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ESSAYS

RELATING TO

AGRICULTURE

AND

RURAL AFFAIRS.

THE SECOND EDITION,
WITH CORRECTIONS AND ADDITIONS.

BY

JAMES ANDERSON, LLD.

F. R. S. F. A. S. S.

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VOLUME THIRD.

And he gave it for his opinion, that whoever could make two ears of corn, or two blades of graſs, to grow upon a ſpot of ground where only one grew before, would deſerve better of mankind, and do more eſſential ſervice to his country, than the whole race of Politicians put together.

SWIFT.

BIBLIOTHEK
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DES LANDBAUES
ZU MOEGLIN

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1798.

TO

GEORGE DEMPSTER, ESQ.

WHOSE EXERTIONS IN THE BRITISH PARLIAMENT, FOR UPWARDS OF THIRTY YEARS, IN SUPPORT OF THE CLAIMS OF JUSTICE AND HUMANITY, WILL RENDER HIS NAME DEAR TO SUCCEEDING AGES,

THIS VOLUME OF ESSAYS

IS,

WITH THE MOST CORDIAL ESTEEM,

RESPECTFULLY INSCRIBED,

BY

THE AUTHOR.

INTRODUCTION.

THE eſſays which compoſe the preſent volume were written at the requeſt of the preſident of the board of agriculture, and were intended, with ſome variations, to form a part of the general report propoſed to be laid before parliament by that board; but were withdrawn by the author, and publiſhed in their preſent form, from the following conſiderations. When the ſubject was firſt mentioned to him, he underſtood that it was the intention of the board to have every part of that report drawn up by men who had actually practiſed agriculture *as a buſineſs*, each individual being deſired to write ſuch parts of it only as he had had occaſion to be particularly acquainted with, in the courſe of his own practice, leaving the other parts to be drawn up by ſuch men as had had more experience in theſe departments. As this plan appeared to be better calculated to obtain authentic practical information in agriculture, than any other the author had ever ſeen; and as he conceived a work of this kind to be much wanted, he readily agreed to lend every aſſiſtance

in his power to forward the undertaking; and ſet himſelf with alacrity to write out ſuch parts of it as his own experience beſt enabled him to do. When he had made a conſiderable progreſs in this taſk, he learnt, with concern, that he had totally miſunderſtood the meaning of the board of agriculture, in regard to the propoſed report; and that, inſtead of proceeding, as above ſtated, and allowing every paper on theſe ſubjects to be printed under the eye of the writer, ſubject to ſuch limitations and corrections only as the board ſhould ſuggeſt, and he approve of,—it was intended that theſe papers ſhould be firſt circulated among a number of gentlemen, who were to be ſeverally authoriſed to alter, cancel, or add whatever they thought fit; and then the work, thus altered, without either the knowledge or the conſent of the original writer, was to be publiſhed.

No ſooner was this underſtood by the author, than he made haſte to inform the preſident of the board, that, underſtanding ſuch was the propoſed plan of publication, he begged leave to decline having any hand in that work. On being preſſed to give his reaſons for thus declining, he candidly ſtated, that as he had never written one line in his life with a view to publication, eſpecially on agricultural ſubjects, which he could not with

truth aſſert had been ſeriouſly intended to communicate ſome information that he deemed uſeful to the reader, he could by no means conſent that any of his agricultural writings ſhould be altered before publication, unleſs ſuch alterations ſhould be firſt ſeen and approved by himſelf. He knows well, that much harm has been done by theoretical notions having been publiſhed under the form of practical directions in agriculture; and had he ſubmitted to the plan propoſed, he might have eventually become a ſort of acceſſary in miſleading the unwary, inſtead of guarding them from error, which he hath ever ſtudied to do, with the moſt cautious circumſpection; and from which plan of conduct no conſideration on earth ſhall ever induce him to depart. He may himſelf, doubtleſs, like every other man, fall into error, and will be thankful to any one who ſhall point out ſuch errors, that they may be corrected; but he ever ſhall ſtudy, as he hitherto has done, not only to avoid them himſelf, but to guard others alſo againſt error, as much as is in his power.

The eſſays thus written were allowed to lie by him for ſome time, without any thoughts of publication. But when the prices of corn had riſen to the alarming height they have now attained,

his attention was turned once more towards them. And as in theſe eſſays many of the circumſtances, that operate towards diminiſhing the amount of the agricultural produce of the country, are developed with much preciſion, he thought no time could be more proper than the preſent for ſuch a publication: and that indeed the circumſtances of the times demanded it.

The author, who now wiſhes rather to withdraw himſelf from the buſy ſcenes of life, than to puſh himſelf forward in the world, having no pretenſions to the character of a fine writer, nor ambition to acquire a reputation of that ſort, would make an apology for the language in theſe eſſays, if he thought the ſubject required it; but in matters of this ſort refinement of language will not be expected. As his object has ever been rather to inform, than to entertain, his attention has been directed rather to the matter than the form. His chief ſtudy has been to acquire ſo much perſpicuity, as that his meaning could not be in any caſe miſunderſtood; and to write in ſuch a manner, as tended to induce the reader to attend to facts, and draw the neceſſary concluſions from them *himſelf*, as they incidentally may in future occur, rather than implicitly to rely on ſuch caſual ſtatements as may fall in his way: and ſome

peculiarities of manner will be found referable to this head. Indeed, as the chief inducement to his writing at all, was a deſire to render ſome truths, which his own experience hath taught him the importance of, more generally known and adverted to, than they ſeem hitherto to have been, he ſometimes preſſes theſe with a degree of carneſtneſs that may lead him, like the Abbé de Saint Pierre, to recur to theſe ſubjects oftener than the faſtidiouſneſs of modern criticiſm might judge allowable: like the good Abbé, too, while he is willing to admit, that, if literary fame had been his chief object, the criticiſm may be juſt; yet with him, alſo, the author will be entirely ſatisfied, if, at the price of reputed inelegance, he ſhall be able to draw theſe objects into notice: for as he now looks with a comparative degree of indifference on that kind of literary fame which ſo much attracts the attention of younger men, and is neither anxious for wealth, nor future aggrandiſement, he proceeds in theſe diſquiſitions with a ſteady earneſtneſs, which to thoſe who are accuſtomed to the writings of men who are actuated by other views, may at times aſſume ſomewhat of a harſh and ungracious aſpect. He is not conſcious, however, of being actuated by the ſlighteſt unkind propenſity towards any human

being; and he hopes that, when duly conſidered, a ſerious deſire to promote the welfare of thoſe who have not adverted ſo much as he himſelf has done to the ſubjects treated, will be found to be the prevailing characteriſtic of the work. He has ſtated what he deems important truths with the greater freedom and preciſion, becauſe he believes that, ſhould he neglect to do it, few others would feel themſelves inclined to do ſo. From this laſt conſideration, he is perhaps better pleaſed that the publication is in it's preſent form, than if it had been given to the public as was originally intended: for ſeveral facts are here ſtated with leſs reſerve than he fears the board of agriculture would have been willing to allow, if the work had been publiſhed under their patronage.

He begs that the reader may underſtand that the facts alluded to in the following letters, had no ſhare whatever in his determination to withdraw theſe eſſays from the board: for it is a truth, that he had intimated ſuch intention to the board, with the reaſons for it, before he had any knowledge of the facts which gave riſe to the ſecond letter. Theſe letters are here reprinted, merely with a view to vindicate the character of the author from the ſlur that was apparently thrown upon it by the conduct of the gentleman to whom

they are addreſſed, and to prevent that vindication from being overlooked by the readers of theſe eſſays. Had it not been for the unfavourable impreſſion that the conduct reprehended in the ſecond of theſe letters, would have made upon the public mind, in the apprehenſion of the author and his friends, reſpecting his character, this laſt letter would never have been either written or publiſhed: but as the evident imputation of the want of *moral rectitude* was public, nothing but a public vindication could be in any degree competent: for the author will never ſuffer any ſuch imputation to remain unrefuted, in as far as a candid ſtatement of facts can do ſo, by whomſoever it may be made.

To Sir JOHN SINCLAIR, Bart.
PRESIDENT OF THE BOARD OF AGRICULTURE.

LETTER FIRST.

SIR, *Cotfield, near Edinburgh, 30th June, 1795.*

I use the freedom to trouble you at preſent on the ſubject of draining adopted by Mr. Elkington, not with a view to detract from the merits

of that gentleman, nor to find fault with the remuneration you have obtained for him, but merely to ſet you right in regard to a matter of fact concerning me, which might eaſily eſcape your notice.

I preſume, Sir, you thought it evident, from the ſtatement made by Mr. Elkington, that the mode of draining ground which has been ſo ſucceſsfully practiſed of late by that gentleman, was an invention peculiarly his own. That this is not the caſe, admits of evidence, which I hope you will allow to be ſatisfactory. It is now twenty years ſince I publiſhed a book, called *Eſſays relating to agriculture and rural affairs*. If you will take the trouble of turning to the ſecond eſſay in that work, which is, *on draining bogs and ſwampy ground*, you will there find the method of draining, by means of *tapping*, which has been adopted by Mr. Elkington, fully explained, and the principles upon which it may be practiſed clearly developed, by the aid of illuſtrative figures, diſcriminating plainly the caſes in which that mode of practice would be improper.

I do not underſtand that Mr. Elkington practiſed this method of draining before the publication of that work, (*anno* 1775,) neither do I mean to aſſert that he adopted the practice from the di-

rections here given. I readily admit that the principle is so simple, and so obvious to every considerate mind, that it would certainly be nothing extraordinary, if he, by his own reflections alone, should have discovered it, as well as I did. There is only one particular mode that I myself had not practised before that essay was published, viz. the making the tapping by means of *a boring instrument*; but even this I have particularly described, as you will find in the following words at page 181. *(Third edition, Vol* 1.*)* of the foresaid essays. After describing the mode of tapping I had adopted, by sinking small pits, and explaining the cases in which it may be successfully practised, it is added, " I have often imagin-
" ed that the expence of digging these pits
" might be saved, *by boring a hole through this*
" *solid stratum of clay with a wimble (an auger)*
" *made on purpose*; but as I have never experi-
" enced this, I cannot say whether it would an-
" swer the desired end exactly."—Neither can I *now* say, whether Mr. Elkington grounded his practice on this hint or not; but I may safely say, if he did not, he might have done it: and as I could not have borrowed it from him, if there be any merit in the *discovery*, I have assuredly a just title to claim it.

I wiſh not to throw out any inſinuation to the prejudice of Mr. Elkington, who, by a proper degree of management on his part, has great merit in having turned the attention of the nation towards a mode of draining, which, if the principles upon which it is grounded are fully underſtood, and properly applied, will be found to be equally cheap and efficacious; as I myſelf, from an experience of it for more than thirty years, can ſafely aſſert. But it is a miſtake, to think it can be univerſally applied. There are many caſes in which it can be of no uſe, and therefore it were vain to attempt it; as I have fully demonſtrated in the treatiſe referred to.

Whether Mr. Elkington did actually diſcover this mode of draining of himſelf, or adopted it from the very plain directions given in that treatiſe, is of little conſequence to the public. In either caſe, he has alike the merit of having introduced it into practice in the ſouthern part of this iſland: for the ſimple fact that he has been *ſuppoſed* to be the firſt inventor of it, is the cleareſt proof that this part of my treatiſe, *by how many ſoever it may have been read*, has been allowed to remain, in a great meaſure, a dead letter, even till the preſent hour.

As my intention in publiſhing that eſſay, doubtleſs, was to benefit the public, I owe, perhaps, thanks to Mr. Elkington, for having thus forwarded the deſign. It is not impoſſible that the time may not be far diſtant, when I ſhall be laid under a ſimilar obligation to ſome other perſon, for bringing into practice, *as a new invention*, the mode of embanking rivers, which is deſcribed in the eſſays referred to, with a ſimilar degree of clearneſs; and which, when reduced into practice, will be an improvement equally cheap and efficacious with the above. An obligation of this ſort was conferred upon me, ſome years ago, without my knowledge of it at the time, by a Mr. BRODIE, I think the name is, when he brought into notice, what he called the *Patent Bath Stove*; the principle upon which that ſtove is conſtructed, having been explained, and clearly illuſtrated by means of a plate in a treatiſe of mine "On ſmoky chimneys," that was firſt publiſhed in the year 1769; but this particular was little adverted to for ſeveral years, till Mr. Brodie, by a *little proper management*, brought it into notice *. My ideas, freely communicated

* It is generally believed that Mr. Brodie has realized an hundred thouſand pounds by this contrivance.

to the public, have been a ſource of emolument or honour to *others* alſo. My own reward has been the ſatisfaction of having done what I know to be right, and the *honour* of being indirectly flattered by compliments that were publicly appropriated to others.

Wiſhing you ſucceſs in your laudable undertakings, which, if properly ſupported, cannot fail to be attended with effects highly beneficial to the nation, I have the honour to be, with due reſpect,

Sir,
Your moſt humble Servant,
JAMES ANDERSON.

LETTER SECOND.

TO THE SAME.

SIR, { *Cotfield, near Edinburgh,*
10th January, 1796.

SINCE I had the honour of addreſſing you in public on the ſubject of draining land, I have learnt that a controverſy has been carried on in the newſpapers to ſome length, upon the ſame ſubject, by various perſons. Who theſe perſons are, I know not; and with the particular object each

party has in view, I am in a great meaſure unacquainted. I never ſaw one of theſe publications except two, which accidentally fell into my hands in September laſt, when I paſſed through London. The preſent letter, therefore, muſt be conſidered as having no connection with, or reference to theſe publications; and if any thing ſhall here occur that ſhall tend either to corroborate or oppoſe any of theſe writings, it muſt be conſidered as merely accidental.

Since my own letter above alluded to was written, I have ſeen two publications by the preſident of the board of agriculture, in which the draining of land has been mentioned. The firſt is an addreſs to the board of agriculture, dated 14th July, 1795, in which it is taken notice of in theſe words: " The board has ſucceeded in it's firſt application [*i. e.* to parliament for a reward on account of *diſcoveries* advantageous to agriculture,] in behalf of a very deſerving individual, " Mr. Joſeph Elkington, *who has carried the* " *art of draining to a perfection hitherto un-* " *known.*" The ſecond is an addreſs to the board of agriculture, on the cultivation and improvement of waſte lands of *Great Britain* by the preſident, printed 23d December, 1795, in theſe words: " A conſiderable proportion of the

" waſtes of Great Britain conſiſts of lands of a " wet and boggy nature, which it has yet been " ſuppoſed was the moſt difficult to improve and " cultivate. Fortunately, however, *diſcoveries* " have been made in the art of draining bogs by " Mr. Joſeph Elkington, a farmer of the county " of Warwick, as renders the improvement of " ſwampy land a matter of much leſs difficulty " or expence than formerly." My friends think that in both theſe paſſages there is manifeſtly a *marked* determination to ſet aſide my claim to any ſhare in the diſcovery of that mode of draining, and a ſtudied care to avoid my name in any way, leſt it might imply ſome ſort of derogation from the merit of Mr. Elkington; and they farther think, that after the public claim I have already made to that diſcovery, it would argue little leſs than a conſciouſneſs of the injuſtice of my claim, ſhould I ſuffer ſuch a public affront to paſs unnoticed. As ſome of Sir *John Sinclair's* beſt friends, with whom I have ſpoken upon the ſubject, concur in the ſame opinion, I find myſelf called upon to urge a farther explanation on that head; which is one of the principal objects of the preſent addreſs.

