soils, and has sometimes succeeded in others not decidedly such, where it has proved a sweet and feeding grass, well affected by both sheep and cattle. It has also succeeded in mixture with white clover and cock's-foot; and in the North, unmix'd, to a very considerable degree, as the following memoir will evince, sent to the Editor in 1812, by the late MALCOLM LAING, Esq., M.P.

“ In September 1801, a small spot of uncommonly rich pasture, in the neighbourhood of Greenock,

" attracted my particular attention : upon inquiry, I  
 " was informed it was a foreign grass. My curiosity,  
 " and the high opinion I had formed of it from what  
 " I saw, led me to wish for a little of the seed. The  
 " gentleman to whom this little field belonged, was  
 " good enough to let me have about two ounces from  
 " that year's crop, which he told me was the seventh.  
 " This I sowed next spring, and have been endea-  
 " vouring to increase my quantity annually from that  
 " period. The name of the plant was at first un-  
 " known to me, but I some time ago discovered it  
 " to be the *phleum pratense*, named meadow cat's  
 " tail or timothy grass.

" At present, I have about twenty acres covered  
 " with that grass, in four fields, and of four different  
 " ages ; that is, one, two, three, and four years old.  
 " Owing to the drought of last year's summer, the  
 " seed sown in the preceding spring has not been so  
 " productive this season in hay as formerly ; yet the  
 " pasture is likely to turn out well. The second year's  
 " crop mown on the 29th June last, yielded at the  
 " rate of 600 stones, at 16 lbs. to the stone, or 400  
 " stones heavy weight per acre. That part which is  
 " three years old, may be reckoned at 320 heavy  
 " stones per acre. The remaining division, four  
 " years old, has been used as pasture which is both  
 " considerably more plentiful, and more to the taste  
 " of horses and black cattle, than that of rye grass  
 " sown on the same field, and at the same time.

" Timothy ought to be sown in spring, at the  
 " usual time of sowing other grasses : it will grow to  
 " the height of four feet on good ground, but would  
 " seem to prefer that which is somewhat moist. I  
 " have it upon newly improved moss, and dry gra-  
 " velly ground, on both of which it thrives better,  
 " and produces more food than rye grass ; but, from  
 " the ground on which I first saw it, I suspect it will  
 " grow best on a moist loam, or clayey soil.

" This grass when used as green food, for which  
 " it is extremely well calculated, may be cut twice,  
 " or perhaps three times, in one season. When in-  
 " tended for hay, it ought to be cut fully a week be-  
 " fore it flowers. Hitherto I have saved seed for  
 " myself annually ; but from some risk in collecting  
 " it, together with the injury done to the hay and  
 " pasture by allowing it to ripen, which it does not  
 " do for six weeks at least after the proper time for  
 " cutting for hay, it would probably be best to get it  
 " from America. It was sold this season, at Liver-  
 " pool, at 90s. per cwt., and 10 lbs. are enough for  
 " seed to an acre.

" From careful observation during nine years, I  
 " am now fully convinced that the timothy is greatly  
 " superior to rye grass, and probably to every other  
 " grass as yet generally employed in this country,  
 " either as pasture, green food, or hay. Horses and  
 " black cattle give it a decided preference, in each of  
 " these states, to both clover and rye grass. It is pro-

"duced in greater abundance, upon an equal space  
 "of ground, than rye grass, and the ground has  
 "never appeared to suffer in the smallest degree by  
 "bearing it. This grass, therefore, is well worth  
 "the attention of every person concerned with agri-  
 "culture; and I am fully persuaded, that whoever  
 "gives it a fair trial, will find it a most valuable  
 "acquisition.

"PS. If timothy grass be intended for pasture,  
 "it will answer very well to sow white clover along  
 "with it; if for hay, it will probably succeed as well  
 "by itself. This, however, is yet to be ascertained  
 "by experiment. Ten pounds are stated as enough  
 "of seed to an acre, but some soils may probably re-  
 "quire twelve pounds, and particularly in a northern  
 "climate. Hitherto I have sown it with barley,  
 "wheat, or oats, and made hay of it in the usual  
 "way. It will admit of being put up into ricks  
 "sooner than rye grass."

The following letter, signed J. C. WORTHINGTON,  
 appeared in "The Farmers' Journal," March 6th,  
 1820. We presume it was from Dr. WORTHINGTON,  
 whose opinion on agricultural subjects is entitled to  
 great attention. We give the letter entire, as afford-  
 ing new practical views of a grass which perhaps,  
 on fair trial, will appear to merit a more general  
 attention than it has hitherto experienced.

"My accidental culture of a grass very commonly  
 "grown in some counties of England, and which in

“ America is cultivated nearly to the exclusion of  
 “ other grasses, whilst, extraordinary to say, it is  
 “ almost unknown to the farmers in this part of  
 “ Kent, having occasioned me to receive applica-  
 “ tions, which it is inconvenient to answer individu-  
 “ ally, and at the same time uncourteous to neglect,  
 “ I avail myself of the medium of your journal  
 “ (which I understand is in every body’s hands) to  
 “ give one answer for all; and I am the more dis-  
 “ posed to do so *publicly*, because I find, that an  
 “ attempt to cultivate the plant at the Earl of CHI-  
 “ CHESTER’s, (which is neither quite in, nor quite  
 “ out, of my neighbourhood) is said *not* to have  
 “ succeeded. The plant in question is the *Herd*  
 “ *grass*, or *Timothy grass* of North America, being  
 “ the *phleum pratense* of the botanist, a perennial  
 “ plant of great hardihood, yielding a very large crop  
 “ of excellent fodder, and which being applicable to  
 “ more uses than the common trash of indifferent  
 “ meadows, may be considered as holding a middle,  
 “ or intermediate rank, in some respects, between  
 “ the inferior grasses and a grain crop. The species  
 “ is, nevertheless, a common and indigenous mea-  
 “ dow grass, *growing wild* about my fields in abun-  
 “ dance, an observation of which occasioned me first  
 “ to cultivate it. Its peculiarities are, its culmi-  
 “ ferous growth, vigorous and upright, setting wind  
 “ and rain (when they lodge other crops) at defi-  
 “ ance; its stature, nearly that of wheat; its luxuri-

“ ant produce, on wet and stiff land, which its pow-  
 “ erful roots render firm in our rainiest winters; its  
 “ considerable crop of seed, when suffered to ripen,  
 “ (subject to no blight or devastation by *larvæ*, in  
 “ my experience) and, finally, the valuable quality  
 “ of its straw, forming an extremely neat, and be-  
 “ yond all comparison the most durable *thatch* that  
 “ any building can be covered with. I have it now  
 “ on hay-stacks, removed from preceding stacks of  
 “ two successive seasons, and still effectually per-  
 “ forming its office, and the better from its slender,  
 “ stiff, and wirey substance, which enables it to re-  
 “ sist the wind, and thus, I imagine, becomes the  
 “ cause of its durability.

“ With regard to the disputed point of its being  
 “ liked by cattle, I can speak only of my own, and  
 “ in this respect principally of *horses*, which do  
 “ decidedly prefer it to any other fodder I grow, a  
 “ preference which I account for from its superior  
 “ saccharine quality; and as animals usually affect  
 “ most what is best and most *bateable* for them, I  
 “ have accordingly found their instinct, in this case,  
 “ confirmed by their condition.

“ It is known that during the period when grain  
 “ was extravagantly dear and scarce, and sugar abun-  
 “ dant and cheap, the Government, acting with an  
 “ economical and scientific discretion, reduced with  
 “ practical good effect the rations of grain to the  
 “ cavalry horses, by substituting an allowance of

“ sugar in its stead. I can on no other principle  
 “ account for the decidedly nutritious property of  
 “ this grass, and the consequent preference given it  
 “ by my cattle; and as to the fact of its containing  
 “ in its juices, and in its foliage, when desiccated  
 “ and even in its *straw*, a superabundant fixed por-  
 “ tion of sugar, no one who has *tasted*, or *smelt it*,  
 “ in any of these stages, can entertain a doubt. A  
 “ chemical analysis, that should ascertain the pro-  
 “ portion of *carbon to hydrogen and oxygen*, as also  
 “ their united quality contained in its mucilage, would  
 “ be extremely illustrative, and (compared with that  
 “ in the other grasses) very decisive.

“ It was an observation of this predominant qua-  
 “ lity possessed by the stalks of its hay, which led to  
 “ infer that the *seed* of a plant so very *saccharine*,  
 “ must contain a proportionately wholesome and nu-  
 “ tritious *farina*; and it happening that I had in  
 “ store about six bushels of the seed of a previous  
 “ year, (which, from having been heated by putting  
 “ together damp, had become discoloured,) I sent it  
 “ to my miller, desiring him, (although it was nearly  
 “ as minute as Dutch clover seed) to grind it into  
 “ meal; which when sent home, I had a hog of be-  
 “ tween 30 and 40 stone put up to be fatted exclu-  
 “ sively with it. The experiment fully succeeded:  
 “ the hog was fatted, with the meal of the grass only,  
 “ *in a shorter time than usual*; and the carcass was  
 “ principally purchased and consumed by one of my

“ men, an experienced judge, who had fed it, and  
 “ killed it. I had the ham at my own table, and the  
 “ quality excellent.