The queſtion at iſſue may be reduced to a very narrow point, which is this. The practice

of Mr. Elkington is, in it's principle, either the ſame with that which was practiſed by me, more than thirty years ago, and publiſhed as above ſaid; or it is not. If it be the ſame, then doubtleſs Mr. Elkington can have no juſt title to be held out to public view *excluſively* as the *diſcoverer* of this practice; for I preſume, he will not alledge that, at the time of the diſcovery, I had ever heard of him or of his practice. Indeed, I never did hear of either, till his name was firſt mentioned in ſome of the publications of the board of agriculture. On the contrary, as it is certain, that my diſcovery was publiſhed more than twenty years ago, and that Mr. Elkington has never till this hour publiſhed his, but has been going on from imperfect beginnings, gradually improving as he went on, it is not ſo clear that he may not have borrowed ſome hints to direct his practice, either directly from my treatiſe, which has been pretty generally read in Lancaſhire, or from the converſation of ſome perſons who had read it. From theſe conſiderations, if the principle be the ſame, it will be difficult for the preſident of the board of agriculture to clear himſelf from the imputation of a marked partiality in the paſſages above quoted; eſpecially after my having pointed out to him, in my former letter,

the paſſages in my eſſays that directed the ſame method of practice ſo long ago as has been already ſpecified. If, on the other hand, the practice followed by Mr. Elkington differs in principle from that which I had ſo long ago explained; in that caſe the preſident of the board of agriculture may be with reaſon accuſed of injuſtice to the public, by having delayed ſo long to explain the principle of that uſeful diſcovery; for, as the public have already paid for the diſcovery, they have a right to demand that it ſhould be made more generally known for the benefit of the whole community; in the ſame manner as Mr. Forſyth's receipt for recovering decayed trees was publiſhed, on receiving his premium. [I underſtand that I have been here miſinformed—a part only of that premium having been as yet paid, April 15, 1798.] I therefore, in the name of the public, demand of you, Sir, who have taken the lead in this tranſaction, to publiſh this ſecret, that all the world may be enabled to know it, and to avail themſelves of it, if they incline, without being obliged to have recourſe to Mr. Elkington himſelf, who, in this inſtance, like the venders of quack medicines, carefully conceals his ſecret, that he may be enabled to profit by the credulity of the public. And ſhall the

preſident of the board of agriculture demean himſelf ſo far as to give countenance to ſuch tranſactions!!!—I will not ſuppoſe that ſuch can be the caſe. Yet appearances are againſt you.—Inadvertence may have led you to adopt a language that is fairly ſuſceptible of that interpretation; and you cannot take too early an opportunity of doing it away.

It will be the eaſieſt thing imaginable for Sir John Sinclair to clear himſelf from this charge, and ſettle the matter,—ſimply by publiſhing the principles on which Mr. Elkington's method of draining is founded. This can be attended with little trouble:—For as Sir John muſt fully underſtand the principle himſelf, (otherwiſe it would be an inſult to ſuppoſe he could have uſed a language ſo ſtrong and deciſive as he has done) —he can find little difficulty in explaining it, as a ſupplement to one of thoſe publications that are every day iſſuing from the preſs, at the expence of the board of agriculture.

Such a publication is likewiſe neceſſary on Mr. Elkington's account, if he means to free himſelf from the imputation of quackery; which idea, the manner in which he has been introduced to public notice by the board of agriculture, has a ſtrong tendency to countenance. This ought to

be done away, if he wiſhes to gain that reſpectability of character to which ſuperior talents ſhould naturally entitle him. With ſuch men, *candour* is ever a leading characteriſtic feature; for, however far concealment and deception may lead to emolument in certain caſes, it never can be accounted honourable. Now, if Mr. Elkington be ſenſible that he underſtands the principles upon whichh is practice is grounded, ſo completely as to be able to explain it in ſuch a ſatisfactory manner, as to ſet at defiance the critiques of philoſophical inveſtigators, he can have no objection to publiſh it. He has received a price for it; and not only honour calls for it, but *juſtice* requires it at his hand. If neither the preſident, nor any other member of the board of agriculture, nor Mr. Elkington himſelf, ſhall, after being thus called upon, publiſh the ſecret that he has ſold, the public will be diſpoſed to believe that Mr. Elkington cannot do it, and that he has availed himſelf of the influence of ſome great man, to impoſe upon the preſident and the board of agriculture; who have thus, in their turn, been induced to lend their aid to enable him to diſpoſe of his noſtrum to the beſt advantage. From theſe conſiderations, it alike behoves the preſident, the board of agriculture, and Mr. Elkington him-

ſelf, to loſe no time in publiſhing his ſecret. Among other good effects that will reſult from this meaſure, it will totally preclude all farther altercation reſpecting the merit of this diſcovery, between him and myſelf, or others.

Till ſuch publication appears, it may not be improper in me to obſerve, that another body of men, who have had good opportunities of information, have thought proper to adopt a conduct reſpecting this particular, very different from that of the preſident of the board of agriculture. The gentlemen who compoſe the ſociety of agriculture at Altringham, near Mancheſter, in the county of Lancaſter, having determined to encourage the draining of land by means of tapping, judged that a reſpect for their character required them, in this caſe, to act with the ſtricteſt impartiality: and thinking it would be of uſe to thoſe who were to attempt it to know the principle on which ſucceſs depended, as well as the mechanical practice of the art, the ſociety offered a premium to thoſe who drained the greateſt quantity of land according to the practice followed by Mr. Elkington, on the principles explained by Dr. Anderſon, in a book called eſſays relating to agriculture and rural affairs.

The following is Mr. Elkington's own account of the way in which he was firſt led into the train of diſcovering this mode of draining by means of tapping, as it was told to me by a gentleman of great veracity, who had it from Mr. Elkington himſelf; and it appears to be ſo natural, as fully convinces me that it is ſtrictly the truth. Mr. Elkington's father having died about the year 1763, left him in poſſeſſion of a ſmall farm of wet ſour land. He found that no good could be made of it without previous draining. He accordingly ſet to work to drain it in the uſual way; but after having laid out as much money as his narrow funds could afford, he had the mortification to find that no benefit had reſulted from his labour; which tended very much to diſcourage him. While he was in a ſtate of deſpondency on this account, he, by accident, dug a little deeper than uſual in one of his drains, and found, to his great ſurpriſe, that a copious ſpring of water burſt forth from the hole, which continued to flow with a plentiful ſtream for a very long period of time. He dug deeper in ſeveral other places with the ſame effect, though the ſtreams were leſs copious than the firſt. In conſequence of theſe openings, he had the ſatisfaction to perceive that his fields gradually became drier and drier,

till they at laſt were perfectly freed by it from all the ſuperfluous moiſture. And not only were his own fields thus drained, but the contiguous land, for a conſiderable diſtance all round, was made drier alſo by the operation. This circumſtance led him to ſuſpect, that in other caſes, where the ſurface-appearance of wet land was ſomewhat ſimilar to his own, they might be drained by making openings reſembling thoſe above named. Succeſs attended his operations in many caſes; and he gradually went on in his practice, correcting his firſt errors by experience, and improving upon it till the preſent time.

From this account, it would ſeem that the diſcovery was, as to him, merely accidental; nor does it appear, from the above, that he had any clear idea of the manner in which the draining is thus effected, or the principles on which it depends, ſo as to be able to diſtinguiſh, *a priori*, thoſe caſes in which that mode of draining could be of no uſe, from thoſe where it muſt of neceſſity prove efficacious.

As to myſelf, the diſcovery of that mode of draining was made in the following manner: I had a field of wet land that lay very flat, but ſo ſurrounded by ditches, that no ſurface water could come to it from higher ground any where,

and poſſeſſing at the ſame time ſuch a level as to prevent any water from neceſſarily ſtagnating upon it. The field was ſo wet, that in many places it was a mere hobbling bog, over which a man could ſcarcely paſs during the drieſt weather in ſummer. This was a very unprofitable as well as diſguſtful object; and, in the beginning of the year 1764, I ſet about ſeriouſly to have it drained. On conſidering the circumſtances of the caſe with attention, I ſoon perceived, that as no *ſurface* water could come upon it from the higher ground; and as the rain that fell upon the field itſelf was ſuffered freely to run off, the water that drowned it muſt riſe up from *below*. But as the weight of the atmoſphere acted on this field as well as on thoſe around, the water could not be made to aſcend, as in a pump, by means of ſuction: it muſt, then, be forced to take that direction in conſequence of ſome powerful preſſure from below ground, acting ſo ſtrongly as to overcome it's natural gravity. This preſſure, it was evident, could only be in conſequence of the water flowing from higher ground, *under the ſurface*, through a ſtratum of pervious matter, being pent in near the bottom by a ſtratum of clay placed above it, and thus forced to riſe to a higher level than the low ground, in this

kind of ſubterraneous canal, ſo as, by the natural power of gravity, to be ſqueezed forcibly through ſmall fiſſures in the ſuperior ſtratum of clay. If ſo, it would neceſſarily follow, that ſhould a hole be dug through the ſuperincumbent ſtratum of clay, ſo as to reach the bed of the reſervoir, the water would be allowed to iſſue freely through that opening, and to run off the ground by it's natural level; and thus would the accumulated water, which occaſioned the preſſure, be gradually diſcharged, after which it could no longer be forced up through the ſmall fiſſures in the clay; and, of courſe, the wetneſs, that had ariſen ſolely from that cauſe, muſt be gradually removed. On this reaſoning, which ſeemed perfectly concluſive, and which was confirmed by obſerving that the ſubſoil of that field was every where a very ſtiff clay, mixed with ſmall ſtones, the dry weather was no ſooner ſet in, than I put a man to dig a pit as near to the edge of the ſwaggle as he could approach, ordering him to penetrate directly downwards, making the pit no larger than was ſufficient to allow him to work, and to proceed without interruption, until he ſhould perceive that, on making his ſtrokes, it ſhould ſound as if it were ſomewhat hollow below. On obſerving this, he was deſired immediately to deſiſt, until

he called me and received farther orders. The labourer accordingly fell to work; but he found the ground ſo hard, that, in the courſe of two days, he had only penetrated to the depth of about five feet. During that time I frequently viſited the work, to examine appearances. Nothing remarkable occurred, ſave that little peering ſprings often were diſcovered, through which the water iſſued; but the quantity of water that came from them was not ſuch as to interrupt the work. On the morning of the third day, about breakfaſt time, the labourer called on me, and ſaid, that as his ſtroke gave a *douf ſound*, (that was his phraſe,) he had called me according to my deſire. I went immediately with him to the place, and having made him go down into the pit, I deſired him to ſhow me in what manner he could come out of it. He then pointed out to me a kind of ſteps he had made into the clay on one ſide; and having lent him my hand to aſſiſt him, I found he could get out very quickly. I then ordered him to take a kind of ſharp pointed iron crow, with a croſs handle and foot to it, which he had found a very uſeful tool in looſening the clay, and give a ſtroke of that with all his force upon the bottom, which he did.—On this, to his great ſurpriſe, the tool penetrated a thin

cruſt, and then fell down from one to two feet, as in a vacuity. Through the opening thus made, a ſtrong jet of water ruſhed inſtantly with great impetuoſity; but I, being aware of it, and at hand to aſſiſt the man in mounting, he got very quickly to the ſurface, and out of all danger, though not a little terrified at what had happened. The ſtream was at firſt ſo large, as might, I ſuppoſe, have filled a pipe of from 6 to 12 inches diameter; and roſe as a *jet d'eau*, to the height of ſix feet, at leaſt, above the ſurface of the ground. The labourer, who had no idea of ſuch a phenomenon, looked upon it with an overpowering aſtoniſhment, which would have furniſhed a fine ſubject for the painter. The ſtream continued to flow, and to riſe above the ſurface of the ground for about a week; but gradually abated in height, till it aroſe not above the ſurface of the ground, and continued ſtill to flow; but the quantity of water gradually diminiſhed, till it at laſt ſettled into a perennial ſpring, which continues to run till the preſent day.

The conſequence of this operation was, that during the courſe of the enſuing ſummer, the water gradually drained off from the boggy ground; the ſwaggle ſlowly acquired a firm ſurface, ſo as to admit of being ploughed at any ſea-

ſon; and about twenty acres of ground were thereby drained, which, before that time, had been in a great meaſure uſeleſs for every agricultural purpoſe.

Ten years afterwards, being about to publiſh an eſſay, containing directions for draining all the different kinds of wet grounds that occaſionally prove detrimental to the farmer, I naturally ſpecified this variety of wet ground among the others, and gave a plate explanatory of the cauſe of that phenomenon, as I had done of the others, in order that every perſon, who choſe it, might be enabled to diſtinguiſh the caſe, and apply the remedy himſelf, if he ſo inclined. The eſſay has been now in the hands of the public above twenty years, and will ſpeak for itſelf; ſo that more need not be ſaid here on that head, further than that all theſe facts could be *proved*, were it thought neceſſary to do ſo.

I may add, however, at preſent, when I find that a diſpoſition is manifeſted, on ſome occaſions, to withhold honour from thoſe to whom honour is due, that though I did not think it proper, in a work that profeſſedly treated of agricultural concerns only, to ſpecify all the uſeful corollaries that might be drawn from the phyſical appearance above explained, I may now, without any

impropriety, barely mention, that from the application of this principle, many phenomena may be explained in a very ſatisfactory manner, which have been hitherto reckoned caſes of great difficulty. Some of theſe, (particularly in the caſe of a well that was ſunk at Tilbury Fort, on the Thames, as narrated in the Phil. Tran. Vol. in which an abundant ſpring of *freſh* water was found, at a great depth below the ſurface of the ſea, after two ſprings of *ſalt* water had been paſſed through above it,) I pointed out, in a letter I did myſelf the honour to write, ſeveral months ago, to Leigh Philips, Eſq. of Mancheſter, who had been kind enough to ſay that the eſſay referred to was what he conceived to be a *compleat ſyſtem of draining*. This expreſſion induced me to ſhow him it could not be deemed *compleat*; as ſeveral caſes were omitted, which I then ſpecified to him: among others, it was ſhown that deep lakes, ſurrounded by mountains of great height on all ſides, may, on ſome occaſions, be entirely drained, by *boring*, or ſinking ſhafts downwards, ſometimes to a moderate depth: that alſo wet land may, on ſome occaſions, be more eaſily drained, by opening an outlet for the water *beneath* the reſervoir which occaſions the wet, than by bringing it up to the ſurface. And that, among moun-

tains, it may frequently be much cheaper to carry off ſuperfluous water from mines, by penetrating downwards, than by driving a horizontal level to the ſurface of the ground, which is in many caſes attended with a ruinous expence. Theſe corollaries are indeed ſo obvious, when the principle is once explained, that it muſt appear aſtoniſhing to any conſiderate mind they have not been made, and very generally applied in practical caſes, long before the preſent period; and I here ſpecify them, merely to direct the attention of men to an object from which much practical good may be derived, in a variety of caſes, which it would be tireſome in me here to enumerate.

I have farther to add on this head, that there is one variety of wet ground which had totally eſcaped my notice in that eſſay, and which has not, that I know of, been treated of by any writer on agriculture; though it is, perhaps, more univerſally hurtful to the farmer, than any other kind of wet land whatever. This I have occaſion particularly to explain, in the ſecond eſſay of the preſent work, on the improvement of waſte lands.

From the facts that were ſtated in the committee of the board of agriculture, in favour of Mr. Elkington's mode of draining, as publiſhed in

their *report*, dated June 15th, 1795, there ſeems to be reaſon to ſuſpect, that Mr. Elkington himſelf, even at that period, was not fully aware of all the circumſtances that were eſſential to the practice of draining ground, in the moſt economical manner, by means of tapping;—as the labour and expences incurred in many of the caſes there ſpecified, ſeem to be much greater than that mode of draining, judiciouſly applied, could poſſibly have required. But as theſe caſes are ſtated by gentlemen who did not themſelves fully underſtand this method, they may poſſibly have been done with ſome degree of inaccuracy. When Mr. Elkington himſelf ſhall publiſh his own method, that doubt will be removed; and every individual will then be able to judge for himſelf as to this particular. If his practice be as good as it is ſaid to be, it cannot be too ſoon or too generally made known. If it ſhall be defective in any reſpect, theſe defects cannot be too ſoon pointed out and rectified; which would probably not be long delayed after the publication required.

I ſhall be ſorry, if, in conſequence of the precipitate conduct of Mr. Elkington's friends, I have been obliged, for the purpoſe of obtaining impartial juſtice, to ſay any thing here that may tend to prove in the ſmalleſt degree detri-

mental to that gentleman. I look upon him as a very worthy member of ſociety; and I believe him to be an honeſt man. I have not a doubt that his practice has already been of much national utility, and will be of ſtill more, the wider it is diffuſed; even although it ſhould not be carried on in the moſt perfect manner of which it will be found to be ultimately ſuſceptible; and I can aſſure that gentleman, with much ſincerity, that there is not a man in the land, not the preſident of the board of agriculture himſelf, nor his ſtill more powerful patron, who will rejoice more in his proſperity than myſelf; or who would more gladly lend his aid to the extending his practice as wide, and the rendering it as perfect, as poſſible. It is perhaps unfortunate, when a plain man finds himſelf forced to come forward in the genteel circle,—eſpecially where ſuch perſon may, by the ill judging partiality of ignorant friends, be induced, from the hope of benefiting his family, to acquieſce in ſtatements that he himſelf would never, perhaps, have made,—even though he be backed by thoſe who have the moſt powerful influence. For it is not in this nation that influence can altogether ſuppreſs the voice of reaſon, or ward off entirely the ſeverity of repri-

mand, when the inſolence of ſuppoſed power provokes a ſcrutiniſing enquiry.

I have now, Sir, done with the buſineſs of Mr. Elkington, but am ſorry that, in juſtice to myſelf, I am not yet at liberty to put an end to this, I fear, ungracious epiſtle.

It appears to me very ſtrange, that I ſhould have occaſion, at one time, to complain of having been ill uſed in *two* reſpects, by Sir John Sinclair, as I am not conſcious of ever having merited any thing of that ſort at his hand, *but much the reverſe*. It unluckily happens to be ſo, however, at preſent. The treſpaſs, too, is of ſuch a kind, as to require that notice ſhould be taken of it in the public manner I now do, in order that I may remove, in part at leaſt, the injury that, by his improper conduct, muſt have been done to my character. I ſhall briefly ſtate the facts, for the juſtneſs of which ſtatement I appeal to yourſelf.

Immediately on receiving a letter from the preſident of the board of agriculture, in February laſt, requeſting that I would favour the board with any information I could give reſpecting the culture and uſes of potatoes; I ſat down, and in great haſte put upon paper ſuch obſervations as occurred to me at the moment. Theſe obſerva-

tions, without reviſal or corrections, were inſtantly forwarded to the board, under cover, addreſſed to the preſident, and were accompanied by a letter, ſtating that I had loſt no time in complying with the wiſhes of the board reſpecting the ſubject of potatoes, and that the papers which accompanied that letter, contained what appeared neceſſary for me to ſay on that head. But I added, that theſe remarks were intended ſolely for the uſe of the members of the board itſelf, and "were not intended to be *publiſhed*." This I forbade in the moſt poſitive manner; and even requeſted that the board would be ſo kind as not to mention my name in any publication they might think proper to make on that ſubject; deſiring that the papers might be returned to me after the members of the board had ſatisfied themſelves with regard to them. So anxious was I that this requiſition ſhould not be forgotten, that I mentioned it no leſs than three times, in as many different letters I had afterwards occaſion to write to Sir John Sinclair; and as the franks had been reduced in weight before the laſt letter was written, I deſired him, with a view to avoid the trouble of addreſſing ſo many covers as it would then require, to ſend the M. S. to my ſon in London, who would take care to get it

forwarded to me. After all this the reader will judge of my ſurpriſe, when I read theſe words in a letter from Sir John: "The board has at length "finiſhed it's publication on the ſubject of po- "tatoes; *and as you have been a contributer to* "*it*, you are entitled to a copy of it." In what manner I had become a contributer to that work, I could not well conceive; for I did not then imagine that ever he could think of publiſhing what I had ſo poſitively forbidden: but as ſome obſervations of mine on potatoes had been printed in other publications, I thought ſomething might have been extracted from theſe works, to which this paſſage might allude. I took the earlieſt opportunity that offered, to conſult that work for my own ſatisfaction. My aſtoniſhment at ſeeing the obſervations printed entire, with all their faults, and others ſuperadded, thus forced upon the public notice, "unanointed, unanelled;" and the indignation I felt at this unexpected inſult, may be eaſier conceived than expreſſed. I call it an inſult, becauſe I conceive that no one, acting in the character of a gentleman, can have a right to publiſh the writings of another, even without his conſent, far leſs, if contrary to his expreſs injunctions, clearly announced, and repeatedly inforced. You, Sir John, have it in your

power, by publiſhing my letter, to correct me if I miſrepreſent the fact. If I have ſtated it juſtly, it is incumbent upon you to make ſuch an apology as one gentleman ought to give, and another to receive.

What adds *injury* to the *inſult*, on the preſent occaſion, is, that from the whole tenor of the writing, it was obviouſly intended for private information only, and not at all for the public uſe; and if you had taken the trouble to read, with an ordinary degree of attention, the firſt ſentence only, you could not have failed to perceive it. You need ſcarcely be told it may be extremely proper to expreſs in a particular way, what was obviouſly calculated for the private peruſal of a few gentlemen only, who were about to judge of matters that were not within the ſphere of their obſervation, though it would be exceedingly prepoſterous to make uſe of the ſame expreſſions, when intended to be laid before the beſt informed profeſſional men in the kingdom. The obſervations which, in the one caſe, would only be calculated to induce that cautious circumſpection which men of profeſſional knowledge in any line, are in ſome meaſure required to uſe, when called upon to aſſiſt thoſe of leſs experience, whoſe ſituation in life incidentally may bring them to de-

cide in matters reſpecting that profeſſion; but, in the other caſe, as being addreſſed to profeſſional men, many of whom may be ſuppoſed to be equally well informed as the writer himſelf, could be conſidered as little better than an inſult, and would indicate an overweening preſumption in the writer, that could only excite diſguſt and contempt. Such, in fact, is preciſely the caſe in the preſent inſtance; and the words of the introductory paragraph to that eſſay, if they were ſuppoſed to be intended for publication, can only be calculated to make an impreſſion on the mind of every reader that is very little in favour of the writer; and what I conceive to be extremely different from what my own character, if not obſcured under ſuch an humiliating diſguiſe, ought naturally to produce. I feel, at leaſt, that if any other perſon had written ſuch a paragraph, intending it to be publiſhed, as this has been, I ſhould have deſpiſed him as an impudent coxcomb, whom it would be a merit to humble. Sir John Sinclair is as capable as any man of judging of the irreſiſtible effects of ſuch impreſſions on the public mind: nor would there have been any thing extraordinary in it, if he had, on receiving ſuch a paragraph for publication, from a man with whom he was in habits of intimacy,

requeſted him to reconſider it, to ſee how far he thought it proper for the public eye, on the ſuppoſition that it had eſcaped his notice through inadvertency. But to publiſh it in that imperfect ſtate, though contrary to the expreſs orders of the writer, repeatedly inforced, without giving him even a hint of ſuch an intention, was uſing a freedom which no man, whatever his ſituation in life may be, has a right to take with another. The law has provided a puniſhment for him who injures his neighbour's good name. The injury may be as great when it is done in this way as any other, though it has, perhaps, hitherto eſcaped the notice of legiſlators. With thoſe who ſhall read this letter, perhaps *a part* of the injury may be done away; but Sir John ought to conſider that thouſands may have ſeen the publication alluded to, who may never have an opportunity of reading this, and that the writer muſt continue to be deſpiſed by them till the end of time.

Beſides the circumſtance above alluded to, there are other blameable particulars originating from the publication of that performance by the board of agriculture, that muſt affect the character of the writer; for ſo little attention has been paid to the printing, that, from the incorrectneſs

of the preſs, he muſt, in ſome caſes, appear to write in a manner altogether unintelligibly, and in others, he is made to ſpeak perfect noneſenſe *. I will not ſay that theſe things were intended: but is it fit that one perſon ſhould ſuffer a material injury, through the careleſſneſs of another; eſpecially when that is produced, not in the ordinary courſe of buſineſs, but is occaſioned entirely by the culpable forwardneſs of that perſon?

I am happy at being now come nearly to the cloſe of a letter, the writing of which has been to me a very unpleaſing taſk; for I mean not to bring forward any other complaints againſt you at this time; and hope I never ſhall be forced to do ſo, at any future period. I do not take pleaſure in finding fault; and in few caſes could it prove more irkſome to me than the preſent. Anxious as I have been, through the whole courſe of my life, to ſee the proſperity of this country

* Examples. I had ſaid, 'But now that *freſh* kinds are obtained from *ſeeds*,' which is printed, 'But now *the* freſh kinds are obtained from *reds*.' I had ſaid, 'Nor are thoſe kinds that ſend their bulbs deep in the ground, ſo *deſirable* as thoſe that riſe upwards,' which is printed, 'So *durable* as thoſe that riſe upwards.' I had ſaid, that 'in a rich mellow ſoil the roots would be able to ſtrike with eaſe, and *find* abundant nouriſhment;' it is printed, 'And *ſend* abundant nouriſhment.'

augmented, by promoting the peaceful exertions of rural induſtry, and thus preſerveing the morals of the people untainted, the only ſure baſis of national welfare, I cannot but feel a ſenſible regret at any degradation of the character of the man who has taken the lead, for the preſent, in that laudable undertaking. Undoubtedly nothing tends ſo much to exalt a man's character, and to give him ſuperior weight on all occaſions among his equals, as that unbiaſſed integrity, which, riſing above thoſe partialities and prejudices that are inſeparable from little minds, preſſes ſteadily forward in it's courſe, without wavering, however aſſailed by the tempting lures that may be held out to it, on either hand by the artful and deſigning. It was this that raiſed Ariſtides, the Athenian, to that exalted pre-eminence that ſuppreſſed even competition itſelf, and gave him ſingly the power of adjuſting the claims of rival ſtates. Such a character commands reſpect, even where talents are rather defective; and will make errors themſelves be overlooked by moſt men: but where this divine attribute is wanting, the moſt brilliant talents diſplay their luſtre in vain; and even the moſt uſeful purſuits, by ſuch men, are fruſtrated. I have been hurt, Sir John, at the obvious partiality of

your conduct towards myself, and the apparent design, unfairly, to leſſen my character with the public. Should a ſimilar weakneſs, to uſe the mildeſt expreſſion, be perceived in regard to others, the influence of the board of agriculture muſt ſoon be loſt with the public. It will only be then viewed as one of thoſe tiny inſtitutions that are calculated to ſoothe the vanity, or to augment the political influence of certain individuals for the time. I moſt anxiouſly wiſh that this may never be the caſe; and ſhall only add, that if any thing I have here ſaid, ſhall, by inducing a little more circumſpection, where the reputation or the intereſt of others may be affected by any caſual inattention on his part, tend to render the character of Sir John Sinclair ſtill more reſpectable than it has hitherto been, it will add to the pleaſure and happineſs of,

SIR,

Your very ſincere well-wiſher,

JAMES ANDERSON.

ADDITION *made to the ſecond edition of this volume of the eſſays, April*, 1798.

SINCE the former edition of this volume was printed, a publication by the board of agriculture has appeared, ſaid to contain an explanation of the principles of Mr. Elkington's mode of draining, which is inſerted in the firſt volume (page 20) of the 4th edition of theſe eſſays, with remarks upon it, to which the reader is referred.

Dr. ANDERSON thinks himſelf ſingularly unfortunate in having occaſion to complain of ſuch repeated acts of injuſtice done to him by Sir John Sinclair. He ſhould not, however, have troubled the public in conſequence of this injury he is now about to ſtate, had it reſpected himſelf alone; but as it tends to affect the memory of a man to whom he lies under the greateſt obligations, and for whoſe memory he bears the moſt reſpectful veneration, no conſideration whatever can prevail with him to become as it were a ſilent accomplice to a deed which tends to wound his reputation in the moſt inſidious manner. Theſe conſiderations induced him to publiſh the following advertiſement in the Morning Chronicle, for March 25th 1797; to which he has not as yet ſeen any anſwer. He now reprints it, to give it the greater degree of publicity, till he ſhould more deliberately determine what farther ſteps will be neceſſary compleatly to effect the purpoſe of reſcuing the memory of Dr. Cullen from the injury it has thus ſuſtained.

ADVERTISEMENT.

"We are authoriſed by Dr. Anderſon, to inform the public, that a paper which has been printed and circulated by the board of agriculture, purporting to be written by the late Dr. Cullen, of

Edinburgh, and commented upon as a genuine performance of that eminent man, is not a work of Dr. Cullen, who never wrote or corrected one ſyllable of it; that every word of that paper was written by Dr. James Anderſon, being the ſubſtance of very imperfect notes taken by him, while yet a boy of little more than fifteen years of age, from the extempore diſcourſes of Dr. Cullen, which was his firſt attempt to take notes of any kind. Conſcious of the extreme inaccuracy of theſe notes, the pupil took care not only to mark the particular in the very title, by the words, "*errores ſunt* "*diſcipuli*," but alſo to ſtate it more clearly in a ſhort advertiſement prefixed, (all of which have been ſuppreſſed in the printed copy) warning every perſon into whoſe hands it might fall, not to ſuffer the errors of the pupil to injure the character of the preceptor; but he farther took care never ſince to allow the MS. to be out of his poſſeſſion, unleſs to two of Dr. Cullen's ſons alone, to whom he lent it under the ſtricteſt injunctions, not to allow it to be ſeen or copied by any perſon whatever. Sir John Sinclair having heard that this MS. was in the poſſeſſion of Mr. Cullen (now Lord Cullen) applied to that gentleman, through various channels, for permiſſion to take a copy of it, which he poſitively refuſed to do, or to give his conſent to its being publiſhed, could a copy of it be even obtained. Sir John afterwards, however, found means (which it is ſuppoſed he does not deſire to have publicly developed) to obtain a copy of that MS. and immediately publiſhed it, to the no ſmall aſtoniſhment of Mr. Cullen, as well as to that of the owner of the MS. No ſooner did Mr. Anderſon ſee a copy of that publication, and came to an explanation with Mr. Cullen on the ſubject, than he ſtated his claim to the MS. in a letter to Sir John Sinclair, and ſoon after to the board of agriculture alſo, requiring that a farther publication of it might be ſtopped, as being his own private property; and alſo, with a view to do juſtice to the character of Dr. Cullen, requeſted

that the board would be pleaſed to make ſome public intimation of the miſtake it had inadvertently fallen into in aſcribing it to him. This the board at laſt declined to do, in conſequence of which this ſhort ſtatement of facts is made public, in the mean time, till more effectual means for obtaining redreſs be adopted.

It was once intended to have noticed, among the obſtructions to agriculture, in the firſt eſſay, the ſpeculations of literary men, and the attempts of men of great wealth and property, to practiſe agriculture; as alſo books of agriculture, of a certain deſcription: but to free theſe propoſitions from the appearance of paradox, would have required ſo many explanations, and exceptions, that it was judged more expedient to omit them entirely. They are mentioned here only that practical farmers, in whoſe eyes theſe muſt often appear to be great and evident obſtructions, may ſee they were not entirely overlooked by the author.