“ Having now specified the good qualities pos-  
 “ sessed by the plant, I am not, in fairness, to omit  
 “ its defects; which are necessarily, and like all  
 “ other things, correlative. Its bulk and gross lux-  
 “ uriance, then, disqualify it for the grass plat, the  
 “ park, and the lawn; and yet it has not the coarse  
 “ unsociable foliage of the *dactylus*, or cock’s-foot  
 “ (so extensively cultivated by Mr. COKE, in Nor-  
 “ folk); on the contrary, it more resembles the rich  
 “ succulence of thriving barley, with a mode of  
 “ growth not unlike the meadow fox-tail, the very  
 “ best of our spring grasses. The defects of sow-  
 “ ing, moreover, (and the steadiest hand will not al-  
 “ ways escape them) are never recovered by the shed-  
 “ ding of any of its subsequent seed, although it  
 “ does so in great abundance. Such, in short, as it  
 “ comes up, such it remains: its own subsequent  
 “ seed cannot struggle with the established tenaci-  
 “ ous roots of the parent plant; nor do any other  
 “ grasses ever contend with it where it grows: its  
 “ possession of the soil is monarchical, and it rules  
 “ alone. The red and white clover only, as I find,  
 “ succeed with it, when sown simultaneously, sus-  
 “ taining themselves by their tap roots, give a rich  
 “ and thick bottom to the sward, or hay, and greatly  
 “ assist the aftermath, or may be cut for seed with-



“ out injury from the *phleum*. If the field destined  
 “ for it, then, be not fully stocked, the best way, and  
 “ the shortest, is to break it up at once, and sow  
 “ again. The seed being very minute, requires a  
 “ *very fine tilth* not always accomplishable in stiff  
 “ land, and thus in its sowing time it is liable to  
 “ hazard; a flax crop accordingly is kindly to it. It  
 “ grows well, however, sown with oats or barley,  
 “ but makes no show until the succeeding spring,  
 “ when it starts off with adult vigour; but I should  
 “ prefer the autumnal sowing for all grasses, as the  
 “ most analogous to nature and the season, when  
 “ every seed will tell; and would sow it with *clover*  
 “ *only*, at the end of August; and as a little seed is  
 “ no object, where the plant is to last for ever, I  
 “ should sow one peck of the *phleum* per acre.

“ With regard to the produce, it will, on a tolera-  
 “ ble land, exceed two tons an acre, and on good  
 “ land considerably exceed it. I have mown and  
 “ seeded it for several successive years, with rather  
 “ an improving than diminished produce; and on  
 “ land *not half stocked* with the plant, have grown  
 “ one quarter of seed per acre; whilst my horses pre-  
 “ fer the *straw* (after thrashing) cut into chaff, to  
 “ *ordinary* hay; and, mixt up with a little beans,  
 “ they cannot have a more heartening provender.  
 “ The hay of it I have sold at £6..10s. per ton, from  
 “ land, which, in its actual condition, would not have  
 “ produced half the quantity of meadow hay of infe-



rior quality. I need scarcely add, that such vigour  
 “ *is not inexhaustible*, and that manure and good  
 “ husbandry must be supplied.

“ I have but one concluding remark, arising out  
 “ of an observation afforded during the late severe  
 “ weather and deep snow. I had preserved the  
 “ game strictly on my place this season, and particu-  
 “ larly partridges, which I had in January in great  
 “ abundance. My grounds are wholly in grass, and  
 “ all the rowens were untouched at the time of the  
 “ snow. The birds had nothing to resort to but  
 “ such herbage as they could reach. The *phleum*  
 “ was by much the shortest, and yet I never found  
 “ the partridges on any other feeding haunt; which  
 “ further satisfied me, that *that* plant must be more  
 “ than ordinarily nutritious, whose mere winter foli-  
 “ age could afford a chosen sustenance for a granivo-  
 “ rous bird. It is a similar *saccharine* quality, proba-  
 “ bly, that makes the *green shoots of wheat* so  
 “ favourite a food of these birds, and imparts to their  
 “ flesh in spring its then peculiarly agreeable flavour.

“ I find, on retrospect, I have omitted to state that  
 “ this grass, although early in spring, (coming im-  
 “ mediately on the heel of the fox-tail) is neverthe-  
 “ less, when seeded, rather late in the harvest, not  
 “ much preceding wheat. In hay time, it occupies a  
 “ middle period between early and late; but may  
 “ be much anticipated by mowing *just before* it  
 “ blooms, at which time it makes its very best hay.”

In soils to which it is adapted, and on which it will grow to a great bulk, timothy may be found profitable to cut green for cattle, in the manner of lucerne; after which, it will afford good autumnal food. Its hay, when the grass is not left too late, is considerably finer and better than is usually supposed, and its character as a non-exhausting grass merits consideration. According to the experience of the present writer, timothy makes very thick bottoms; and from its affecting moisture, as well as doing less injury to the land than other grasses, in all probability, may be most advantageous as kept grass for spring use. On light land this grass rises very fine, and is extremely palatable to sheep; in course, the crop will not be weighty as upon strong and most soils, although perhaps equally so with the other poor land grasses, and is excellent on either to mat and fix the soil.

*Avena elatior*, tall-oat grass, has perhaps not yet had its merits fully ascertained, although its seed is always cultivated and procurable. It is a coarse, substitutional grass, to be adopted where gramineous products are scanty, or for early spring and late autumnal use. It is very prolific, and its bulk great. It is best calculated for clays and strong loams, from which, probably, three tons per acre of its hay might be obtained. Much is said of the saccharine juices of some varieties of grass, and of their being relished by animals on account of their

*sweetness* ; we have however found in the cultivation of oat grass and timothy, at least as far as those trials went, that cattle and sheep did not much affect those.

CLOVER.—This, now universally cultivated and most valuable grass, was introduced to this country, between two and three centuries since, from Flanders. The following notes thereon have been extracted from a writer of nearly that period. He observes, that poor lands are not fit for clover, unless *burnt* or *denshired* ; at least limed, marled, or otherwise well manured. On this original ground, it probably is, that certain lands, according to the common farming phrase, become “tired of clover ;” which indeed finds a proof in the fact, that strong and deep soils have no such defect. Old untilled land is most prolific of clover, as of corn. Red or large clover was held to be quinquennial, or to last five seasons. Our indigenous clover, marl grass, or cow grass, is perennial, and has been improved by culture, to nearly the size and bulk of the quinquennial or foreign ; it would thence seem, that the reason for the early importation of Dutch clover, was on account of its improvement upon the Continent, and its superior produce ; not that our soil was destitute of that grass. The same may be said of white or hop clover. But Flanders, in former days, was the great school of husbandry for the rest of Europe.

The Brabanters, in those days, boasted of feeding

four of their large cows, during the winter and summer, upon a single acre of clover, part cut and eaten green, the remainder cut and consumed in hay. At the same period, in England, an acre of clover from Dutch seed, cut green, kept four coach-horses and a saddle-horse throughout the summer, upon land, an acre of which had never previously maintained a single cow. Six acres also maintained, during half a year, thirteen cows, ten oxen, three horses and twenty-six hogs, exclusive of the winter herbage. It is further recorded that, upon four acres, there grew twelve loads of clover hay at twice mowing, and twenty bushels of seed, the after pasture being three times better than any other, and the hay double the worth of the common hay. The seed, at that time, fetched at market from three to four pounds per bushel. These four acres yielded, in one year, fourscore pounds. He was reckoned a good thrasher, who could beat out six gallons of clover seed in one day. The superior nutritive power of clover is established by the fact, that its herbage will fatten a hog, an animal which requires the strongest fattening material.

Of LUCERNE it was said, that an acre would keep three horses the year round. This admirable grass, superior to all others, more especially considering its medicinal and fattening properties to the horse, was cultivated to a far greater extent, in England, fifty years ago, than at present. This neglect, from

defect of a better reason, may be attributed to the epidemic dread of drilling and hoeing in our farmers, certain of whom have, of late, sagaciously discovered the superior profit of *broad-casting* lucerne, under which practice, in all probability, the lucerne might not be entirely devoured by the natural grasses within three years; although in that period, it would assuredly be mixed and adulterated by all kinds of rubbish. Lucerne rowed at eighteen or twenty inches, and kept perfectly clean by the hoe, will last twenty years. Well manured, it may be cut four times in the season, although three times may be more profitable. The benefit of a good stock of lucerne, in a droughty summer, is inconceivable, but through the actual experience of it. It will succeed upon almost any, excepting cold wet lands, and the most barren of the dry, which last are better calculated for *sainfoin*; and that would succeed far better and last longer under the drill, but that custom has forbidden it. *Sainfoin* should always be sown alone.

*Burnet* is extremely salubrious to sheep, and enters into the composition of those pastures which make the most delicate and fine flavoured mutton, but has been seldom cultivated by itself, from the smallness of its product, and the frequency of its failure. The late Lord SOMERVILLE, at the request of the present writer, tried it unsuccessfully, at Fairmile.

*Saxifrage* should be invariably used among the

grass seeds, on lands laid down for the dairy, according to the experience of the old dairy women.

*Spurry* is sown, in Belgium, in April and May; it flowers in July, and in August the seed is ripe. It is sown a second time upon the same land, or upon rye, or any corn stubble once ploughed, in the latter end of August or beginning of September, as a dairy pasture for November and December; which is said then to make butter superior to the famous May butter. Poultry are very greedy of spurry grass. For a permanent pasture in this view, a mixture of spurry, timothy, and white clover, might succeed, as productive of greater bulk.

*Yarrow* and *Sheeps-parsley* are perhaps among the earliest herbage. We have seen them in the middle of February. The former should enter into the composition of all grass seeds for early pasture. We are not aware that the latter has ever been cultivated, although no other herbage is so early, and the bulk very great. Both sheep and rabbits will eat sheeps-parsley. A pasture of garden parsley and burnet, upon sound dry land, would, in all probability, cure the incipient rot in sheep.

*Bunias orientalis*.— We tried this plant from seed procured of Mr. GIBBS; it grows to the height of nearly a yard, with broad leaves and a succulent stalk; is early, not difficult as to soil, and produces a great bulk. It endures repeated cutting equally with any plant, and in hay, which cattle seem to

relish, renders a great weight. Bunias might succeed on land not strong enough for clover.

*Chicory* perhaps has long since been experimented to a sufficient extent, to prove that its great bulk will not render it worthy of cultivation: it is coarse and innutritive, of which animals seem to be aware, by their rejection of it, when any other food presents.

For soiling in July and August, upon a good sandy loam, an acre of *maize*, or Indian corn, will produce the largest quantity of rich and fattening keep; and all animals, according to our experience, will eat the stalk down to the root.

Oats have been, in Norfolk, successfully dibbled by Mr. SALTER, early in the spring, upon poor grass land, ensuring a large bulk, either for feeding, cutting to use green, or hay. The oat, cut while the stem is succulent, makes excellent hay, and a great burden, acceptable to all kinds of cattle. Or it may be cut twice in the season for soiling.

The *Maddington grass* (see p. 69).—Of this grass, the old author (1675) already quoted writes as follows:—"It is extraordinary sweet, and not so easily propagated as hath been imagined; the length thereof being occasioned by the washing of a declining sheep down, that the rain, in a hasty shower, brings with it much of the fatness of the sheep dung over the meadow; so that in such springs that are not subject to such showers, or at



“least from some certain causes, this grass thriveth  
 “not so well, the ground being then no better than  
 “another.”

*Tares, Lupines, Lentils.*—These are the chief pulse used as grass or fodder. Tares require the best land, and afford the greater and more succulent burden. Their distinction as summer and winter tares is well known, also their highly useful and feeding quality for all kinds of live stock. They are cut green for summer soiling, and although seldom made into hay, yet tare hay is most substantial winter food, and the acreable product great. The winter tare is invaluable for spring food, and greatly productive of milk in ewes. The herbage of lupines and lentils, much used upon the Continent, is finer and lighter than that of the tare, but better adapted to dry and barren soils, upon which it will probably increase to a greater bulk than any other crop, thence worthy of trial upon the worst light lands of this country. These pulse will also fatten cattle, sheep or swine, and upon poor land will be more productive than peas. It was formerly recommended to gather and plant the wild vetch or tare, which grows upon poor soils that are not strong enough for the cultivated tare.

*Winter barley*, or black oats, sown early, also afford a good and early crop of green food for sheep in the spring, being far preferable to rye with

respect to burden and succulence: large crops of the grain often succeed the feeding.

The foregoing list of summer and winter green food for cattle and sheep, upon all kinds of soil, being joined with another, easily made out, of roots and cabbage, ought to silence all the usual complaints of inability to keep live stock upon this or that soil; which, in fact, may well be referred to indolence, a slavish deference to established custom, or a pedantic adherence to a settled course of crops, to which every acre upon a farm must implicitly submit.

With respect to our indigenous grasses, their number is very considerable, a hundred and upwards of varieties having, at different periods, been discovered and illustrated. But in the end, a few have been found, or supposed, to comprise the virtues of the whole. In the mean time, the field remains open for farther discovery. The grass-cultivator's object in seeding his grounds, is, to procure the best reputed varieties of seed adapted to his soil. This he can seldom or never do, at home; and it is doing the thing incompletely and unprofitably, in fact, it is ultimately, and in its consequence, the most expensive mode, to make shift with ordinary species of seed, or with a deficiency of the most valuable. Hence the necessity of application to those whose occupation it is, to cultivate for sale the different

varieties. Here we again take occasion to recommend to the public attention, Mr. GIBBS, seedsman, during its existence, to the Board of Agriculture, whose practice and experience in the culture of grass seeds are greater than that of any other individual, and who has been engaged in laying to grass the greatest quantity and variety of land. He has, for many years, been particularly successful in the selection and composition of the seeds best calculated for the soil, when an account of its nature, situation, condition, and ordinary products, has been previously sent to him. The amelioration of our grass land is a great and important object, both to the proprietor and occupier: in fact, considering the vast and increasing population to be supported, and which, until of late years, had been fed in so great a measure by importation, it is a most impressive public duty, in this country, to advance its productions of every kind, to the utmost power and capacity of the soil. It is with regret we re-state the incontrovertible fact, that our meadows and pastures have ever been too much, or rather habitually neglected.

It is a difficult and usually unsuccessful task, to plead against established and favourite customs: on this point, having no new arguments to urge, we make the following quotation from "A Week at Great Barton," published in the Agricultural Magazine for December, 1812. "It is generally a favourite practice in laying down meadow land, to have

“ a double crop of corn and grass the first season ;  
 “ and the advantage is taken for granted to be  
 “ double, namely, that of the crop of corn, and of  
 “ the shelter afforded to the young grass. In all  
 “ probability, both advantages exist nowhere but in  
 “ the opinion ; and Mr. GIBBS, whose opportunities  
 “ of judging in this case are more numerous than  
 “ those of any other man in England, has often de-  
 “ clared to me, that nothing gives him so much  
 “ trouble in the business of laying down meadows,  
 “ as the obstinate adherence of most farmers to the  
 “ old practice of casting the grass seeds upon a corn  
 “ crop. There cannot be, at once, a full crop of  
 “ corn and of grass ; and the latter, which needs no  
 “ shelter in the spring, is rather smothered than  
 “ sheltered by the corn, and frequently the finer  
 “ grasses entirely killed. The same reasoning holds  
 “ good with respect to clover, which, according to  
 “ Mr. COKE’s method, I should always choose to  
 “ sow by itself ; besides that, an entire crop of clo-  
 “ ver (and clover, I should suppose, is wanted by its  
 “ being sown) will be far the heaviest ; it will most  
 “ assuredly be a heavy burden upon the barley in a  
 “ wet harvest. For permanent mowing grounds,  
 “ where the land may be too wet for lucerne, cow  
 “ grass and broad clover, sown in equal quantities,  
 “ in eighteen inch rows, and horse hoed, have  
 “ proved eminently successful.”

PARING and BURNING, or *denshiring*, as it was

denominated in former days, has ever proved the most effectual and profitable mode of breaking up grass or waste land, in order to aration and corn-cropping, or to re-leying and fresh seeding. But there has existed also, generally, a prejudice against the practice, from its presumed exhaustion of the staple of the soil. Its advocates, however, contend, adducing the most satisfactory experimental vouchers upon the large scale, that the exhaustion complained of, results not from the previous paring or the fire, but the subsequent unmerciful and unreasonable succession of crops, adventured on the strength of the first stimulating manure of the ashes. They proceed to the length, on their own personal experience, of asserting that even the thinnest and poorest soils do not, nor can they, receive the slightest injury from the fire, but that such, in an especial manner, are improved by it, and fertilized beyond any other possible process. There is, however, it must be confessed, a danger in this process, on peaty and inflammable soils: and in the fen districts, when they pare and burn, the fire often catches the peat below, and cannot be extinguished; whence the land sustains great damage. It seems difficult to devise a method of obviating this danger. That such soils particularly require superinduction and manure, whether burned or not, in order to render and keep them fertile, and materially so when burned, is an obvious proposition. On this practice, one of the most

important within the range of agricultural duties, we refer the reader to the second edition of the *Modern Land Steward*.

There is one desperate case, in which neither burning nor any other remedy will prove available, or render grasses wholesome and nutritive, thorough DRAINAGE excepted: it is when the soil is saturated and sodden, during the greater part of the year, with stagnant water. The case peremptorily requiring the fire, is that of an inveterate tough and moss-grown surface, covered with ant-hills and hassocks of rough, coarse, and, as it is called, sour grass, with rushes, and the inferior and innutritious gramineous varieties; the soil beneath being choaked with the roots of docks, thistles, and an accumulation of every species of vegetable trumpery. Unfortunately for the country, how many thousand acres of pasture land could we exhibit in this disgraceful predicament; and what a vast difference might be expected in their produce, under an improving system. We were forcibly stricken by the following picture in "The Farmers' Journal" (November 8, 1819), one which has been so often exhibited before our own eyes:—

“ Many a time have I seen a fine piece of pasture  
 “ apparently, and yet lean stock look sour and  
 “ rough about the head, with downcast eyes and  
 “ staring coat, which tells every man of business  
 “ that they are doing bad. I have seen hungry

“ horses turned into this fine pasture with empty bellies, just as they had left the plough, and go over this fine long grass, snuffing and blowing, browsing it over as they walked, and go and settle and gnaw where it was already eaten down to the roots.”

Upon all soils, particularly peat and moor, which will burn readily, the practice of paring and burning should be invariably resorted to, not merely as the sole effectual remedy, but as the cheapest, most expeditious, and most profitable ; the danger of it consisting, with an exception, as has been stated, purely in the abuse, that is to say, in after driving of the land, without sufficient manure. Dry, crumbling clays, and moist soils replenished with roots and vegetation; will burn ; but deep, heavy loams and clays are generally supposed not to be calculated for such purpose, although perhaps the opinion may arise from defect of experience. Upon these last, a different method is pursued, which, to render it effective, far greater attention and perseverance than usual is absolutely necessary. We will briefly run over the specific measures required.

It has sometimes been proposed to pare the turf, to lay the sods reversed, in regular order, to be replaced, by that mean obtaining access to the soil beneath, in order to use the most effective measures for cleaning it, drawing to the surface, and burning or carrying off the offensive rubbish. A writer in

"The Farmers' Journal," January 31st, 1820, having observed the impetus given to vegetation in consequence of digging among the roots of the grass, stirring up and lightening the soil, and bringing the subsoil nearer to the surface, which took place in consequence of paring off and afterwards replacing the turf, for the purpose of making a drain, recommends the above proposition. We quote his words:

"I now beg to submit to your readers, whether this principle might not be advantageously applied on a large scale, by paring the sod a good thickness, ploughing the soil underneath, as deep as it will admit of, and then laying the sod down again. To effect this, I should think would not be difficult; and the expense would no doubt be considerably less than a good manuring. This operation would, in my opinion, be attended with great benefit to such lands as are hide-bound or mossy. I would not, however, have it take place altogether of manuring; but might occasionally be substituted for that species of improvement."