ANALYTICAL

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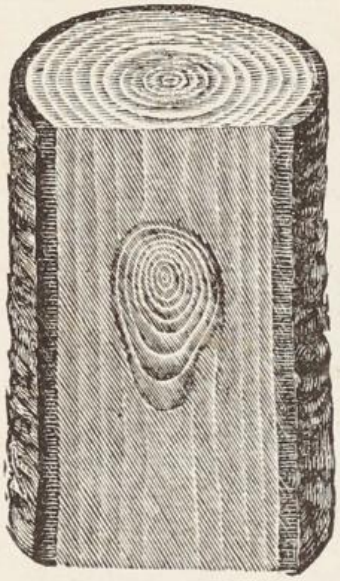

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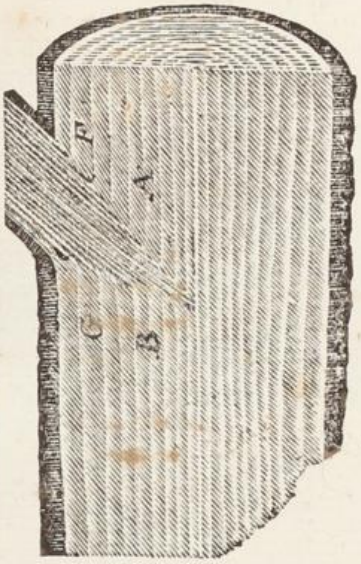

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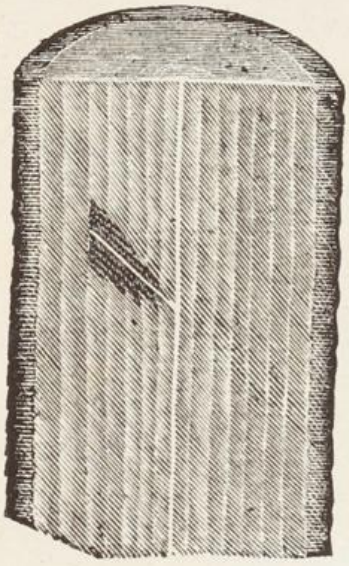

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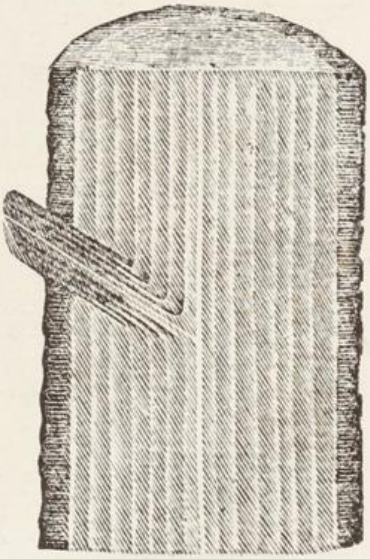

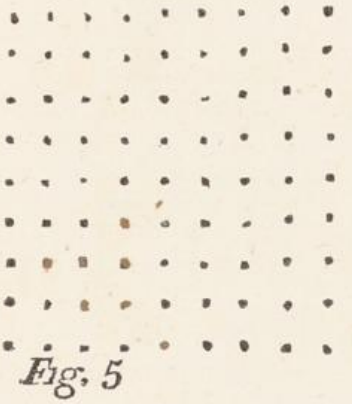

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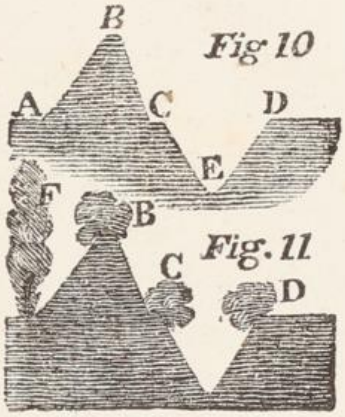

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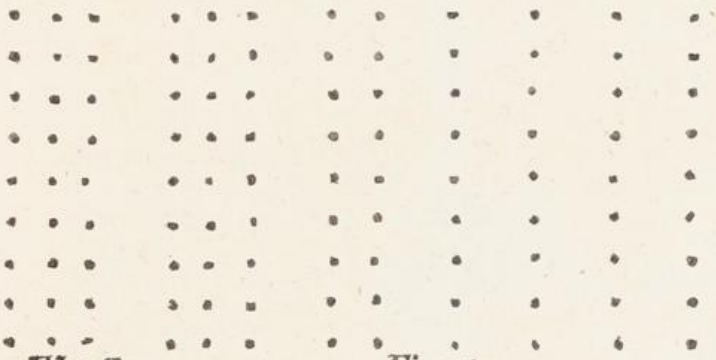

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ESSAY FIRST

ON THE

OBSTACLES TO AGRICULTURE,

AND THE

MEANS OF REMOVING THEM.

Il faut gagner les ceurs, et faire trouver aux hommes leur avantage dans les choſes, ou l'on veut ſe ſervir de leur induſtrie.

FENELON.

ESSAYS, &c.

ON THE OBSTACLES TO THE ADVANCEMENT OF AGRICULTURE IN ENGLAND, AND THE MEANS OF REMOVING THEM.

INTRODUCTION.

THE diſcouraging *Report* of the Lords of the Privy Council, which was publiſhed a few years ago, concerning the deficient ſtate of the agricultural produce of this kingdom, was ſo little calculated to flatter the national pride of the people, as to give a very general diſguſt at the time; and many perſons felt, in their own minds, a ſtrong propenſity to refute theſe *ill grounded* aſſertions, as they thought they could eaſily prove them to be. This made them examine the ſubject with an attention it had never before obtained. The conſequence has been, like what happened in many caſes with the champions of the Roman Catholic religion againſt the Reformers, that thoſe who engaged in the conteſt were finally made converts to that very doc-

trine which they intended to refute. Among other benefits that have accrued from theſe diſcuſſions, we may, perhaps, rank the inſtitution of the Board of Agriculture as one, which, if its enquiries ſhall be proſecuted for a ſufficient length of time, with due caution and energy, will be productive of national benefits, greater than perhaps have been derived from any other political inſtitution in modern times. For, although the money which has been expended on this department, when compared with that beſtowed on any other national eſtabliſhment, may be conſidered as nothing, yet, in conſequence of its exertions, continued for the courſe of little more than one year, a body of authentic facts, reſpecting the agricultural and internal economy of this country, have already been laid before the public, greater than was ever obtained in any other nation ſince the beginning of time; on which facts the political enquirer can ground his reaſonings, on many of the moſt important topics that can ever engage his attention, with a degree of certainty he could *never* have otherwiſe obtained. In conſequence of this, many ideal phantoms of propoſed national aggrandiſement will be baniſhed, and, in their ſtead, plans of ſubſtantial improvement will poſſibly be

brought forward, which could not otherwiſe have been adopted; becauſe the obſtructions, which repreſs alike the ſuggeſtions of genius, and the hand of induſtry, would have remained unknown, as they hitherto have been in every European nation, and, of courſe, entirely unattended to by thoſe claſſes of men who alone have power to remove them.

I could not produce a more ſtriking illuſtration of the truth of theſe aſſertions, than the Eſſay which I am now about to ſubmit to public conſideration; for it will conſiſt of little more than a compreſſed view of facts that have been brought to light by the agricultural ſurveys of the ſeveral counties already printed, ſome of which facts were unknown, or never adverted to, by every perſon who ſhall read this: for I preſume no one perſon in any ſituation in Britain, could have otherwiſe had an opportunity of obſerving the whole; and innumerable perſons no doubt exiſt, who are deeply intereſted in the diſcuſſion, who never before had adverted to one of them; and who, of courſe, could never be aware of the very important conſequences that flow from them.

By a careful attention to theſe ſurveys, the principal obſtructions to agriculture, (not to dwell on

thoſe that depend upon natural cauſes, or that may be overcome by individual exertions, but thoſe which owe their origin to political inſtitutions, or which can only be removed by the conjunct exertions of numerous bodies of men,) may, as far as occurs to me at preſent, be reſolved into one or other of the following heads, which will fall to be ſeverally diſcuſſed.

Commonable fields.
Commons.
Minute diviſions of property.
Intermixture of property.
Mills.
Inadequate ſize of farms.
Injudicious reſtrictions, and want of leaſes.
Want of adequate capital among farmers.
Incloſures injudiciouſly made.
Lands in mortmain and entails.
Indefinite claims upon land, particularly tithes, and poors rates.
Difficulty of communication between places.
Want of proper markets in particular diſtricts.
Injudicious fiſcal regulations.
Want of ready means for conveying agricultural knowledge.

On each of theſe heads, I ſhall make ſome remarks.

§ I.

Commonable lands conſidered as an Obſtruction to Agriculture.

THOUGH the very phraſe *commonable lands* is not known in Scotland; either becauſe the practice which gave riſe to the name was not there perhaps ever in any caſe ſtrictly adopted, or, if it was of old adopted, it had been diſtinguiſhed by another name; yet this practice ſo univerſally prevails, either in a greater or ſmaller degree, throughout every county in England, that it comes forward in each of theſe ſurveys in a very conſpicuous manner. From the ſuppoſed notoriety of the practice, as I ſuppoſe, I do not find that one perſon, among all thoſe ſurveyors, has ſo much as attempted to give a definition of the phraſe. It is not difficult, however, from the notices concerning it that are ſcattered through theſe reports, to form, as I hope, a tolerably juſt idea of the meaning of the phraſe.

Commonable lands I underſtand to mean lands generally arable, at leaſt in part, which belong in property to individuals who are known, and

the limits of whoſe property are aſcertained; but which, in regard to their culture and mode of cropping, are ſubject to certain regulations, which cuſtom, for time immemorial, has eſtabliſhed, ſo as gradually to have acquired the force of law,—to which rules every individual occupying ſuch property muſt adhere, until theſe old cuſtoms ſhall be abrogated, either by the *unanimous* conſent of all the individuals having a right to theſe commonable fields, or by an expreſs ſtatute, obtained with their conſent, for the purpoſe of annulling them.

From a bare ſtatement of the caſe, it is eaſy to perceive that regulations, which were adopted at a very diſtant period, when agriculture might be ſaid to be but in its earlieſt infancy in this iſland, and which were calculated to accord with a ſtate of ſociety very diſſimilar to that which now prevails, muſt be extremely defective; and in particular, that they will prove an unſurmountable barrier to every kind of improvement, wherever they are ſuffered to exiſt. But it has been calmly tolerated, in every county in England, to an enormous extent even till the preſent time, without one national effort to remove it. In ſome counties, it appears that not much leſs than one half of the whole arable lands are in this ſtate;

although it is evident, by the concurring teſtimony of the whole reporters, that, taking all theſe lands at an average, they do not afford *half* the produce the ſame lands would do, if they were put under the ordinary management that appropriated farms are ſubjected to in their reſpective diſtricts; and not perhaps one tenth part of what they might eaſily be made to afford, within a very ſhort period of time, ſhould all other obſtructions to improvement be removed.

It would be tireſome to enumerate the whole facts that occur in the different agricultural ſurveys, tending to point out the pernicious tendency of this mode of tenure: but a few of them may be mentioned. In one place it is ſtated, that a few incloſures had been made, ſeemingly with the concurrence of the whole parties concerned; but when the hedges had advanced nearly to become a fence, one of the commonable tenants went deliberately and pulled them up by the roots, and eradicated them entirely. In another caſe, [Bucks, p. 29.] the pariſhioners having come to an agreement to ſow clover, after that practice had been univerſally acquieſced in for the ſpace of 18 years, one of the farmers, occupying 16 acres of land, bought a large flock of lean ſheep in the month of May, and turned them

on the clover crops, which were nearly in bloom; and no one could hinder him. In another caſe, [*ibid.* p. 30.] where cuſtom had eſtabliſhed the practice of having one corn crop, and one fallow alternately, the occupiers of the diſtrict came to an agreement to have *two* crops and a fallow, alternately; but before the expiration of ten years, one of the farmers broke through the agreement, and turned his cattle upon the crops of beans, oats, and barley; in which plan he was followed by the reſt of his neighbours; and the crops were, in conſequence, totally deſtroyed on that part of the field, which, agreeable to the antient cuſtom, ſhould have been that year in fallow.

Theſe few notices, while they tend to illuſtrate the nature of the particular kind of tenure here complained of, at the ſame time clearly demonſtrate its pernicious tendency to the public; ſo that it would be time miſſpent to adduce a greater number of proofs of a ſelf evident propoſition. No one who has conſidered the ſubject for a moment, but will readily admit, that it were much for the intereſt of Britain that no ſuch practice exiſted in it; and that, of courſe, no time ſhould be loſt in endeavouring to eradicate it: for were this effectually done, it muſt

appear evident, from the facts ſtated, that the total produce of the kingdom would be greatly augmented.

Yet it by no means follows, that it would be prudent in the owners of ſuch property, were it even at their abſolute diſpoſal, in every caſe inſtantly to aboliſh intercommonage. No practice can ever be univerſally eſtabliſhed, by a long concurrence in opinion of a numerous body of men, which is not grounded on reaſon, and is calculated for their mutual convenience, under the circumſtances in which they were placed at the time when ſuch practice was eſtabliſhed. And although it may happen, that, by a gradual alteration in the ſtate of ſociety, thoſe practices which were once ſalutary, may become no longer neceſſary, but pernicious; yet it will be in general found, that when this laſt comes to be inconteſtibly the caſe, the ſame common ſenſe which at firſt concurred in eſtabliſhing the practice, will, in like manner, at length concur in aboliſhing it.

From this train of reaſoning, there is always room to ſuſpect, that whenever a particular cuſtom is loudly complained of by thoſe who only caſually conſider of it, while it is acquieſced in without much ſeeming uneaſineſs by thoſe who

are more immediately ſubjected to its operation, there muſt probably be ſome unobſerved circumſtances, which perpetually come in the way as great inconveniences, whenever an attempt is made to remove the *apparent* evil. And if ſuch inconveniences are found to ariſe, it will be in vain to make laws to aboliſh it; for, in theſe circumſtances, the practice will ſtill prevail in ſpite of the law, however peremptory it may be, and however beneficial in its tendency it may appear to haſty obſervers.

Can any thing, for example, be apparently more beneficial, or at firſt ſight more eaſy, than to enforce an uniformity of weights and meaſures throughout a whole kingdom? The propoſition appears to be ſo ſelf-evident, that the legiſlators of England, of Scotland, of France, and of many other kingdoms have ſeparately judged, at many different times, that this might be done with evident advantage to all their ſubjects; and laws have been repeatedly made in all thoſe nations, as ſimple in their tenor as could well be expected, and as peremptory in their exactments as can be conceived; yet in no one of theſe countries has it been ever found poſſible to enforce theſe laws. The fact is, that there are inconveniences to which ſuch a change would give

riſe, and which would be ſo univerſally felt by individuals, though they have been totally overlooked by legiſlators, that, it requires not the gift of prophecy to ſay, they will for ever ſtand in the way of ſuch an improvement, until thoſe circumſtances ſhall be firſt adverted to and obviated.

Similar in kind, there is reaſon to ſuſpect, muſt the inconveniences be that are in many caſes felt, when an attempt has been made to eradicate the practice of commonable fields: for although it be true, that the difficulty of bringing a numerous body of proprietors to be unanimous in any one meaſure is very great, and that the expence of obtaining an act of parliament is ſuch as to deter many perſons from reſorting to that meaſure, who would otherwiſe have been glad to avail themſelves of that means, for ſilencing unreaſonable opponents to their plans; yet there muſt be many caſes, where a ſingle proprietor is lord of the whole extent of commonable fields in one diſtrict, who in that caſe would have nothing elſe to do, but to allow his leaſes to expire; and then he has it in his power to turn out every tenant, who is not willing to accept a leaſe under ſuch terms as he ſhall pleaſe to grant it. And where the whole of the commonable pro-

perty belongs only to two or three proprietors, the ſame thing could be effected with little more difficulty than in the former caſe, were it ſo obviouſly beneficial to all parties as at firſt ſight it appears to be: but ſince we find that ſuch meaſures are not generally adopted in theſe caſes, I ſee ſtill reaſon to ſuſpect, that there muſt be ſome circumſtances of general conveniency that ſtand in the way; and it becomes of conſequence to enquire what theſe circumſtances are, in order to ſee whether theſe can be firſt removed, before any general law be recommended for aboliſhing this kind of tenure.