This method, which might improve a tough and hide-bound sward, would not, probably, destroy old mosses; but it would be more expeditious, if less effectual, than breaking up the turf, in order to a course of aration previous to re-leying; a process, in the opinion of many, attended with great risk, in respect to obtaining a good sward afterwards, at least, under a number of years.



It may be necessary to re-introduce that perpetual topic of complaint, during the last half century,—the universal dread in landlords, to have their old meadow broken up, in however decayed and unproductive a state. This *veto* forms an eminent clause in most leases. It is grounded, in the first instance, in the mere prejudice, that a meadow once broken up, can *never*, by any possible means, be restored to its pristine fertility and worth. This we know, theoretically and practically, in a great variety of instances, to be, in truth, a groundless notion. A second objection, however, in equal verity, has but too solid grounds : it is, the great risk, whether a tenant, under permission to break the sward, will perform that task judiciously, crop it with corn afterwards mercifully, allowing sufficient manure ; and in the end, restore the meadow, procuring the best seeds, and re-leying in the best style. In the mean time, it is a great loss to the public, as well as to proprietors, that decayed meadow should remain unimproved ; and the proper compromise, as it appears to us, is, that breaking up old, foul, unproductive meadow should always be allowed to the tenant who requires it, the whole process, to the restoration of the grasses, being placed under the inspection of an able land-steward or other experienced person.

On *paring and burning*, Mr. MORRIS BIRKBECK, a most intelligent and highly experienced cultivator of the soil, made the following observations in the

communications to the Board of Agriculture, 1805.  
 “ Paring and burning is an operation so well  
 “ adapted to the purpose of converting grass land  
 “ to a temporary course of tillage, in every view of  
 “ the subject, that I have no hesitation in proposing  
 “ it as the first step, *in all soils and situations*;  
 “ though I am aware that strong objections to the  
 “ practice have been frequently made, and supported  
 “ by plausible reasoning.”

“ I conceive it unnecessary to describe the operation, it being well known in most parts of the kingdom. Workmen who understand it, are in the habit of travelling to a distance for jobs: such should be engaged; they perform the work better than strangers to it can, with the best directions; and the labourers of the neighbourhood may acquire the practice from them.” These are the first and last paragraphs of Mr. BIRKBECK’S communication, the whole of which merits the serious attention of every landlord and tenant. The same volume is a text book for various other essays on the subject, from the actual experience of the writers on all sorts of soils.

The difference of quality in the various known grass seeds, is, no doubt, as usually stated; the quality of the soil is still of more importance, for the same grasses shall be highly nutritious and *feeding*, upon one soil, and but very moderately so upon another; and yet these spots shall be at no

great distance apart, and the cause of such difference by no means readily apparent. Another diversity exists with respect to whole districts, on some of which the grass is calculated for feeding and fattening animals, on others for hay-making; nor does this seem to depend merely on custom, but on the nature of the soil, unless it be that the long habit of mowing has, in the latter case, reduced the fattening property of the grasses. Thus, mowing grounds and feeding grounds, properly so called, demand a separate consideration and somewhat different treatment. Middlesex is the chief county for mowing grounds, which beside, are necessarily found in the vicinity of all cities and large towns.

It is sufficiently obvious, that mowing grounds should be kept in the most perfect level state possible, and clear of every obstruction to the scythe, with proper channels for the evacuation of surface water. Harrowing and rolling, when necessary, must not be neglected, in order to press down the inequalities of the surface, pulverize the earth around the roots of the grasses, and cause them to spread. On these grounds no cattle should be admitted; and if they are sheep-fed in the autumn, they must not be eaten down bare, which would be to expose the roots of the grasses to great injury from the severity of the winter's cold. The soil of meadows which will bear to be mowed twice annually, must be of the greatest strength and utility; to maintain which, will require

regular and constant manuring; and with these it will be advantageous to suffer the lattermath to remain, periodically, the top of it being eaten off by sheep.

Among the beneficial measures recommended as common to all grass land, is an occasional interchange of mowing and depasturing, which indeed is not only beneficial to the land, but may be often convenient to the occupier. Coarse, innutritious grasses upon a soil which might produce better, long exhaustion of the grasses on any soil, or the ascendancy of weeds and inedible rubbish above the grasses, are the warning evidence of an immediate necessity of a thorough renovation; which, if neglected, from that moment, the land is a losing concern both in a public and private view. We repeat, the *fire* is the true catholic remedy, which may be perfected in the spring, and the land releyed with a mixture of the best grass seeds in August, or early in September, the best season of the year for sowing grasses; which, sown in the spring, will suffer more injury from a hot and droughty summer, than from the most rigid winter. Thin, poor, and hazardous lands, sown with grass seeds, may be profitably covered, on the approach of winter, with a defensive coat of good earth, or any manure which can be spared; and such lands, at any rate, should not be approached even by sheep, at any period of the following year, which will do infinitely more damage by drawing up and wounding the roots

of the grasses, than can possibly be repayed by their manure, their pressure, or their layer. A good rolling, in moderately dry weather, will answer, and more regularly, every use and purpose of pressure. After burning, manure cannot be wanted; and if it be considered how difficult it generally is, to obtain expeditiously a full sward upon a new ley, it will be conceded that no unnecessary risk had need be incurred.

It is not, however, upon poor, thin soils, generally, that the grasses are immediately resown. It may indeed be more advantageous to crop them variously, for several seasons, previously to their being releyed, in which case, root and pulse crops, as less exhausting, are to be preferred to corn crops.

In this place it may be proper to devote a few additional lines to those soils, whether thin or otherwise, which, although they will produce considerable crops of corn and pulse, and even of the artificial grasses, are by no means equally productive of the natural, and upon which it is so difficult, indeed often impossible, to establish a good permanent sward.— This we conceive should not be attempted, but that such soils should be held to corn cropping, periodically relieved by crops of pulse, roots, and artificial grasses, or, at any rate, nothing farther attempted upon them in the grass way, but temporary leys.— We have known lands on which the best grasses have been sown in vain. A few years since, grass seeds were sown at *Great Barton*, in Suffolk, upon

a piece of land, which in the first season, being once mowed, produced a crop fully equal to any taken from the best old sward; whilst another piece of twenty acres upon the same estate, and sown with the same seed, totally failed, throwing up only a blade of grass here and there. This last field failed twice with grass. It was a soil far inferior in quality to the former, which had succeeded so well. The following year, some prime grass seeds were purchased for the purpose of laying down a piece of good land, upon which they almost entirely failed, although we had previously witnessed the goodness, and even excellence, of the same lot of seeds. This accident must, in probability have arisen from the improper state of the land to receive the seeds, from injudicious management, or from the devastation of small birds, which is not always suspected or attended to. When observed, the birds should be watched; and it may be necessary to make channels with the harrows, for the reception of the small seeds, that they may not remain upon the surface to perish, or be picked up by birds; subsequent harrowing and rolling being carefully and accurately performed.

Ploughing decayed sward under, with the view of releying, after the soil shall have been purified by a course of aration, is a long and tedious process, requiring besides a perfect hoe culture, in order to its perfection. In laying down arable land to permanent pasture, although the fire has not hitherto been an

instrument, we have often considered it applicable. on a view of the stubble and luxuriant fleece of weeds above ground, and on consideration of the ample crop of roots and couch beneath. Such a mass would make a glorious boufire in a dry August or September. The hint might, perhaps, save much expense, and contribute materially to both amelioration and expedition. With respect to the instrumental methods for the extirpation of couch grass from the bosom of arable land, the improved *grubber*, with square curved tines, of the ingenious Mr. BLAKIE, Steward at *Holkham*, ought to be universally known, as certainly one of the best implements for its intended purpose hitherto invented. It had been long a *desideratum*; a complaint of the cutting scarifiers having the effect of dividing and transplanting the roots of the offending grasses, being an ancient subject with the intelligent.

It remains to advert to the proper modes of improving those meadows and pastures, which it may not be expedient to break up. The incumbrances common to both, are rushes, broom, thistles, docks, nettles, chickweed, sheep's-parsley, and a multitudinous list of too well known rubbish. Colt's-foot will seldom be found on thoroughly drained land, but rushes may exist in good sound meadow, on the borders of a river. Broom also has been left for ages on upland grass. Coarse and sedgy grass may prevail, either from the nature of the land, or from neg-

ligent and improper management; or this kind of grass may be found dispersed over the field in large tufts or *hassoeks*. Upon sheep pastures also, in some districts more particularly, the *senatula arvensis*, a small, repent, and trailing thistle, is a most troublesome weed, creeping along the ground, and turning itself in the grass. This is said to wound the mouths of the sheep.

The furze and broom should be effectually stubbed up, unless in ordinary pastures, where the latter may be left as medicinal to diseased sheep. The rushes and thistles must be early and annually mowed, the latter cut to the crown of the root, after which it is said that the grasses will smother any fresh vegetation of thistles; a notion altogether unworthy of dependence, and which often induces the discontinuance of farther attempts. The spud and pecker must be the last resort, when close mowing shall fail, and especially with the dock, in drawing which even the roots will often break, leaving behind the seeds of a fresh crop. These measures indeed, common in the destruction of all kinds of weeds, are well known and often practised; but there is one grand essential not so well known or regarded, or its vast benefits are overlooked and undervalued, in a view of the change, small as it comparatively is, and apprehended trouble—we mean *perseverance*. Without that essential, grass land can never be thoroughly cleaned; in fact, by half measures in the case, the



crop of weeds is merely thinned, to increase its luxuriance and beauty; under its influence, grass land may be kept clean as well as arable, although not so readily, since no root or vegetable can stand against the persevering acts of extirpation. The expense and trouble must gradually decrease, until, in a few seasons, their amount is trifling, whilst the benefit they confer is perpetually increasing.