A perſon who is well acquainted with the practice of agriculture, can eaſily form an idea of many arrangements, under which a mutual intercommonage, at certain times of the year eſpecially, and under particular modifications, might be not only a convenience, but even a *neceſſary accomodation*, without which, the tenant could not farm his lands. In all ſituations, for example, where the quantity of arable land occupied by one tenant is ſo ſmall as that it cannot afford to maintain a ſufficient ſtrength of men or beaſts to labour, and carry on the neceſſary operations upon it, that tenant muſt join with ſome other neighbour, in ſimilar circumſtances,

for mutual aid and affiſtance. Wherever the produce of the fields are ſo ſcanty, as to require a very wide range for the beaſts which pick up that produce, unleſs the occupier of the land be able to ſtock ſuch an extent of land, as to afford to keep a perſon, by himſelf, to tend his own flocks, an intercommongae between the ſmaller tenants, if ſuch there ſhall be on that ground, becomes abſolutely neceſſary. Wherever the number of cows that can be kept by one tenant are too few to eat down the produce of any field; to avoid the neceſſity of frittering it to pieces, by rearing innumerable fences for very ſmall incloſures, it will be for the mutual convenience of all parties, to have the meadow laid open to the whole of theſe ſmall tenants, as ſoon as the hay can be carried off from it. I might go on to quote other particulars, in which this kind of partial intercommonage might be convenient; but thoſe above ſtated, are ſufficient to account for the origin of commonable lands, and to ſhow that the practice was not only neceſſary, at the time when it was firſt eſtabliſhed; but that, under the ſame circumſtances, it is equally neceſſary now, and muſt continue to be ſo till the end of time, if the ſtate of occupation on theſe lands ſhall continue to be the ſame.

The fact is, a ſimilar practice, under whatever name it may be known, muſt have prevailed, and muſt ſtill prevail, in every country where land is parcelled out among tenants in allotments too ſmall for the ſtate it is in at the time to admit of, under a ſtrict appropriation. In Scotland, it was, and is known, with this difference between the practice there and in England,—that whereas in Scotland every man's poſſeſſion is, by the law of the land, declared to be his own excluſively for the time he holds it; and that of courſe he can puniſh any perſon who ſhall treſpaſs upon it without his permiſſion; a reliance being placed upon the common ſenſe of men, and their mutual intereſt, as ſufficient to inſure good neighbourhood, and a voluntary interchange of mutual right; in England it has been judged to be more for the mutual benefit of the parties, to inſure themſelves againſt any infraction of good neighbourhood, by eſtabliſhing general regulations for that purpoſe; which were to compel the refractory to yield the unlimited exerciſe of his own will to the general ſenſe of the community.

It thus appears, that if *common-field* huſbandry be an obſtruction to agriculture, which no conſiderate perſon will deny, this would not be annihilated merely by obtaining a law for its aboli-

tion. This evil, in fact, reſolves into another, viz. the inadequate ſize of farms, which will come to be treated under the fourth head above enumerated; and, till care be taken to obviate this difficulty, there will be ſo many intereſts deeply affected by any propoſed change in the ſtate of *commonable lands*, that innumerable obſtructions will occur, in attempting haſtily to abolish the practice by law, without taking judicious precautions to guard againſt the difficulties that may be expected to ariſe.

And it deſerves to be particularly adverted to on this occaſion, that however detrimental to the public at large, the practice of occupying commonable lands may be; or however much the income of the owners of ſuch lands muſt thereby be diminiſhed; it is a matter of comparatively ſmall importance to the tenants, or occupiers of ſuch lands: for to the tenant, eſpecially if a tenant at will, or one having a leaſe renewable by fine upon lives, (under which two kinds of tenure the greateſt part of commonable lands are occupied,) it is a matter of very little conſequence, whether the land he occupies yields on an average, ten quarters *per* acre, or ten buſhels only: for, under theſe circumſtances, the rent that another perſon would be willing to give for

the premiſes, will always be exactly in proportion to the *free* produce he thinks he can diſpoſe of from the lands. If the lands were rich, therefore, the occupier of the land muſt lay his account with paying a proportionably higher rent, or quit; ſo that his actual profits may be equally great upon theſe lands in their preſent ſtate, as if they were capable of yielding ten times their preſent produce. What inducement has ſuch a man to make exertions in induſtry? It is rather his intereſt to let things continue as they are: for this will effectually prevent ſpirited men, who have ſtock for carrying forward agricultural improvements, from ever thinking of interfering with him in a competition for his miſerable farm. In this way, a proprietor who ſhall think of making an alteration on tenures of this ſort, muſt frequently find that he meets with a body of *vis inertiæ* to remove, which it is impoſſible for him to overcome. It is, as if a fiſherman in his boat were to attempt to move the Craken of Pontippidon. He finds it exceeds his force, and he muſt finally give over the attempt as hopeleſs.

But though a law, which ſhould ſet aſide all the practice of commonable fields, could ſuch a law be actually obtained, would not, of itſelf, remove the evils complained of; yet, as there may

occur many cafes, in which the proprietors, were they at liberty to act with freedom, would perceive it was their intereft to adopt fuch meafures as fhould admit of having thefe, now commonable lands, cultivated in a proper manner, it would furely be a very defirable thing, if fome eafy mode could be devifed for giving them that freedom, when they found they could avail themfelves of it with propriety ; while it fhould, at the fame time, allow others to retain the undifturbed enjoyment of their prefent commonage, until a fit occafion fhould prefent itfelf for altering it.

In all cafes of this fort, it is neceffary to proceed with caution ; and whenever recourfe can be had to experience, in fimilar cafes, that ought to be confulted in preference to any preconceived idea, however beautiful, that never has been carried into practice : for unforfeen difficulties in every new cafe occur, which are often accompanied with very ferious confequences. In the prefent cafe we find, that the fame evil which fubfifted in Scotland, nearly, as I fuppofe, to an equal proportional extent as it now does in England, has been gradually done away, without violence or difficulty of any fort ; merely by *permitting* every one who found it his intereft to abandon the practice of intercommonage, to do fo,

without positively *requiring* that this, in any case, should be done, till some one of the parties wished for it. It is true, that in this way, it would be in the power of one man, at times, to incommode his neighbours; but it is also true, that he cannot do this without being disquieted himself, unless his situation be such as that it is much for the benefit of the community at large, that he should exercise this privilege; and it has been found, that in practice this privilege has scarcely ever been claimed, but in these circumstances.

Now, could an act be obtained, which should put the whole tenants of the commonable lands in England precisely in the same condition with lands occupied by the same class of persons in Scotland, it does not appear that any other consequences should be experienced in the one case, than those that have been felt in the other. This appears to be a very easy matter: for were it simply enacted, that "the practice of no per-"son occupying lands in England, should be "influenced by the will of any person whatever; "unless it were in respect to those things alone "which a tenant specifically agreed to perform "in his lease, any law, privilege, or custom to "the contrary, notwithstanding;" the thing would be at once done. In that case, the *occu-*

piers of commonable lands would be at perfect freedom to continue to intercommon, as at present, if ſo they ſhould incline; but whenever any one among them found his ſituation ſuch as no longer rendered his practice beneficial to him, he could withdraw himſelf from the aſſociation, without having any power to diſſolve the connection of the reſt of the community with each other, as long as they inclined it ſhould continue in force.

We have, in Scotland, the experience of preciſely ſuch a law, in a caſe nearly ſimilar to that here treated. During the courſe of many ages, a vaſt diverſity of practices had been there eſtabliſhed by cuſtom, in regard to certain ſervices that were wont to be performed by tenants to their lords, which were accepted in part of rent. Theſe practices, like thoſe of commonable lands in England, varied in every diſtrict, and pariſh, and barony; ſo that, perhaps, no two of them were alike in all reſpects: but every court of barony took cogniſance of the old uſages eſtabliſhed in that barony, and all the tenants in it were bound to pay theſe ſervices *according to uſe and wont*. With the change of manners which gradually prevailed in every part of this iſland, a change of ideas took place; and, like the commonable rights

in England, theſe ſervices, eſtabliſhed by *uſe and wont*, were generally accounted a grievance that ought to be removed. Accordingly, in the act which took away all heritable juriſdictions in Scotland, which was paſſed in the year 1746; a clauſe was introduced, declaring that all *indefinite* ſtipulations in a leaſe were entirely null and void; ever ſince which time, thoſe vague terms of *uſe and wont* have been conſidered as nothing in every court of law; though ſervices in kind, when particularly ſpecified, are ſtill as much accounted a part of the rent as any ſums in money, or other preſtations. The law propoſed, therefore, would not be without a precedent, which in its execution has been found to be eaſy, as in its operation ſalutary.

With regard to the intermixture of lands which in many caſes, take place in theſe commonable fields, to the very great detriment of agriculture; the ſame thing took place in Scotland, under the name of *run-rig*; a practice which took its riſe in thoſe times of anarchy, when individuals were often marked out for deſtruction by other individuals: for, by their mixing the property of one with another, every attack upon one became an attack upon the whole, which all, of courſe, were bound to defend. This in-

termixture of land reſpected either the poſſeſſion by the tenants only, which was ſometimes intermixed, while that of the different proprietors were ſeparated; or it reſpected the property of the proprietors alſo, which were ſometimes blended together in ſmall detached parcels. Both theſe evils have now been remedied ſo effectually, that ſcarcely any veſtiges of them are found to exiſt. They have been got rid of in this manner. Where the intermixture of ground was only among the tenants belonging to the ſame lord, he uſually allowed all the leaſes to expire before a renewal of any one was granted; and when the lands were thus out of leaſe, he divided the whole into farms, uſually the ſame number as before, and then re-let them as ſeparate farms. Where the intermixture was of ſeparate properties, very often thoſe proprietors agreed to authoriſe certain perſons, named by themſelves, to make a fair and equitable diviſion of the properties; aſſigning to each the part appropriated for him, in the ſituation that beſt ſuited him, or what was moſt contiguous, if he had other adjoining property. But if one or more of the parties ſtood out, and would not come to an amicable compromiſe; then it was competent for any one of the parties, who choſe

it, to bring an action before the ſheriff of the county for a diviſion, who, after nominating perſons ſkilled in matters of this ſort, to divide and apportion the ground in diſpute, and to give in a report; and having heard parties, and viſited the ground in queſtion himſelf, and ſeen the boundaries fixed before numerous witneſſes, the ſheriff proceeded to give an award, which was final, unleſs, upon appeal to a higher tribunal, (which was competent,) his ſentence ſhould be altered. In diviſions of this ſort, I do not recollect ever to have heard of an appeal from the deciſion of the ſheriff. It is, at the ſame time ſo little expenſive to the parties, and ſo well calculated for the diſtribution of material juſtice, in caſes of this ſort, that it is not perhaps poſſible to propoſe a better model for imitation.

Were theſe, or ſimilar regulations, adopted in England, there ſeems reaſon to be ſatisfied, that all the evils originating from the practice of *common field huſbandry*, ſo much, and with ſuch reaſon, complained of at preſent, would be effectually and imperceptibly removed; without any convulſion or violent ſtruggle. If all the other obſtructions to agriculture ſhall admit of as eaſy a remedy as this one, we may hope to ſee the improvement of the country put upon a very deſirable footing, even in our own day.

§ II.

Of Commons, as an Obſtruction to Agriculture.

IF *commonable lands* be complained of as a grievance, *commons* muſt juſtly be accounted an evil of ſtill greater magnitude: and this alſo is experienced to an aſtoniſhing extent in every county in England. Among the diſtinguiſhing characteriſtics of man, the moſt peculiar is the faculty of obſervation, that has been conferred upon him by the beneficent Creator of the univerſe. By means of this faculty, he is enabled to compare together facts that fall under his obſervation, to reaſon upon theſe, and to draw concluſions from them thatt end to accommodate himſelf. It is by this means he has been able to diſcover, that a ſoil which in its natural ſtate, is perhaps incapable of producing almoſt any of thoſe things that are neceſſary for his ſubſiſtence, may be ſo managed as to be made to yield abundance of the moſt delicate products of the earth: nor is it poſſible to ſet any limits to the encreaſed fertility that a continued induſtry, under the guidance of reaſon, may confer upon even the moſt

infertile ſoil. It was by means of ſuch exertions, that Paleſtine of old, from being one of the moſt infertile regions on the globe, had become, in the ſtrong language of the ſcriptures, a land flowing with milk and honey; and was capable of then ſupporting within itſelf, a population at leaſt an hundred times greater than it can do in its preſent ſtate, after it has been ſuffered to revert to its original condition merely by withdrawing the induſtrious exertions of man. There are many inſtances, in our own country, where a field has been, in the courſe of a few years, made to yield a thouſand times its original produce. But in a country where commonage univerſally prevailed, this favoured gift of reaſoning, would, in this inſtance, have been conferred on man in vain. He can then only trample under foot a forlorn waſte, which, though it poſſeſſes the capability of being made to afford him innumerable comforts, he is effectually barred from indulging the cheering hope of being ever permitted to enjoy. He is indeed debarred from ever being able to ameliorate the ſoil, and thus to augment its product to the ſtate; but he is not prevented ſo effectually from deteriorating it. While in the ſtate of a common, the ſurface of the ground may be broken by him in ſuch a

way, as not to recover for ages a ſward equal to that which was originally upon it. It may be caſt up and ſunk into pits: it may be converted into wet and rotten marſhes, by caſual obſtructions being thrown in the way of the water, which no one finds it his intereſt to remove: it may, in ſhort, while a common, be abuſed in a thouſand ways, by reaſon of the obſtinacy, indolence, or caprice of individuals; but it never can be benefited by the induſtry of man: and not only *may* this be done, but theſe things actually *are* done, in innumerable inſtances, in this land of freedom; ſo that to a perſon who contemplates the loſs that the nation muſt ſuſtain by theſe deplorable abuſes, nothing can afford a more melancholy train of reflections, than that which the frequent recurrence of thoſe diſguſting commons ſuggeſt to his mind, as he travels over that, otherwiſe delightful, country of England.

When he ſtops to enquire more minutely into the effects of this kind of property, upon the morals and domeſtic economy of the individuals who claim a right to theſe commons; he only finds additional cauſes for regret. He frequently diſcovers, that the quiet and induſtrious cultivator, having a right upon a common, is obliged to abandon that right, becauſe of the harraſſ-

ments to which he is ſubjected from turbulent and aſſuming neighbours; who have obtained a ſmall footing there, with a predetermined reſolution, perhaps, to encroach much farther than their rights would authoriſe; becauſe they know that, towards the reſtraining of theſe exceſſes, no obvious and eaſy means occur. Thus does the peaceable man often find it better to relinquiſh his right almoſt entirely, than be ſubjected to the perpetual contention that would occur in defending it. Such an enquirer frequently finds, that in conſequence of this the ſmall flocks of the poor cottager, who cannot afford to look after them continually himſelf, are ſo tormented, by being chaſed from place to place by thoſe marauders, that, inſtead of a relief to the poor cottager, theſe flocks prove only a torment to him: his family becomes in conſequence of this, a burthen on the pariſh, which is obliged to ſupport them: he finds, that among thoſe who are bred up in theſe ſituations, there are many young men who delight more in active plunder than in ſober induſtry; and who, tempted by the high prices that luxurious inhabitants of towns offer for game, become poachers, and and form ſuch powerful confederations of determined profligates for their mutual protection,

that no one leſs determined that themſelves will dare to interfere with them; which enables them to carry on their depredations with impunity. He obſerves, that the money theſe young men thus acquire, is uſually ſquandered in drinking and riotous exceſſes: the young women are contaminated by their converſation, corrupted by their exceſſes, and debauched; the leaſt evil attending which courſes, is a great number of illegitimate children, and an extravagant poor rate. But who can eſtimate the detriment that a nation ſuſtains, when the morals of the country inhabitants of it become corrupted? It is like tainting the ſprings of water with poiſon, which, inſtead of promoting health and vigour, as they naturally ought to have done, produce one univerſal maſs of infectious diſeaſe.

It is common to read in the hiſtory of Britain, that the *rot* became, at times, ſo prevalent in England, as to carry off many millions of ſheep at once; and theſe diſeaſes were regarded, like the peſtilence among the human ſpecies, as a terrible viſitation of heaven for the ſins of a guilty land. There is great reaſon to believe, that theſe frequent mortalities among the flocks were entirely occaſioned by the numerous commons, which were in thoſe times much more extenſive than at

preſent: for it is ſtill known, that in neglected ſpots, where water is allowed to ſtagnate and generate marſhes, as is often the caſe with commons, when the ſeaſon proves wet, the ſheep paſtured upon them are, to this day, ſo much ſubjected to the rot, as to induce many perſons rather to give up their right, than to allow their flocks to enter upon theſe unhealthy paſtures. Conſidered under every poſſible point of view then, it appears to be undeniable, that the prevalence of *commons* is a great national grievance, which ought, if poſſible, to be removed; and that the Board of Agriculture cannot be more beneficially employed, than by granting all the aid that their wiſdom can deviſe, for removing thoſe bars that at preſent tend to prevent the equitable diviſion of this kind of property.

As to the *extent* of theſe commons in Britain, facts are ſtill wanting to aſcertain it with preciſion: nor is exact preciſion in that caſe abſolutely neceſſary. From every one of the agricultural ſurveys yet made, it is evident, that in every county in England and Wales, there are extenſive tracts of land of this deſcription, (for *commons* and *waſtes* may be conſidered as nearly ſynonimous terms, although it be a truth, that many of theſe commons conſiſt of land naturally as good as any in the kingdom). The Preſident

of the Board of Agriculture has given a ſlight view of the eſtimated extent, and probable improvement of which theſe lands would be ſuſceptible, if divided. Of the extent of theſe lands, were it neceſſary, a tolerably accurate knowledge might be attained; but as to the amount of improvement, it is impoſſible for any perſon to form at preſent an idea of it, ſhould the proſperity of this country *be permitted* to go forward, for a conſiderable track of time, in that accelerating *ratio* into which it would naturally fall, if the general tranquillity of the nation ſhall be preſerved; and the other obſtructions to be mentioned in this eſſay, which have hitherto repreſſed exertions in agriculture, be removed. It is enough here to ſay, that it would be an object of immenſe magnitude. I have already had occaſion to obſerve, that in ſome favourable ſituations, it is well known that land, in the courſe of a very few years, has been made a thouſand times, at leaſt, more productive than in its original ſtate. Many commons are at preſent lying waſte, in ſituations equally favourable, as theſe: and many other ſituations may become equally favourable, by an extenſion of thoſe modes of facilitating intercourſe, which are now in contemplation; and are only prevented from

being carried into effect by barriers that judicious laws may eaſily remove.

The origin of commons may be traced to the ſame ſource with that of commonable fields; viz. an inadequate ſize of individual poſſeſſions: and ſo long as this mode of parcelling out lands ſhall continue, thoſe having a right to commons, will have the ſame objections to a diviſion of them, as the tenants of commonable lands muſt have; with this difference, however, that ſome individuals among thoſe having a right of commonage, being much more conveniently ſituated for availing themſelves of that right, than others equally entitled to it who live at a greater diſtance, it muſt of courſe be the intereſt of the firſt to oppoſe any diviſion of the common, which can be ſuppoſed to have juſtice for its baſis. To require then, as the law at preſent, if I am rightly informed, actually does, an *unanimous* conſent of all the parties concerned, (were minors and fatuous perſons out of the queſtion,) before a diviſion can take place, unleſs under a ſpecial act of parliament, obtained expreſsly for that purpoſe, is nearly the ſame thing, as ſaying that no diviſion of a common can take place, without a ſpecial act of parliament for that purpoſe.

There are three circumſtances that have hitherto tended greatly to retard the diviſion of com-

mons in England These are, *Firſt*, the great expence that muſt, in moſt caſes, be incurred, before an act of parliament can be obtained for the diviſion of a common. *Second*, the difficulties that occur in ſetting juſt bounds to the claims of the lord of the manor, and the tithe owner. And, *Third*, the expence that neceſſarily muſt follow ſuch diviſion, in conſequence of the general practice that has hitherto prevailed, of obliging every one of the owners of ſuch divided property immediately to incloſe their reſpective ſhares, even where the circumſtances are ſuch, as that a prudent economy would not permit the effecting of ſuch incloſures, but much the reverſe. Were theſe three obſtructions to be moderated, or totally removed, much good would reſult from it: nor does it ſeem to be impoſſible to do this.

In regard to the *firſt* circumſtance, the expence of obtaining an act of parliament for *dividing*, which I would wiſh to ſubſtitute for *incloſing* of commons; this, I am aſſured, in all caſes, amounts to ſuch a ſum, as to exceed the whole preſent value of many ſmall commons, were they fairly ſold by open auction. Of courſe, if no mode ſhall be deviſed for removing this bar to their diviſion, all ſuch ſmall commons, which, though they may be of little value *individually*, would

be of great national concern *collectively* conſidered, are doomed to remain in the ſtate of *waſtes* till the end of time. In intricate caſes, or where ſome of the parties concerned are wealthy and obſtinate, I am aſſured that the actual expence incurred before an act has been obtained, for authoriſing the diviſion of a common, has amounted to the enormous ſum of ſeveral thouſand pounds. With the dread of even the chance of any thing like ſuch a charge being incurred, it is eaſy to ſee, that many owners of ſuch commons muſt feel a great reluctance at taking any ſteps that might eventually ſubject them to ſuch an alarming expence, before they can be permitted to begin to improve their own property.

In regard to the *lord of the manor*, who has ſometimes a very ſmall claim in other reſpects upon the common lands, his ſingle negative, in the preſent ſtate of our laws, if I be rightly informed, proves an abſolute bar to every attempt at a diviſion of a common ſo that if this man ſhould be capricious and obſtinate, he may prevent ſuch a ſalutary meaſure from being carried into effect; even though all the other parties concerned ſhould be unanimous for it. I do not know how the caſe ſtands in this reſpect, in regard to incapacity or nonage; and in reſpect to *tithes*, I

know of no method that has yet been devised for ſatisfying this demand; but that alone of obtaining the conſent of the tithe owner, to agree to accept of ſuch a ſpecific ſum in money, or ſuch a proportion of the land itſelf as ſhall content him *in lieu* of tithe: nor can even this be done, where the tithe is claimed by the clergy, ſo as not to be liable to future challenge, unleſs under the ſanction of a ſpecial act of parliament: ſo that if theſe men ſhall prove greedy, capricious, and obſtinate, a great deal of expence muſt be incurred before their claims can be ſettled; the dread of which muſt alſo operate, in many caſes, to prevent a diviſion of this kind of property.

How theſe different obſtacles are to be removed, will require the mature deliberation of the honourable Board of Agriculture, and the legiſlature at large. But the object is of ſuch conſequence, as to demand their moſt ſerious attention. With a view to pave the way for ſuch deliberations, I ſhall beg leave, with due deference, to ſubmit to their conſideration ſuch hints as have occurred to me on this ſubject, after the moſt careful attention that I myſelf have been able to beſtow upon it, aided by the ſuggeſtions of ſeveral men of ſound underſtanding, who are well

acquainted with things of this nature, with whoſe opinions I have been favoured.

I have found it to be the general wiſh of every perſon with whom I have communicated on this ſubject, that one general act of parliament ſhould, if poſſible, be obtained, under the authority of which all commons might be divided; without the neceſſity of applying for a ſeparate act for the diviſion of each individual common. Nor does the thing ſeem to be at all impracticable. Under the authority of juſt ſuch an act as the gentlemen in England ſeem to wiſh for, I find that nearly all the commons in Scotland have been divided, within the ſpace of about an hundred and thirty years paſt, with little expence or trouble to the parties; ſo that a common, in that country, unleſs it be preciſely thoſe that are excepted by this act, is ſcarcely now to be found. I cannot help remarking, in this place, as a circumſtance greatly in favour of the meaſure propoſed, that the ſame idea occurred to many individuals, who had in England ſeparately conſidered the ſubject; none of whom knew that ſuch an act as I am now about to quote, had ever had an exiſtence; or were in the leaſt acquainted with the manner in which it had operated. The act I allude to is ſo ſhort, ſo ſimple,

and ſo comprehenſive, that I ſhall hope to be excuſed for quoting it entire. This act was paſſed in the year 1665, and runs *verbatim* thus.

" All commons, excepting thoſe belonging to " the King in property, or royal burghs in bur- " gage, *may* be divided at the inſtance of *any* " individual having intereſt, by ſummons raiſed " againſt all perſons concerned before the Lords " of Seſſion, who are empowered to diſcuſs the " relevancy, to determine upon the rights of the " parties concerned, to *divide* the ſame amongſt " them, and to grant commiſſion for perambulat- " ing, and taking all other neceſſary probation, " to be reported to the Lords, and the proceſs to " be ultimately determined by them; declaring, " that the intereſt of the heritors having right " in the common, ſhall be eſtimated according to " the *valuation* of their reſpective lands and pro- " perties; [having right to that common,] and " that a portion be adjudged to each adjacent " heritor, in proportion to his property, with " power to the Lords to divide the moſſes, if " any be in the common, among the parties hav- " ing intereſt; or in caſe they cannot be divided, " that they remain in common, with free iſh and " entry, whether divided or not."

No eulogium can be too high for the comprehenſive clearneſs of this ſhort act; which is in no reſpect liable to ambiguity or miſconſtruction of any ſort. The conſequence has been, that in its application, it has been the moſt eaſy and ſatisfactory to all parties that can be conceived. It puts it in the power of *any* individual having intereſt, to *force* a diviſion of a common, whenever he ſhall find it ſuits his own intereſt, by a very ſimple proceſs, that can be raiſed at a trifling expence. It puts it in the power of every perſon concerned, to bring forward their juſt claims; and preſcribes an undeviating rule by which they are to be adjuſted. And, finally, it allows every perſon to uſe the property that ſhall be thus awarded to him, in that manner which ſhall ſeem beſt calculated to promote his own intereſt, without limitation, or reſtraint.

In regard to *incloſing*, the general law of the land is allowed to apply here as in every other caſe. The law in Scotland reſpecting incloſures, is, that if any one chooſes to incloſe his property, he can *compel* any adjoining proprietor, by means of a proceſs raiſed before the ſheriff of the county, to ſtreight marches, where neceſſary, at the ſight of the ſheriff; who muſt perambulate the marches, and ſettle the line, if the parties do not agree

upon it themſelves; and to make each party bear one half the charge of a common march-fence. The ſheriff, alſo, is to preſcribe what this fence ſhall be, if the parties diſagree; which fence is to be upheld in all time coming, at their mutual charge. This is the practice by thoſe who chooſe to carry the law to its utmoſt rigour. But the general practice is, (and what I humbly conceive *ought* to be the law) that if one of the parties wiſhes to make an incloſure for his own convenience, one ſide of which runs along the line of the march, while the adjoining proprietor has no intention of *there* making an incloſure at all; in that caſe, the *firſt* erects the fence that runs along the march, entirely at his own expence, as well as the other fences round his field: nor does he claim any part of that expence from the adjoining proprietor, until that proprietor avails himſelf of it, by making it a part of the fence of an incloſure made on his ſide alſo; at which time, and not before, he pays to his neighbour the half of the original expence of rearing that fence, and is at half the expence of upholding it ever afterwards. This is alſo the rule adhered to reſpecting partition walls, that mutually belong to adjoining buildings; and ſeems to be conſiſtent alike with the ſtricteſt

equity and good neighbourhood: and it would be doubtleſs attended with very good effects, were this rule adopted univerſally in England, with regard to all incloſures to be made, whether on commons, commonable fields, or otherwiſe.

Though the law above quoted was perfectly applicable to the ſtate of commom lands in Scotland, at the time it was made: yet, as there are ſome peculiarities reſpecting commons in England, that did not there prevail; in an act to be obtained for the ſame purpoſe in England, proviſion ought to be made for theſe circumſtances. The ſeignorial rights claimed by the lord of the manor over commons in England, never ſeems to have been exerciſed in Scotland; and therefore they are not attended to in this act. A common, in Scotland, ſeems to have been conſidered merely as having been originally a tacit agreement only between the adjoining proprieters of land, to allow a certain proportion of their fields to be paſtured and otherwiſe uſed, *in common*, for the mutual convenience of their reſpective adjoining tenants. It ſeems to be underſtood, that no one of theſe proprietors gave up the right to any part of his property, in conſequence of throwing it common; but merely admitted of intercommonage for paſturage, or other purpoſes of

mutual accommodation to the tenant. It was therefore underſtood, that no perſon but the adjoining heritors, or their tenants, had any right whatever to the common; nor even that theſe proprietors had any claim upon theſe commons, except for ſo much of their lands only, as had a right of commonage upon them by immemorial practice. On theſe principles, the law has been conſtructed, by which each proprietor is entitled to reſume the whole of the property, it was ſuppoſed he had only confounded with that of others for a time. In England, ideas of another kind, reſpecting the original property of commons, ſeem to have prevailed. The whole property of the common appears to have been conceived originally to belong to one perſon, who allotted to his own tenants, or the holders of his own lands around the common, or to others whom he choſe to tolerate upon it, a right to have the ſame uſe of the ſurface-produce of the common, as a tenant uſually enjoys of their lands; or other partial uſe of it only; without giving up his excluſive right to the ſoil itſelf, or to mines or minerals under the ſurface: that in ſelling off the adjacent property which had a right to the common, either in whole, or in part, he gave off with each parcel of land ſo alienated, the ſame right upon the com-

mon, that his tenants on that parcel of land formerly enjoyed, and no more; and that, of courſe, he himſelf ſtill retained his ſeignorial rights over the whole as before. In conſequence of which, we find, that there are two ſeparate intereſts to be averted to in the diviſion of a common in England, that were not known in Scotland, which will, of courſe, require to be averted to in any general law that ſhall be made for dividing commons in England. Theſe are, the lord of the manor, and thoſe perſons who, by mere occupancy, have acquired, by preſcription, a kind of right that the law conſiders as valid; though in no way connected with a ſeparate poſſeſſion of land, beyond the bounds of the common itſelf, and ſtill in no wiſe affecting the ſeignorial rights of the lord of the manor over the whole.