Coarse grass must be cured by occasional mowing, by close feeding with sheep, and by superinductions of dung or lime. The *hassocks* being mowed close, those bottoms should be covered with the same, or, in an inveterate case, the bottoms dug up, some good fresh mould thrown in, and proper seed sown. The same in all bare patches, from whatever cause, unless that of stagnant water, the draining of which is the only remedy. On shutting up the meadow or pasture, all these precautions should be complete; the scythe should be used to mow down the tall irregular stems and coarse herbage left by the cattle, and an attention, unfortunately not too common, should be extended to hedge-rows, the usual receptacles and nurseries of all kinds of weed vegetation. Grass land in perfection, although so certainly attainable, is not perhaps yet to be seen in this country: nevertheless the superior excellence of the hay to be thence attained, and of the fattening material for the grazier, surely ought to be an encouragement to proceed, and to persevere; and it certainly must af-

ford the farmer a pleasure, as well as profit, to be able to turn his labouring horses into grass so universally good and pleasing to their taste, that they may soon fill themselves, and lie down to rest their wearied limbs, without the renewed exertion of travelling for hours over a field of rubbish, picking here and there a mouthful which may please their palate, and help to satisfy their hunger.

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#### MISCELLANEOUS NOTES.

*Rough Cock's-foot grass.*—LORD SOMERVILLE, President of the Board of Agriculture, strongly recommended, in 1799, the culture of cock's-foot, which was soon after tried with success, by ROGERS PARKER, Esq., and Sir T. F. LEWIS. Sir MORDANT MARTEN, in 1813, claimed to have been the original planter of this grass, which, he justly observed, had been more successful than fiorin. The experiment, it seems, passed from Sir MORDANT to Mr. OVERMAN of Norfolk; from him to Mr. COKE. The late Dr. SIBTHORPE also, Regius Professor of Botany at Oxford, made a very successful experiment at *Southleigh*, with this grass, sown by itself, about Midsummer, perhaps about thirty years since. We have some recollection of this grass being quoted by ELLIS, an earlier cultivator than the Doctor, when cock's-foot might have been tried and relinquished, as has so often happened with new articles, which

have been subsequently and fortuitously introduced with success. The eddish of this grass is most rapid in growth, also succulent and wholesome beyond most of the autumnal grasses; but it is said, as a food for cows, to produce more milk than butter, which appears very probable, its juices not being so rich and nutritious as the superior varieties. There is a notion in some of the dairy counties, that cock's-foot impoverishes the soil, even beyond ray grass; but their authority acquires no sanction by their adding, that no stock will eat cock's-foot, which is notoriously unfounded.

*Fiorin grass.*—I have the honour of a communication, dated April 12, 1823, from the Earl of STRADBROKE, (Lord ROUS) stating that the final result of his Lordship's experiment, on this grass, was a full conviction that it did not answer the reports made of it; in consequence, all the land at Henham-hall, on which it had been planted, was ploughed up. This grass is no longer cultivated in England, within my knowledge, nor have we any recent accounts of it from Ireland.

*Crested dog's-tail, yarrow, white clover,* and *cock's-foot*, mixed and sown in August, have had great success in Norfolk, affording abundance of food in the following spring, and one ton and a quarter per acre of hay afterwards. In Herts, *dog's-tail, cock's-foot,* and *yarrow*, have been equally successful. Tall oat-grass succeeds in *Romney Marsh*.

To us it seems a soft, corn-tasted, and probably nutritious grass. Ray-grass and burnet, on a soil not too heavy and wet, make excellent after-grass and fog, extremely wholesome for sheep.

*Trifolium odoratum*, MELILOT, vulgarly called *stinking trefoil*.—The fate of this plant is singular at any rate strange, that it should have attracted no attention from the cultivators of the soil, although so many years have passed since the high commendations bestowed upon it. It grows in hedges and among corn, flowering in July, according to Dr. JAMES, who also instructs us that the name is derived from two Greek words, the one signifying honey, the other a plant celebrated among the ancients. Melilot, however, is not named from honey, on account of its sweetness, for it is bitter to the taste; but because there is no plant from which the bees gather sweeter honey, or more in quantity. The leaves and flowers have an aromatic quality, and the plant is acrid, bitter, styptic, odoriferous, and gives a slight nausea when chewed. So far Dr. JAMES.

From the above, and from the taste of timothy grass, which we find bitter, and which is yet often styled a sweet grass, and said to abound with *saccharum*, it must then be understood, that such *saccharum* is not discoverable by the human palate; that of beasts, which are fond of bitters, being more apt at the discovery. The late Mr. YOUNG, in his *Annals of Agriculture*, No. 240, thus characterizes MELILOT:

It is found in quantities near *Hull*, two or three feet high, upon poor loamy sand, when other herbage is burnt up. Horses eat it up, woody stalks and all, even when they are not hungry. A plant of it grew on the edge of a limestone quarry, the soil not three inches deep, and no moisture; and yet finer and more luxuriant than the above description, a perfect shrub and standing alone. A horse then feeding in clover, ate up this Melilot shrub, stalks and all. It is the *pan-succus* of Linné, eaten by cows, horses, sheep, goats, and swine. The common English Melilot—GILBERT says, in France, this plant is eaten by all cattle, whether in a green or dry state. YOUNG says, sheep and deer are very fond of it. It loves shade, but bears drought, and on all soils reaches the height of from four to six and a half feet. A plant measured three feet seven inches on dry sand. It retains verdure very late in the season, and was cut perfectly green in September. It is a *classical* plant, known to the ancients (*caballinus*), and described by HOMER, as growing on the estates of MENELAUS, and as food proper in breeding horses. Is it more astonishing or disgraceful, that a plant of such magnificent report and splendid qualities should be entirely overlooked in this country? We have twenty times determined, within the last twenty years, to make trial of Melilot, but want of plants or seed, or some other obstacle, has constantly occurred.

*Breaking up grass land.*—"The evil is not in

“ the practice of paring and burning, liming or mar-  
 “ ing, but in the following up those processes, by a  
 “ severe and injurious course of over-cropping. The  
 “ quantity throughout the kingdom of wastes and  
 “ unbroken lands, capable of being converted to til-  
 “ lage, is yet very great, and as population advances  
 “ may be wanted. The usual process of converting  
 “ such lands to tillage, by either breaking up, fal-  
 “ lowing, liming on the sward, and, after two  
 “ years, breaking up, fallowing, liming, and at the  
 “ third year, cropping; or by liming on the sward,  
 “ and after two years breaking up and cropping, is,  
 “ in both instances, very expensive, and very cir-  
 “ cuitous. To fallow, before liming or marling, is  
 “ the mode found most certain of success; but it  
 “ cannot be effected in less than two summers, and  
 “ that too with much severe labour. The liming or  
 “ marling follows, and a crop is obtained in the third  
 “ year. Where the lime is spread hot upon the  
 “ sward, it is requisite that it remain in that state  
 “ two seasons, before breaking up; if broke up after  
 “ remaining only one season, we can state from ex-  
 “ perience that the crop will fail. If broken up  
 “ after lying two seasons, the tilth will be extremely  
 “ coarse; and although it may produce two good  
 “ crops of oats, yet these must be followed by a sum-  
 “ mer fallow, with either dung or a second liming,  
 “ before the land can be sown for pasture.”

“ Paring and burning, previous to breaking up

" any old pasture, meadow, sward or heath, destroys  
 " the wire-worm, which, without this process, does  
 " incalculable damage to lands newly broken up.  
 " The ashes ought to be spread immediately, mixed  
 " with four tons of quick lime per acre, reduced  
 " to a powder. These will form so strong an alka-  
 " line ley, as to destroy all insectite vermin, with  
 " their sperin and *ova*, wherever it can reach, and far  
 " beyond the plough. In proportion to the quantity  
 " of animal substance thus dissolved, so will be the  
 " increase of manure."

" By paring thick, some have imagined that the  
 " soil must be wasted, but there is little danger of it  
 " upon strong and deep lands. But it is not the  
 " case, even upon any kind of land, where the opera-  
 " tion is properly performed. The tops and fibres  
 " of the roots are all dissolved at once, by the fire,  
 " which would be the case, in time, by the process of  
 " tillage without fire: by burning, the earth is cal-  
 " cined, and apparently reduced in quantity, as ashes,  
 " while dry; but when they are spread abroad and  
 " rain has fallen, the mass expands, and becomes as  
 " great in quantity, as before burning. This is ca-  
 " pable of proof, were it possible to separate the  
 " vegetables, root and branch, from it immediately."

The indigenous marl grass, cow grass, or red clo-  
 ver, and the white or hop clover, being collected  
 pure, will not fail, excepting upon lands generally  
 unfavourable to the grasses. These may be culti-

vated perennially like lucern. There are periodical clovers which go off at their proper season.

Land five or seven years under any grass will have acquired substance sufficient for burning. If no manure can be obtained, pare and burn, spread the ashes, scarify, and harrow in fresh seeds: or if more convenient, take two or three crops of turnips or tares, previously to releying to grass. Both plans have been tried with the utmost success.

*Alopecurus pratensis*, meadow fox-tail, has generally been held superior to all the English cultivated grasses, both for bulk and nutritive power; but its goodness indicates the need of a soil equal, in that respect, to its production. It requires a degree of moisture, and is early. It is now denied on experiment that the *anthoxanthum odoratum*, or sweet vernal grass, imparts the fragrant scent to hay, which, being made of the proper grasses, derives its fragrancly from good making and good weather. The sweet vernal, an early grass, is found upon the sea beach, with a luxuriance of root and product among the shingle and stones. It should make a part of the mixture for all light, dry, and poor lands. This grass, in composition with native white clover, wild tare, saxifrage, sheep's fescue, burnet, and the blue dog's-tail, formed an admirable, wholesome, and productive sheep pasture upon a piece of burned sandy waste, which had previously yielded next to nothing.



When unproductive meadow cannot be broken up, the next best method is constantly to *salter* it; that is, dibble it in autumn with winter barley, tares, or black oats, or peas, as already described. Manure must, in course, be allowed; but that expense, together with the small charge of seed and dibbling, is well repayed by the constant production of most valuable and seasonable herbage, not otherwise to be obtained on such soils. In Mr. *SALTER's* practice, the holes are four inches square from each other, two to four seeds in a hole.

We have seen timothy grass flourishing in a light garden soil, and wearing, comparatively, the appearance of sheep's fescue. It is a matting, thickening grass, well relished by sheep, and perhaps might be introduced with advantage in the composition for seeding light land pasture.

The brush or bush *harrow* is not a very effective tool. A small grass harrow has, of late years, been found very convenient. It may be had of any of the implement makers, or any village mechanic may make one under directions.

The lands of this country and Ireland are naturally graminiferous; the native grasses arise spontaneously, as the first product of the soil. Were *Cheapside* shut up for a considerable length of time, its surface would be covered with a fleece of grasses. These considerations induced the old farmers to trust to nature and time for the establishment of a

sward ; and whilst resident in Hants, I have known a tenant merely level a piece of exhausted arable, and shut it up for a crop of God-send grass. This, however, upon a soil even the best adapted to the production of grass, is a most expensive, roundabout, and imperfect mode of going to work ; and, exclusive of the length of time necessary to perfect a spontaneous sward, that sward, in the end, however good the land, may be one in which the inferior grasses predominate. The first cost is ever the greatest profit, if judiciously applied to the purchase of the superior grasses.

Moss, as well as rushes, arises from stagnant water below, and can be radically cured by no other method than draining. We have indeed seen much pains and expense bestowed, in Middlesex, in dragging off the moss with heavy harrows, and by hand raking ; but in a few years the mosses returned, and a renewal of the same operation was necessary.

It is held by some, that all new grass leys are apt to occasion the rot in sheep. We recollect to have seen the fact otherwise generally, and are confident that sheep are safe upon sound and dry pasture, however new the sward. No part of English husbandry has been more improved, than that of the depasturing of sheep. In former days, and even within the memory of the present writer, farmers were constantly ruined, in various counties, by the rot in their flocks.

The reader is referred to page 55, for Mr. CURTIS's opinion on clover and lucerne. We have noticed formerly two comparative pieces of lucerne, side by side, the one drilled at eighteen inches, the other broad cast. During the first and even the second year, the broad cast appeared the most luxuriant, but the weeds were beginning to gain the ascendancy, which they generally complete in the sixth year; in the interim, the lucerne necessarily losing ground, both in quantity and quality. In the aggregate of six years crop, we apprehend, the quantity of drilled lucerne will be considerably the greater, with a still greater superiority in respect to the quality.

Many persons have remarked that, in the attempt to convert lands to pasture, of whatever variety or quality the seeds sown may be, the grasses, notwithstanding the crop may be luxuriant for three years, and sometimes longer, will assuredly fail about that period, leaving the soil in possession of weeds and a thin product of its natural and worthless grass. This we take to be the plainest indication of a soil adapted to temporary leys solely. Yet we have formerly seen in Suffolk, upon middling land, productive pieces of ray grass and clover, the seeding of which the oldest man upon the farm could not remember.

An old correspondent writes, that, on making the experiment, he is fully convinced grasses should never be fed off on the first or second season, nor any

stock turned upon the aftermath, until late in the autumn. He says, that animals, on his experience, injure the tender grasses, which once or twice use of the scythe does not; on the contrary, that the grasses being left to themselves, thicken and spread more than when constantly trodden down and cropped by either sheep or cattle. The experiment is easily made. The great object is to give the roots time to establish themselves. The grass being mowed late, the seeds will be scattered over the surface, which should be immediately rolled, but perhaps not harrowed. Others assert, that suffering the young grasses to seed, exhausts them. To make use of Mr. CURTIS's motto—*fiat experimentum*.

To fix and consolidate loose, blowing sands, white clover is the chief dependance; upon wet and boggy lands, timothy stands in the same rank. The seeds of timothy are small, and a peck weighs about ten pounds, the usually allotted quantity for an acre of land; but one of the most extensive cultivators of timothy sows double that quantity.

Without denying the presumed specific properties of the different grasses, yet, as has been before observed, the soil is the chief agent in fattening cattle, and a rich and gramineous soil will render almost any grass nutritive. Upon a soil not adapted to the purpose, no quantity of the highest reputed varieties of grass will make an animal fat. He will be completed only upon *feeding* land. The same nearly,

as we have witnessed, may be said of turnips. The object then is, to be careful to seed our best feeding lands with the most nutritive grasses, when defective in such; to keep them free from stagnant water below, clean, and well manured above, and we shall have done the full of our duty by them, and shall not fail of our reward. With respect to soils of a different or of ordinary quality, their proper destination is to mowing and store feeding, care being taken to replenish them with seeds most accordant with their nature and habits.

Dr. ANDERSON obtained great quantities of *sheeps-fescue*, a grass generally undervalued from defect in quantity. In all probability, could an abundant crop of this grass be raised on a rich or manured soil, largeness of quantity would be countervailed by defect of quality. Such would not equal in goodness the fescue grown in its native downs. We believe this grass really to merit the high character formerly given of it, and that it never ought to be omitted in the mixture for light dry sheep pastures.

On lands where sheep are generally liable to the disease called *red water*, it may be useful to have an acre or two of parsley and burnet, sown in equal quantities; or if burnet will not grow upon the soil, ray grass may be substituted, or the three together. On the first symptoms of the disease, the patients should be turned into the parsley. It lasts two years.

The plants called *Gardeners' Ribands*, and even thistles, have been strongly recommended as cattle food. The former we tried some years since, finding it not only excessive prickly and rough, but dry and sapless. *Clivers* or *goose grass* have also a strong commendation from a Scots Clergyman, in the communications to the Board of Agriculture, as making substantial hay; and for their seeds as food for horses, instead of oats, which seeds left to maturity, he affirms nearly equal oats in weight.

In "The Farmers' Journal," March 24th, 1823, Mr. SINCLAIR, Gardener to his Grace the Duke of Bedford, announces that it is in contemplation to Publish a Second Edition, with Additions, of the *Hortus Gramineus Woburnensis*. This splendid work, containing *fac simile* specimens of a number of the native grasses, is a proof of the patriotism of the Noble Duke, and of his real attachment to the interests of agriculture. The price, however, of the book (50 guineas), must necessarily confine it to the libraries of the opulent. A previous number of the Journal contains letters replete with information on the subject of re-leying those downs, which, during the scarcity of bread corn, were converted into arable. It is supposed to be questionable—'whether it be possible to restore land (broken up) to that state of pasturage which is called down?' I apprehend, no person versed in both the theory and practice of agriculture can entertain a doubt, that, under a judi-

cious system of management, downs may be restored to their pristine and native state, and even highly improved. It is justly observed, that the present state of the country renders the restoration of downs an object of great importance. An obvious difficulty in this undertaking, to any considerable extent, is, how and where to obtain the necessary variety of seeds, and such as can be depended upon. Mr. GIBBS can, doubtless, supply a considerable quantity of the most material, and some of every species necessary for down culture. For the rest, the cultivator must depend on his own resources, in the application of which, I trust he will find this small tract a useful guide. For the following hints, I am obliged to the Farmers' Journal of March 17, a weekly Paper (with the exception of a too frequent great load of *agricultural and economical polemics*) assuredly the most useful and instructive that has hitherto appeared in this country.

“ Let a piece of sweet old pasture land be selected,  
 “ the size proportionate to the quantity of grass seeds  
 “ required, the soil and situation as much similar as  
 “ possible to the arable land intended to be laid to  
 “ grass. Fence the selected turf early in the season,  
 “ effectually against the depredation of all sorts of  
 “ stock, and prepare the inclosure for being mowed.  
 “ The stones and rubbish should be clean picked, and  
 “ the surface well rolled.

“ As the season advances, and the early grasses

“ begin to arrive at maturity, employ a vigilant bird-  
“ keeper. Divide the plot of land into a given num-  
“ ber of parts, say four or more; and in the first  
“ favourable weather, sow one part in one week,  
“ another in the second week, and so on to the last;  
“ and as the seeds of the various grasses ripen at dif-  
“ ferent periods, a portion of seeds from the greater  
“ part will be obtained from the method here recom-  
“ mended. If the swaths of grass are heavy, they  
“ should be turned in fine weather: great care is re-  
“ quisite in performing the operation, so as to pre-  
“ vent the seeds from being shaken out. As the  
“ mowings respectively become dry, no time should  
“ be lost in beating or thrashing out the grass seeds;  
“ this should be done upon a close woven cloth, or  
“ sheet spread in the field; a calm day should be se-  
“ lected for the operation, for even a light wind  
“ would disperse the seeds. As the thrashing pro-  
“ cess advances, the seed and chaff should be put  
“ into sacks, and conveyed to a close boarded floor  
“ of a well ventilated granary or chamber, where  
“ there is sufficient room for drying, cleaning, and  
“ intimately mixing the seeds from the different  
“ mowings. Rats, mice, and birds, should be entirely  
“ excluded from the grass and store chamber.”