There is yet another intereſt, that was not recogniſed as affecting common lands in Scotland, at the time the above act was made, which ought to be attended to in England; viz. that of the perſon claiming a right to the tithe. In Scotland, every common was conſidered as an appendage to, and a conſtituent part of two or more farms that lay contiguous to the common; and that, of courſe, the rent of theſe farms were higher or lower, in proportion to the benefit the tenant de-

rived from the common. And as the tithes in Scotland are all, by law, liable to be converted into a fixed ſum, according to a certain *ratio* preſcribed by that law, *in proportion to the rent*, it followed, that when the proportion of the common belonging to each farm, was aſcertained and allocated in ſeveralty to that farm, it did not materially alter the caſe in regard to tithe; and was not to be ſeparately adverted to. In England, where the tithe is uſually drawn *in kind*, and where the tithe owner claims a right to draw tithe for even all the produce that has been created by the joint exertions of induſtry, and outlay of capital, it becomes neceſſary, if that tithe is to be abrogated, to make a proviſion for this intereſt alſo. Inſtead of the clauſe in the above act, which runs thus; "declaring that the intereſt of the heritors hav-"ing right to the common, ſhall be eſtimated "according to the valuation of their reſpective "lands and properties," a clauſe to this purpoſe may be introduced; "declaring, that the ſeigno-"rial rights of the lord of the manor ſhall be "preſerved: the rights of the tithe-owner pre-"ſerved, either by an adequate allocation in mo-"ney, or a proportion of the ſoil; the quantum "of either money or land to be appropriated *in* "*lieu* of tithe, to be aſcertained by a jury of re-

" ſpectable men in the vicinity : and the ſurface-
" right to be divided among all the other parties
" having an intereſt in it, according to the valua-
" tion, (or the rent, or the value they are put at according to the eſtimation of a jury, as the one or other mode ſhall ſeem moſt eligible, when the bill is under diſcuſſion,) " of the reſpective lands
" and properties they hold, having a right to the
" common." Something to this effect ſeems to be all that is requiſite to adapt the act, *mutatis mutandis*, to England as well as Scotland. Should it be thought more eligible by the parties, to aboliſh the ſeignorial rights entirely, on the diviſion of the common, perhaps it might be well to leave it in the option of the parties, at that time either to purchaſe that right by a ſum of money, the quantum to be aſcertained by a jury, or to leave it entire, as ſhould prove moſt agreeable to the parties: but unleſs three fourths in value of the proprietors, at leaſt, excluſive of the lord of the manor himſelf, ſhall concur in a deſire to purchaſe the manorial rights, it ſhall not be competent to compel a ſale of them.

Were a law to this effect obtained, *authoriſing*, though not *requiring*, the immediate diviſion of commons, with little expence to the parties concerned, it is not to be doubted but, in a few years,

moſt of the commons in the kingdom would be divided, and gradually brought into ſuch a ſtate of cultivation, as would very ſoon make a great addition to the annual produce of the kingdom, without encroaching on the rights of any one.

§ III.

The minute Diviſion of Property a cauſe of the Retardment of Agriculture.

IT requires but a very ſlight degree of conſideration, to perceive, that wherever property is much divided, the bars to any meaſure of general utility that ſhall be propoſed, ſuch as roads, canals, irrigations, &c. muſt be multiplied to an aſtoniſhing degree.

The tenure called *gavel-kind*, which implies a diviſion of all the landed property a man holds, in equal portions among his children; though it ſeems to be, at firſt ſight, a very juſt and equitable inſtitution, ſeeing it is an obvious truth, that all the children of any man have an equal right to his care and kindneſs, and conſequently, to an equal ſhare in his property: yet here, as in many other caſes, this law of ſtrict equity in ſpeculation, appears to be, when rigidly applied in practice, highly injurious to ſociety; and had not means been invented to counteract this law of *juſtice*, as ſome would call it, the property of this iſland, would have been divided into ſuch parcels, long ere this time, as to have proved a

total bar to the cultivation of the ſoil in any way. For example, ſuppoſe a man to be poſſeſſed of one hundred acres of good land, worth one pound an acre *per annum*; which is one of the moſt favourable caſes that can be ſuppoſed to admit of a ſmall diviſion of property: and let it alſo be granted, that three children, on an average, may be produced from each marriage. This hundred acres would, in the firſt generation, be divided into lots of thirty three acres each, omiting the fraction; in the ſecond generation, the lots would be eleven acres; in the third, three acres and a fraction; in the fourth, one acre each in the fifth, 59, ſay 60 falls [poles]; in the ſixth, 20 falls; in the ſeventh, 7 falls nearly; in the eighth, $3\frac{1}{3}$ falls, or 66 yards; in the ninth, 22 yards; in the tenth, 7 yards nearly; and in the eleventh, two and one third yards. Thus, in the courſe of eleven generations, each man's property would be barely ſufficient to make a grave to hold himſelf. In this caſe, it might truly be ſaid, that *ſumma jus* is *ſumma injuria*. Suppoſing it were poſſible to make theſe diviſions without diſputes and heart-burnings: ſuppoſing charters, for defining theſe, could be obtained without expence, (neither of which we know could poſſibly take place, and either of which would be productive

of unſurmountable inconveniencies,) yet ſtill this would be a ſmall evil, compared to thoſe that follow: no incloſures could be made, no ground could be plowed, no cattle could be grazed; nothing would remain, but for each man to lie down and die upon the ſmall ſpot he claimed as his property.

Inſtead of that exceſs of *ſpeculative* juſtice, the wiſdom derived from *experience* has happily remedied all theſe evils, by departing from the idea of chimerical *rights*, that can in no caſe be ever exerciſed, and adopting another rule, which though it appears, at firſt ſight, to be grounded on injuſtice, has been found to be dictated by wiſdom. The law of *primogeniture*, (*a*) which prevents landed property from being frittered away into ſuch ſmall portions as would render it uſeleſs, while it enables the father, by burthening the eldeſt ſon with the payment of ſuch ſums out of it, for younger children, as he ſees expedient, puts it in the power of every owner of land, to make as minute a diviſion of his territorial property as he may think proper, without cutting it into pieces. The conſequence is, that when theſe portions of land become too ſmall to admit of being uſefully divided, the whole of the property muſt be ſold; and ſo this unwieldy

maſs, by paſſing to another perſon who has funds abundant for the acquiſition of it, throws into the hands of thoſe whoſe ſubſtance was too mean to allow them to make a *proper* uſe of that kind of property, another kind of property, *caſh*, which can be applied in a thouſand ways, in the moſt minute proportions, towards exciting energy in exertions of induſtry. This is one of thoſe few political inſtitutions, which, on account of the unconſtrained tendency of its operation to promote the public weal, ſomewhat reſembles, in this reſpect, the beneficent operations of nature, though it ſeems to run directly counter to that ideal perfection which, to the diſgrace of the *learned*, has aſſumed, among the philoſophers of the preſent day, the place of common ſenſe, by ſubſtituting ideal phantoms, inſtead of well authenticated facts, as a baſis on which all reaſoning concerning human affairs ſhould ultimately depend.

§ IV.

Intermixture of Property an Obſtruction to Agriculture.

WHATEVER tends to divide landed property into very ſmall patches, neceſſarily tends to throw it, in time, into the moſt aukward ſtate of intermixture; many inſtances of which occur in a variety of the ſurveys. Suppoſe, for example, a field, conſiſting of ten acres, or ten ridges, was divided among ten children; and that theſe portions were laid off in the moſt regular order; no one perſon having any part of his property diſjoined from any part of what belongs properly to himſelf; but the youngeſt, we ſhall ſuppoſe, chooſes to ſell his ſhare to the eldeſt. Here the eldeſt becomes poſſeſſed of two acres, or ridges, one at each ſide of the field, without having any part of the intervening property. If he ſhould get ſtill richer, and ſhould purchaſe another ſhare from ſome of his other brothers, he thus gets three bits of property, all of them detached from each other. So on, the evil may be encreaſed in *infinitum*. Something of this nature muſt be accounted the origin of thoſe little patches,

called *ſlangs*, in Wales, ſo often to be met with, lying ſcattered in the midſt of another man's property, to the total obſtruction of all improvement, and the perpetual annoyance of the neighbourhood, wherever they take place.

It would, perhaps, be uſing too free with private property in this iſland, to ſay, that it ſhould be ordained, that wherever a patch of ground belonging to one perſon, not exceeding acres, which is ſuppoſed to be the loweſt ſize of a field capable of proper culture, was found lying in the midſt of fields belonging to any other perſon; in that caſe, it ſhould be competent, upon a proper application, for a court of juſtice to compel that perſon, either to ſell that property to the owner of the ſurrounding land, at a price that ſhould be deemed a fair one, by an unprejudiced jury; or to accept of land *in lieu* of it, that ſhould, by a jury, be deemed of equal value, lying at one ſide, contiguous to ſome road, or other convenient boundary, that ſhould not neceſſarily tend to interrupt the proper culture of the fields: yet, a man of an upright mind, who had the public good only in view, without regarding private prejudices, would hardly perceive any valid objection to ſuch a law; eſpecially if it ſhould give the holder of ſuch interjected pro-

perty an option to chooſe the one alternative, after he had ſeen the determination of the jury in regard to the other: that is to ſay, when a price had been aſſigned which he judged inadequate, he ſhould be permitted, in its ſtead, to chooſe an allotment of land, or *vice verſâ*. But if, with all theſe limitations in favour of the holder of ſmall property, the above meaſure ſhall not be deemed expedient, I muſt leave it to the wiſdom of parliament, to deviſe one that ſhall be leſs exceptionable. For this evil ſo much prevails, eſpecially in the diſtant and unimproved parts of England and Wales, as loudly to call out for a remedy, if the effectual improvement of the country be ſeriouſly intended.

§ V.

Mills conſidered as an Obſtruction to Agriculture.

THE practice of irrigation, with a view to promote the fertility of the ſoil, and counteract the backwardneſs of the climate, is already pretty well underſtood in a few diſtricts, where it is known to be the greateſt and the cheapeſt improvement of land that has ever yet been diſcovered. And as the knowledge of it will quickly, it is hoped, be now communicated to all parts of the country, there can be no doubt but it would be ſoon *univerſally* adopted, to the unſpeakable advantage of the nation, were it not from the oppoſition that owners of mills, in all caſes, make to the diverting the water from its ordinary channel, for an indefinite diſtance above them, even where the property of the ground through which the water flows, is not their own; or where it returned into its former channel, before it reaches their mill; alledging, that they have a ſervitude for the uſe of the water; and, that whatever diminiſhes the quantity of that water, if it is at

any time ſcanty, is a manifeſt abatement of the value of their property, which they conſider as not to be allowable: not adverting that the ſame argument, to perhaps a much greater amount, might be adduced by the others. And as, at the time that water-mills firſt came into uſe, they were judged to be a very great national improvement; thoſe who erected ſuch were encouraged in theſe laudable attempts, by many privileges and immunities conferred upon them: and in all caſes, where diſputes aroſe reſpecting mills, the moſt favourable conſtruction poſſible was put upon every circumſtance that affected the owners of them. In conſequence of this, a body of deciſions, favourable to the claims of mill-owners, might be found ſo formidable, as to deter any man from thinking of engaging in a law-ſuit with them. Theſe circumſtances have given to the holders of water-mills, a preponderance in the ſcale of property that they ought not to enjoy. And the time has long ſince been arrived, when theſe indefinite privileges ought to have been reſtricted and defined by law; which becomes every day more and more neceſſary, now that canals for internal communication, and for irrigation, are called for univerſally; and, in many caſes, are entirely interrupted by the ob-

ſtructions that this circumſtance throws in the way. Nothing can ſhow more ſtrongly, than the preſent caſe does, the neceſſity that there is for reſerving a power in parliament to remove obſtructions that the laws themſelves, from a change in the circumſtances of the country, may have thrown in the way of improvements; or the futility of the reaſoning of thoſe who contend, that *juſtice* requires, that in every caſe, where old eſtabliſhed cuſtom, which is, in other words, the common law, has authoriſed or encouraged a certain practice, it is incompetent for the legiſlature to interfere ever afterwards, in reſtraining, new modelling, or, in any way curtailing theſe practices. If legiſlators act to the beſt of their knowledge, by giving their ſilent acquieſcence to certain practices, which ſeemed to be good, and calculated to promote the public weal, at that time, they perform all that can be required of them; but if facts ſhall be afterwards diſcovered, which ſhow, that theſe well-intended laws come, in time, greatly to retard, inſtead of promoting the general proſperity, would it not be abſurd to ſay, that thoſe evils muſt not be removed, which a change of circumſtances has brought to light? At the time water-mills were firſt introduced and en-

couraged by the legiſlature, the uſe of water, for the purpoſes of irrigation, and of conſtructing internal canals, was entirely unknown: neither was it conceived to be poſſible to turn machinery by any inanimate moving power, either ſo great or ſo ſteady as water; ſo that the turning of mills may, at that time, have been conſidered as the moſt uſeful national purpoſe to which water could be applied. That this is not the caſe, even in the preſent ſtate of our knowledge, admits of the cleareſt proof. Let it, for example, be ſuppoſed, (which will ſcarcely be denied) that an ordinary mill-ſtream, including, on an average, the whole diſtance of run appropriated to that mill, ſhould be ſufficient to irrigate one hundred acres of land; it is admitted, by all thoſe who are in the practice of this mode of improvement, that, merely by this means, land which was not worth more than five ſhillings, will, in the courſe of a few years, be made worth three pounds *per* acre *per annum*. Let us for the preſent ſay, that the land was meliorated to the rate of forty ſhillings *per* acre. In this caſe, the mill-ſtream would be worth to the public, or to the owner of the land, which is the ſame thing, two hundred pounds *per annum*. But it is believed that, taking all the mills in the kingdom,

the average rent afforded for them will not exceed twenty pounds, after deducting repairs, and every other collateral expence conjoined with them. Thus is the public ſubjected to a loſs of no leſs than one hundred and eighty pounds a year by this mill.

Nor is it neceſſary that the public ſhould be deprived of the benefit of the mill, even if the whole water ſhould be abſtracted from it. For, in moſt ſituations, the mill could be worked by ſteam, nearly as cheap, and certainly with as great effect as by water. It would ſeem, therefore, that in balancing the caſe between two claimants for water, one who was to employ it for the purpoſe of irrigation, and the other for the uſe of a mill, there can be no reaſon to heſitate on which ſide the public weal would require the deciſion to be made: becauſe, in the one caſe, the public is not only deprived of a benefit to a much greater amount than in the other; but alſo, becauſe that loſs can be made up by no other device yet known; whereas, in the other caſe, the loſs ſuſtained by abſtracting the water, if incurred without any abatement, is comparatively very ſmall; but alſo, that loſs may be eaſily averted almoſt entirely, by a ſubſtitute that can be put in its place.

That the public would be often more benefited, by employing ſteam as a moving power, in preference to water, is obvious, from this ſingle conſideration ; that where water is the moving power, the peculiarity of the ſituation neceſſarily induces a great expence of carriage, which might be ſaved by a ſteam-mill being placed in the moſt convenient ſituation. Thoſe who advert to the amazing extent of the produce of our fields that is conſumed by beaſts of burthen, will not think lightly of this conſideration.

Theſe obſervations are thrown out, merely for the conſideration of the public, without any intention of deſiring that the plan they would ſuggeſt ſhould be adopted. But without going theſe lengths, it is humbly ſubmitted to the public, whether, from theſe and other conſiderations, it ought not, among other things, to be enacted, that in every caſe where an oppoſition is made, by the owner of a mill, againſt any perſon employing the water for the purpoſes of irrigation, or navigable canals, that he ſhould have no power to ſtop them, until he ſhould previouſly have eſtabliſhed the following facts by the determination of a jury, and the ſentence of a judge conſequent thereon ; viz.

1ſt. That the machinery of his mill is conſtructed upon ſuch principles as admits it to perform the greateſt quantity of work poſſible, in a given time, with the leaſt expenditure of water: And,

2dly. That the quantity of work he has been in the uſe to perform for five years back, on an average, has been ſuch, as, upon the beſt conſtruction of the mill, would have required a quantity of water, though no part of it had been allowed to run to waſte, equal to the whole that the ſtream in queſtion could afford. In caſe he ſhould fail in theſe points, and it ſhould be found that his mill, from her faulty conſtruction, or improper poſition, required more water than was neceſſary: or that he allowed it, through careleſſneſs, to run to waſte; he ſhould, in theſe caſes, have the exact quantity of water aſcertained, that would be ſufficient, with a mill properly conſtructed, and where none of the water was ſuffered to run to waſte, to perform the work he had been in uſe to perform as above; which quantity of water he ſhould have a title to claim from thoſe who diverted the ſtream for the purpoſes above named, and no more.