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A  
SHORT ACCOUNT  
OF  
THE CAUSE  
OF  
The Disease in Corn,  
CALLED BY FARMERS  
THE BLIGHT, THE MILDEW,  
AND  
THE RUST.

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*By SIR JOSEPH BANKS, Bart.*

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WITH A PLATE.

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*The following brief Publication, suggested by the alarming state of the Harvest in August 1804, would have been distributed before the end of wheat seed-time, had the Engraver fulfilled his engagement.*

*This circumstance will, it is hoped, be considered as a sufficient apology for the want of actual observations on the origin and progress of the disease. These, it is presumed, will be abundantly supplied, in the course of the present year, by those intelligent Agriculturists whose residence in the country enables them daily to examine, not only the progress of their crops, but the origin and advances also of all those obstacles which nature has opposed to the success of agricultural labours, as if to awaken the energies of reason, and to reward the farmer for the exertions of his intellectual faculties, by the satisfaction of surmounting them.*

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ON  
THE BLIGHT IN CORN.

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**BOTANISTS** have long known that the blight in corn is occasioned by the growth of a minute parasitic fungus or mushroom on the leaves, stems, and glumes of the living plant. **FELICE FONTANA** published, in the year 1767, an elaborate account of this mischievous weed\*, with microscopic figures, which give a tolerable idea of its form; more modern botanists† have given figures both of corn and of grass affected by it, but have not used high magnifying powers in their researches.

Agriculturists do not appear to have paid, on this head, sufficient attention to the discoveries of their fellow-labourers in the field of nature; for though scarcely any English writer of note on the subject of rural economy has failed to state this opinion of the origin of this evil, no one of them has yet attributed it to the real cause, unless **Mr. KIRBY's** excellent papers on some diseases of corn, published in the

\* Osservazioni sopra la Ruggine del Grano. *Lucca*, 1767, 8vo.

† Sowerby's English Fungi, vol. II, tab. 140. Wheat, tab. 139. *Poa aquatica*.

Transactions of the Linnæan Society, are considered as agricultural essays.

On this account it has been deemed expedient to offer to the consideration of farmers, engravings of this destructive plant, made from the drawings of the accurate and ingenious Mr. BAUER, Botanical Painter to his Majesty, accompanied with his explanation; from whence it is presumed an attentive reader will be able to form a correct idea of the facts intended to be represented, and a just opinion whether or not they are, as is presumed to be the case, correct and satisfactory.

In order, however, to render Mr. BAUER's explanation more easy to be understood, it is necessary to premise, that the striped appearance of the surface of a straw which may be seen with a common magnifying glass, is caused by alternate longitudinal partitions of the bark, the one imperforate, and the other furnished with one or two rows of pores or mouths, shut in dry, open in wet weather, and well calculated to imbibe fluid whenever the straw is damp\*.

\* Pores or mouths similar to these are placed by nature on the surface of the leaves, branches, and stems, of all perfect plants: a provision intended no doubt to compensate, in some measure, the want of locomotion in vegetables. A plant cannot when thirsty go to the brook and drink; but it can open innumerable orifices for the reception of every degree of moisture, which either falls in the shape of rain and of dew, or is

By these pores, which exist also on the leaves and glumes, it is presumed that the seeds of the fungus gain admission, and at the bottom of the hollows to which they lead (see Plate, *fig. 1, 2*), they germinate and push their minute roots, no doubt (though these have not yet been traced), into the cellular texture beyond the bark, where they draw their nourishment, by intercepting the sap that was intended by nature for the nutriment of the grain: the corn of course becomes shrivelled in proportion as the fungi are more or less numerous on the plant; and as the kernel only is abstracted from the grain, while the cortical part remains undiminished, the proportion of *flour to bran* in blighted corn is always reduced in the same degree as the corn is made light. Some corn of this year's crop will not yield a stone of flour from a sack of wheat; and it is not impossible that in some cases the corn has been so completely robbed of its flour by the fungus, that, if the proprietor should choose to incur the expense of thrashing and grinding it, bran would be the produce, with scarcely an atom of flour for each grain.

Every species of corn, properly so called, is subject to the blight; but it is observable that spring

separated from the mass of water always held in solution by the atmosphere: it seldom happens, in the driest season, that the night does not afford some refreshment of this kind, to restore the moisture that has been exhausted by the heats of the preceding day.

corn is less damaged by it than winter, and rye less than wheat, probably because it is ripe, and cut down before the fungus has had time to increase in any large degree.—TULL says, that “white cone or bearded wheat, which hath its straw like a rush full of pitch, is less subject to blight than Lammas wheat, which ripens a week later.” See page 74. The spring wheat of *Lincolnshire* was not in the least shrivelled this year, though the straw was in some degree infected: the millers allowed that it was the best sample brought to market. Barley was in some places considerably spotted; but as the whole of the stem of that grain is naturally enveloped in the hose or the basis of the leaf, the fungus can in no case gain admittance to the straw; it is however to be observed, that barley rises from the flail lighter this year than was expected from the appearance of the crop when gathered in.

Though diligent inquiry was made during the last autumn, no information of importance relative to the origin or the progress of the blight could be obtained: this is not to be wondered at; for as no one of the persons applied to had any knowledge of the real cause of the malady, none of them could direct their curiosity in a proper channel. Now that its nature and cause have been explained, we may reasonably expect that a few years will produce an interesting collection of facts and observations, and we may hope that some progress will be made to-

wards the very desirable attainment of either a preventive or a cure.

It seems probable that the leaf is first infected in the spring, or early in the summer, before the corn shoots up into straw, and that the fungus is then of an orange colour\* ; after the straw has become yellow, the fungus assumes a deep chocolate brown: each individual is so small, that every pore on a straw will produce from 20 to 40 fungi, as may be seen in the Plate, and every one of these will no doubt produce at least 100 seeds: if, then, one of these seeds tillows out into the number of plants that appear at the bottom of a pore in the Plate, *fig. 7, 8*, how incalculably large must the increase be! A few diseased plants scattered over a field must very speedily infect a whole neighbourhood; for the seeds of fungi are not much heavier than air, as every one who has trod upon a ripe puff-ball must have observed, by seeing the dust, among which is its seed, rise up and float on before him.

How long it is before this fungus arrives at puberty, and scatters its seeds in the wind, can only be guessed at by the analogy of others; probably the

\* The ABBE TESSIER, in his *Traité des Maladies des Grains*, tells us, that in France this disease first shows itself in minute spots of a dirty colour on the leaves and stems, which spots extend themselves by degrees, and in time change to a yellow colour, and throw off a dry orange-coloured powder. Pp. 201, 340.

period of a generation is short, possibly not more than a week in a hot season : if so, how frequently, in the latter end of the summer, must the air be loaded, as it were, with this animated dust, ready whenever a gentle breeze, accompanied with humidity, shall give the signal to intrude itself into the pores of thousands of acres of corn ! Providence, however, careful of the creatures it has created, has benevolently provided against the too extensive multiplication of any species of being : were it otherwise, the minute plants and animals, enemies against which man has the fewest means of defence, would increase to an inordinate extent ; this, however, can in no case happen, unless many predisposing causes afford their combined assistance. But for this wise and beneficent provision, the plague of slugs, the plague of grubs, wire-worms, chafers, and many other creatures whose power of multiplying is countless as the sands of the sea, would, long before this time, have driven mankind, and all the larger animals, from the face of the earth.

Though all old persons who have concerned themselves in agriculture remember the blight in corn many years, yet some have supposed that of late years it has materially increased ; this, however, does not seem to be the case. TULL, in his *Horse-hoeing Husbandry*, p. 74, tells us, that the year 1725 “ was a year of blight, the like of which was never before heard of, and which he hopes may never hap-



“pen again;” yet the average price of wheat in the year 1726, when the harvest of 1725 was at market, was only 36s. 4d. and the average of the five years of which it makes the first, 37s. 7d.—1797 was also a year of great blight: the price of wheat in 1798 was 49s. 1d., and the average of the five years, from 1795 to 1799, 63s. 5d\*.

The climate of the British isles is not the only one that is liable to the Blight in corn; it happens occasionally in every part of Europe, and probably in all countries where corn is grown. Italy is very subject to it, and the last harvest of Sicily has been materially hurt by it. Specimens received from the colony of New South Wales shew that considerable mischief was done to the wheat crop there, in the year 1803, by a parasitic plant, very similar to the English one.

\* The scarcity of the year 1801 was in part occasioned by a mildew, which in many places attacked the plants of wheat on the S.E. side only, but was principally owing to the very wet harvest of 1800; the deficiency of wheat at that harvest was found, on a very accurate calculation, somewhat to exceed one-fourth: but wheat was not the only grain that failed; all others, and potatoes also, were materially deficient. This year (1805) the wheat is probably somewhat more damaged than it was in 1800, and barley somewhat less than an average crop: every other article of agricultural food is abundant, and potatoes one of the largest crops that has been known; but for these blessings on the labour of man, wheat must before this time have reached an exorbitant price.

It has long been admitted by farmers, though scarcely credited by botanists, that wheat in the neighbourhood of a barberry bush seldom escapes the Blight. The Village of *Rollesby* in Norfolk, where barberries abound, and wheat seldom succeeds, is called by the opprobrious appellation of *Mildew Rollesby*. Some observing men have of late attributed this very perplexing effect to the farina of the flowers of the barberry, which is in truth yellow, and resembles in some degree the appearance of the rust, or what is presumed to be the Blight in its early state. It is, however, notorious to all botanical observers, that the leaves of the barberry are very subject to the attack of a yellow parasitic fungus, larger, but otherwise much resembling the rust in corn.

Is it not more than possible that the parasitic fungus of the barberry and that of wheat are one and the same species, and that the seed is transferred from the barberry to the corn? Mistletoe, the parasitic plant with which we are the best acquainted, delights most to grow on the apple and hawthorn, but it flourishes occasionally on trees widely differing in their nature from both of these: in the Home Park, at *Windsor*, mistletoe may be seen in abundance on the lime trees planted there in avenues. If this conjecture is well founded, another year will not pass without its being confirmed by the observations of inquisitive and observing farmers.

It would be presumptuous to offer any remedy for

a malady, the progress of which is so little understood; conjectures, however, founded on the origin here assigned to it, may be hazarded without offence.

It is believed\* to begin early in the spring, and first to appear on the leaves of wheat in the form of rust, or orange-coloured powder: at this season, the fungus will, in all probability, require as many weeks for its progress from infancy to puberty as it does days during the heats of autumn; but a very few plants of wheat, thus infected, are quite sufficient, if the fungus is permitted to ripen its seed, to spread the malady over the field, or indeed over a whole parish.

The chocolate-coloured Blight is little observed till the corn is approaching very nearly to ripeness; it appears then in the field in spots, which increase very rapidly in size, and are in calm weather somewhat circular, as if the disease took its origin from a central position.

May it not happen, then, that the fungus is brought into the field in a few stalks of infected straw uncorrupted among the mass of dung laid in the ground at the time of sowing? it must be confessed, however, from the clover lays, on which no dung from the yard was used, were as much infected last autumn as the manured crops. The im-

\* This, though believed, is not dogmatically asserted, because FONTANA, the best writer on the subject, asserts that the yellow and the dark-coloured Blight are different species of fungi.

mense multiplication of the disease in the last season seems, certainly, to account for this, as the air was no doubt frequently charged with seed for miles together, and deposited it indiscriminately on all sorts of crops.

It cannot, however, be an expensive precaution to search diligently in the spring for your plants of wheat infected with the disease, and carefully to extirpate them, as well as all grasses, for several are subject to this or a similar malady, which have the appearance of orange-coloured or of black stripes on their leaves, or on their straw; and if experience shall prove that uncorrupted straw can carry the disease with it into the field, it will cost the farmer but little precaution to prevent any mixture of fresh straw from being carried out with his rotten dung to the wheat field.

In a year like the present (1805), that offers so fair an opportunity, it will be useful to observe attentively whether cattle in the straw-yard thrive better or worse on blighted than on healthy straw. That blighted straw, retaining on it the fungi that have robbed the corn of its flour, has in it more nutritious matter than clean straw which has yielded a crop of plump grain, cannot be doubted; the question is, whether this nutriment in the form of fungi does or can be made to agree as well with the stomachs of the animals that consume it, as it would do in that of straw and corn.

It cannot be improper in this place to remark, that although the seeds of wheat are rendered, by the exhausting power of the fungus, so lean and shrivelled that scarcely any flower fit for the manufacture of bread can be obtained by grinding them, these very seeds will, except, perhaps, in the very worst cases\*, answer the purpose of seed corn as well as the fairest and plumpest sample that can be obtained, and in some respects better: for a bushel of much blighted corn will contain one-third at least more grains in number than a bushel of plump corn; three bushels of such corn will go as far in sowing land, as four bushels of large grain.

The use of the flour of corn in furthering the process of vegetation is to nourish the minute plant from the time of its developement till its roots are able to attract food from the manured earth; for this purpose one-tenth of the contents of a grain of good wheat is more than sufficient. The quantity of flour in wheat has been increased by culture and management, calculated to improve its qualities for the benefit of mankind, in the same proportion as the pulp of apples and pears has been increased, by the same means, above what is found on the wildings and crabs in the hedges.

\* 80 grains of the most blighted wheat of last year, that could be obtained, were sown in pots in the hot-house; of these, seventy-two produced healthy plants, a loss of 10 per cent only.

. It is customary to set aside or to purchase for seed corn the boldest and plumpest samples that can be obtained, that is, those that contain the most flour; but this is unnecessary waste of human subsistence: the smallest grains, such as are sifted out before the wheat is carried to market, and either consumed in the farmer's family, or given to his poultry, will be found by experience to answer the purpose of propagating the sort from whence they sprung, as effectually as the largest.

Every ear of wheat is composed of a number of cups placed alternately on each side of the straw: the lower ones contain, according to circumstances, three or four grains, nearly equal in size; but towards the top of the ear, where the quantity of nutriment is diminished by the more ample supply of those cups that are nearer the root, the third or fourth grain in a cup is frequently defrauded of its proportion, and becomes shrivelled and small.— These small grains, which are rejected by the miller because they do not contain flour enough for his purpose, have nevertheless an ample abundance for all purposes of vegetation, and as fully partake of the sap (or blood, as we should call it in animals) of the kind which produced them, as the fairest and fullest grain that can be obtained from the bottoms of the lower cups by the wasteful process of beating the sheaves.

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☞ For a *practical* Investigation of the diseases in corn and vegetables, continued diurnally, through a long course of years,—their nature, causes, and the degree of dependence which may be placed on the customary, or any remedies,—the Reader is referred to the *Fifth Edition* of the NEW FARMER'S CALENDAR.

FINIS.

## EXPLANATION of the PLATE.

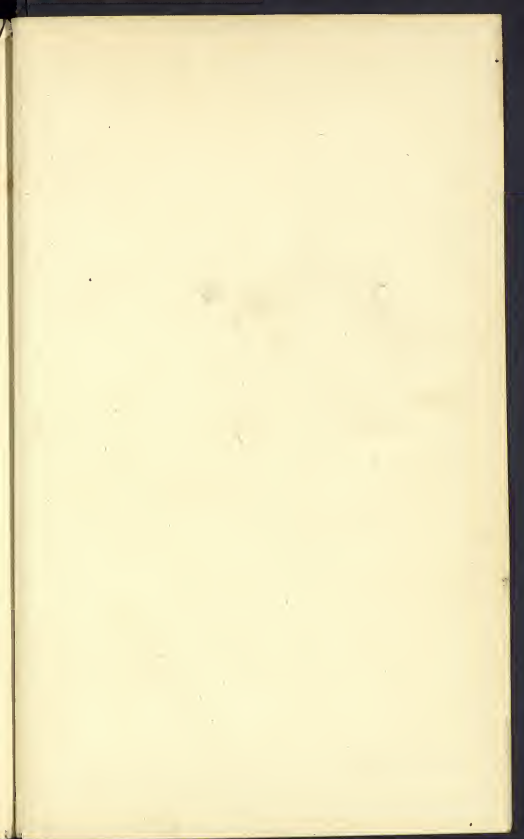
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1. A piece of the infected wheat straw—natural size: at *a* the Wheat-sheath is broken and removed, to shew the straw which is not infected under it.
2. A highly magnified representation of the parasitic plant which infects the wheat: *a* in a young state; *b* full grown; *c* are two plants bursting and shedding their seeds when under water in the microscope; *d* two plants burst in a dry place; *e* seems to be abortive; *f*, seeds in a dry state; *g*, a small part of the bottom of a pore with some of the parasitic fungi growing upon it.
3. A part of the straw of *fig. 1*, magnified.
4. Part of *fig. 3*, at *a b* more magnified.
5. Part of a straw similar to *fig. 3*, but in its green state, and before the parasitic plant is quite ripe.
6. A small part of the same, more magnified.
7. A highly magnified transverse cutting of the straw, corresponding with *fig. 4*, shewing the insertion of the parasite in the bark of the straw.
8. A longitudinal cutting of the same, magnified to the same degree.
9. A small piece of the epidermis of a straw, shewing the large pores which receive the seed of the parasite: the smaller spots, observable on the epidermis, are the bases of hairs that grow on the plant of the wheat whilst young, but which fall off when it ripens, magnified to the same degree as the preceding figures.

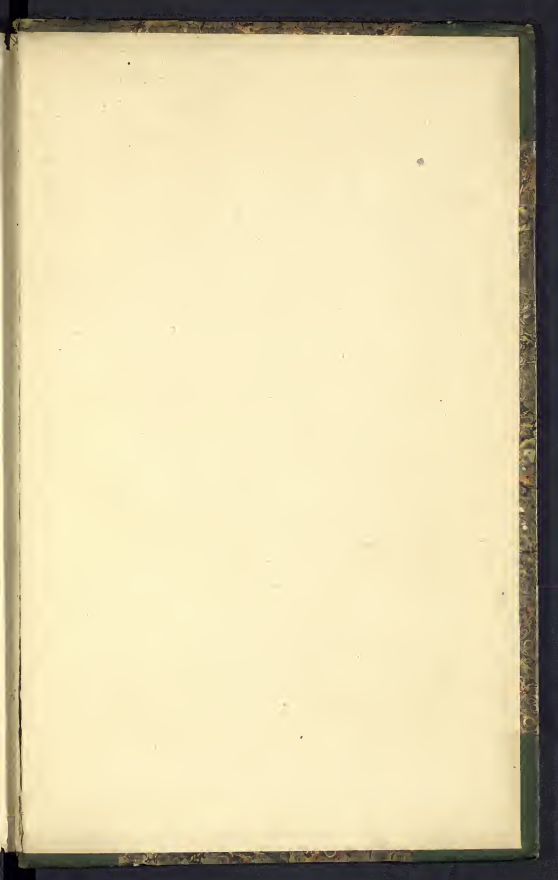
















SERIES

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