A law to this purpoſe, it is humbly conceived, would prove highly beneficial to the country; as it would tend to bring a great many diſputed points to an amicable compromiſe, which muſt go before parliament at preſent: for, in the circumſtances above ſtated, neither the miller, nor the perſon claiming the water, could be *certain* of carrying their point if it came to be litigated; unleſs in a caſe where it was very obvious that one of the parties acted unjuſtly: but where both parties wiſhed *bona fide* to benefit themſelves only, without doing material injury to the other, they would find it their intereſt each rather to yield a little to what he thought the *ſtricteſt* equity ought to grant him, for fear that, in the event of a diſpute, he might, perhaps, be cut off with leſs. Thus inſolence on both ſides would be repreſſed; and that irritation of mind which ſuch a conduct never fails to inſpire, would not be felt; ſo that the parties would come more kindly together, than when one of them thinks the law views him with a favourable partiality, as at preſent.

In another point of view, mills have proved a great bar to improvements in ſome parts of the country. Wherever the practice called

thirlage, (that is, a power authorized by law, to prevent the tenants of certain diſtricts from carrying their corn to be ground any where elſe but at a particular mill) prevails, it is too often uſed as an engine of oppreſſion, that proves extremely galling to thoſe who muſt ſubmit to it. It is a monopoly of a grievous ſort, which ought to be moſt certainly aboliſhed. This could, perhaps, be beſt done by authoriſing the owners of ſuch lands as are reſtricted (or thirled) to a mill belonging to another proprietor, to buy off that reſtriction whenever he ſhould ſo incline, at the rate of years purchaſe, of the annual value which ſhould be found by an impartial jury of honeſt men, to have been the average amount of ſuch millers for years paſt.

§ VI.

Farms, of a ſize inadequate to the circumſtances in which they are placed, conſidered as an Obſtruction to Improvements in Agriculture.

FEW queſtions have been more agitated of late years than that which reſpects the ſize of farms: but theſe diſputes have been carried on chiefly by perſons who were little acquainted with the practice of agriculture, and who were, of courſe, unable to judge of the circumſtances in which a large or a ſmall farm may become neceſſary for the arrangements of a judicious economy: which circumſtances have, in theſe performances, been often entirely diſregarded. In general the diſputants have arranged themſelves into two parties, the one of which has argued in favour of *large* farms univerſally; while the other has inſiſted, with a ſtill greater degree of eagerneſs, that large farms have been the cauſe of every evil that theſe perſons were capable of perceiving; and that no ſalvation remained for the country, but the ſubdividing theſe farms, and reducing them once more to thoſe narrow limits which, in their ima-

gination, was the cauſe of innumerable benefits to our predeceſſors, that we in the preſent age are not permitted to enjoy.

It is not my intention to arrange myſelf under the banner of either of theſe parties. There are, undoubtedly, circumſtances which admit of land being cultivated in the moſt economical manner, for the purpoſe of affording human ſuſtenance, when it is divided into very ſmall allotments; there are others in which a farm can never be managed with economy, unleſs where it is of very large extent; while there are other caſes, which require an intermediate extent of bounds, of many different ſizes: nor can the country be ever improved to the utmoſt extent of which it is ſuſceptible, until theſe caſes ſhall be diſcriminated, and the farms univerſally apportioned nearly to the circumſtances that would ſuit the caſe; but it would require a long treatiſe to enter minutely into this inveſtigation. All that can be attempted at preſent, is, merely to give an outline view of the principles that may lead the mind into a train of diſcriminating the particulars neceſſary to be adverted to, before a judicious allotment can be made in caſes of this ſort.

In the eſſay "*On the Improvement of waſte Lands*," in the preſent volume, it will be made

manifeſt, that in ſcarcely any poſſible ſituation can theſe lands be brought into a proper degree of culture, unleſs where they are laid out into large farms, or annexed to ſuch: and under the heads, " commonable lands," and " com- " mons," in the preſent eſſay, it has been ſhewn, that both theſe pernicious practices derive their exiſtence from an inadequate ſmallneſs of farms; and can never be aboliſhed in a proper manner, till this injudicious partition of land ſhall be abandoned. The reader is referred to theſe places for farther ſatisfaction as to theſe caſes.

In every caſe where land is poor, and ſtands in need of lime or other extraneous manure, before it can be fertilized, the farm muſt be of ſuch extent as to admit of keeping a ſufficient number of beaſts to labour it in a proper manner,— of ſheep, or other domeſtic animals, in ſuch a quantity as to allow of their being managed in a proper and economical manner, ſo as to admit of their dung being applied with effect for the production of future crops. To do all this, requires a very large capital: and a man who has a large capital, has a right to expect, and he muſt have, a comfortable ſubſiſtence to himſelf and family, or he will abandon that occupation. But ſuch a ſum as would be neceſſary for all

theſe purpoſes, can never be gleaned from a ſmall extent of the ſurface of *poor* land. If ever ſuch land is to be *farmed in a ſpirited manner*, ſo as to admit of its being rendered more productive than before, or, in other words, *improved*, it muſt be let out into allotments of a very conſiderable ſize: and happy may the proprietor of ſuch lands be, when he can find a tenant of ſpirit, with an adequate ſtock, who is willing to ſit down upon them; for then, and not till then, it can be put into the train of a gradual and progreſſive amelioration. If it ſhall continue in ſmall allotments, as it has hitherto done, the tenants muſt continue a poor and diſpirited race, as heretofore, and the land muſt continue alſo in a hopeleſs ſtate of eternal unproductiveneſs; for every effort to excite a ſpirit of induſtry among men in theſe circumſtances, muſt prove abortive. I ſpecify no particular caſe of this kind as an illuſtrative example; but refer to the caſes, wherever they ſhall occur under this predicament, now, and at all future times, as invariably illuſtrative of this important fact, which has been but too long diſregarded in this nation *(b)*.

If poor ground, even where no natural obſtruction ſtands in the way of its cultivation, requires for its mere cultivation alone, a large capital and

conſiderable extent of ſurface. This becomes ſtill more neceſſary, where conſiderable obſtructions of another ſort are to be ſurmounted. Where large ſtones require to be removed—the ſurface to be freed from obſtructive inequalities, and rendered *even* for cultivation; and where draining, at a great expence, muſt precede every other effectual improvement,—capital becomes ſtill more requiſite, and ſpirited exertions indiſpenſible. Theſe impediments, indeed, can never be removed without it. And to expect to find that the miſerable holders of *ſmall* farms of ſuch land can ever be induced to make theſe neceſſary exertions, is nearly equally hopeleſs, as it would be, to expect to gather pine-apples from thiſtles, or the fruit of the bread-tree from brambles.

Arable land, when even of a good quality, that has been at ſome former period brought into good order, cannot be ſo managed as to be kept in that ſtate, and be made to yield nearly its greateſt *quantum* of free produce, unleſs it be let off in allotments, though of a ſmaller extent of ſurface than in the former caſe, and requiring a leſs extent of capital; yet they muſt ſtill be in the claſs that the writers above named would denominate large farms. And if the amount of rent

be to be the rule of judging, perhaps theſe would require to be even larger than the foregoing; becauſe a much greater proportion of the produce can, in this caſe, be allowed to go to rent, than in the other. In every caſe, where economy in the management of arable land is aimed at, the farm muſt be of ſuch an extent as to admit of all operations being carried on like clock-work, ſo as that one operation does not interfere with, or interrupt an other; and they muſt be ſo arranged, if poſſible, as that no variation of weather can lay the operators idle, or prevent the horſes from working, when they would not be endangered by going out of doors: but this kind of arrangement can in no poſſible circumſtances be permitted unleſs where the range is conſiderable.

When the plough indeed is abandoned, and the ground is ſo rich as to admit of being cultivated entirely by the ſpade, the ſame neceſſity does not exiſt for having large farms; and they may, without inconvenience, and even with profit, be diminiſhed to a much ſmaller ſcale. But, even in this caſe there are limits, above or below which, they cannot be permited to go, without a hurtful, influence upon economical arrangements. On the one hand, the price of labour is, in this country, perhaps too high in proportion to the price

of grain, to admit of the ſpade culture being adopted in any circumſtances, for the production of corn crops: it muſt, therefore, be confined to the rearing a few other articles of leſs general conſumption, which never can be accounted of great national moment; chiefly, indeed, to the rearing of eſculent plants for the ſupply of families in towns. Of courſe, ſuch diviſions of lands can take place to a conſiderable extent only in the near vicinity of towns: and they muſt be very near, indeed, if the produce can be economically carried to market, or the neceſſary manures be brought back, without the aid of one horſe at leaſt. It follows, that the ground muſt be of ſuch extent, at leaſt, as to afford conſtant employment to that one horſe and a perſon to attend him, otherwiſe a waſte muſt be ſuſtained. This may, therefore, be ſtated as the leaſt economical diviſion of cultivated land admiſſible. Its *maximum*, when cultivated in this manner, cannot reach far: for unleſs the owner himſelf work with his own hands, or be almoſt conſtantly with his labourers himſelf, while in the field, a want of economy in this department will ſoon be experienced, that muſt quickly prove ruinous to the farmer, if ſo he can be called. At any rate, this kind of diminutive occupation of land muſt be very much limit-

ed in its *quantum*, ſo as to be of very ſmall account in a national point of view; and ſcarcely required to have been here mentioned, except for the purpoſe of illuſtration.

The ſame thing may be ſaid of thoſe ſmall patches which are ſometimes occupied by manufacturers, as an accommodation to them in carrying on the particular details of their buſineſs reſpectively. They are to be accounted as mere accidental localities, that are of too ſmall an extent to require particular conſideration.

In very light dry ſoils, that are of a peculiarly rich quality, arable farms may be reduced to a ſmaller ſize, with a leſſer want of economy, than under any other circumſtances: and there may occur ſituations of this ſort, where the advantages that may ariſe from the minute attention of the occupier, may be ſuch as to counterbalance the inconveniences that ariſe from other circumſtances; or that he may perhaps farm with nearly as great economy, if he keeps no ſervants, but does the work himſelf, with the occaſional aſſiſtance of his wife and family, as if it were let off in larger allotments: but this is the only caſe I know, in which what would be, by the writers above-named, called *ſmall* arable farms, is poſſibly admiſſible; and, theſe ſituations are ſo few in this

country, as ſtill leſs to deſerve conſideration in a national point of view, than thoſe above enumerated. In the Netherlands, the ſoil is in general of this deſcription, and admits of being allotted into ſmaller farms, than any where elſe that I know of. In all other caſes, cultivable farms require to be of a conſiderable ſize; more or leſs as the circumſtances of the caſe require: and till ſuch lands be put into ſuch kind of occupation, the country can never be put into a ſtate of progreſſive amelioration; or be made to yield *nearly* the *quantum* of human ſuſtenance, that it is naturally ſuſceptible of being brought to afford.

The produce of rich graſs-lands can as ſeldom be conſumed with economy, without the advance of a large capital, as in almoſt any other caſe; ſo that there are few circumſtances, except thoſe alluded to above, in which ſuch lands can be properly occupied, in very ſmall patches. Under the dairy management, however, an over-extent may be productive of inconveniences. In the vicinity of towns, lands of this deſcription, like others, admit of being divided into ſmaller portions, or made larger, than in the country; where alone, farming, in the proper ſenſe of the word, can be ſaid to exiſt. And there the *minimum*, even for the dairy, is not of ſmall extent

§ VII.

Inadequate ſecurity of Tenure: Improper Conditions under which that Tenure has been granted, and reſtrictive Clauſes in Leaſes, Impediments to Agriculture.

THE higheſt benefits that man derives from civil inſtitutions, are ſafety to his perſon, and ſecurity of property; and human induſtry is always found to be nearly in proportion to the degree in which theſe privileges are enjoyed, in every country on the globe. In this iſland great attention has been beſtowed upon this ſubject; and, in moſt caſes, the property of individuals is ſo effectually guarded at to prompt them to vigorous exertions: but ſome caſes of great moment have unfortunately eſcaped the national attention till the preſent hour.

Habit has a wonderful influence on the human mind, ſo as to be able to bring it to view objects, with which it has been familiariſed from its infancy, with indifference, which it would have beheld with horror, had they been for the firſt time obſerved only when man had attained the

full exercise of his faculties in riper years. It is to this circumstance alone, we are to attribute that indifference with which men of sound understanding can view the condition of those who are engaged in agricultural employments in this country, without perceiving the remarkable difference, between the situations of these men, and that of persons in almost every other profession in this kingdom,—in regard to their security of tenure, and the inducements they have to make vigorous exertions in industry, from the hopes of benefitting themselves and families by these exertions—For the tenure of the land they occupy is so slight, and usually for such a short period of years, and they are so much cramped by the terms on which the lands are granted, that an unprejudiced person, who should attentively consider the whole system of conduct pursued by landed proprietors, and the ideas that in general prevail in this respect, would believe that agriculture was an employment which it was deemed to be good policy to repress above all others. Yet so far is this from being avowedly the case, that he hears, from every quarter, that agriculture is the most useful and the most honourable of all employments, and deserves to be encouraged above all others.

Such a diſcordancy between profeſſion and practice might, by a cynic, be conſtrued to imply a degree of inſincerity: but when we look back to the ſtate of ſociety in former times in this iſland, we are enabled to account for it on a more ſatisfactory principle. Land was originally let off by proprietors to perſons who were in the loweſt ſtate of depreſſion that ſlavery produces, ſo that to allow *them* to acquire property of any ſort, was deemed a favour: and no terms, however hard, could be looked on as ſevere. Though theſe ideas, in the moſt rigid ſenſe of the word, have been greatly moderated, yet it does not ſeem that they have been entirely obliterated. To this cauſe I have no difficulty in referring for a ſolution of the contradictory caſe above ſtated (*c*). However this may be, the fact is certain, that in no other profeſſion in this country, is a man, who poſſeſſes the ſame amount of capital, and extent of knowledge, and who beſtows an equal degree of attention to buſineſs, ſo much dependent upon the will of others, lives, upon the whole, ſo poorly, or acquires ſo little money by equal exertions, continued for the ſame length of time, as thoſe who are in the profeſſion of agriculture.

As a proof of this, I wiſh to refer every reader to the recollection of facts connected with this

queſtion, which he himſelf muſt know. Is it, I would aſk, any thing extraordinary to meet with a man in the mercantile buſineſs who ſet out in life without one farthing of capital, and who, merely by diligence and attention to buſineſs, has raiſed himſelf into reſpectability, lives in eaſy and even affluent circumſtances, educates a family in a ſuperb ſtile, and at laſt, when he dies, bequeaths to them a fortune of many thouſand pounds? he well knows that this is no uncommon thing. The ſame thing is by no means uncommon among thoſe who follow the profeſſion of the law; or the manufacturing line of buſineſs; and even ſome handicraft employments. But though it is by no means uncommon for a farmer to ſet out in buſineſs with a capital of from five hundred to one thouſand pounds,—where will he find an inſtance of ſuch a man, either living in a ſtile of as great elegance as a merchant, who began with ſcarcely one ſhilling, or bequeathing to his children as much money as would be deemed a very moderate competency, in a commercial or manufacturing line of buſineſs?

If this be ſo (and that it is ſo, every perſon who looks around him muſt be ſatisfied) does it not afford the cleareſt proof that agriculture is forced into an unnatural degree of depreſſion

which it is highly impolitic to continue? let us now, therefore, enquire into the circumſtances that tend to produce this effect, and the eaſieſt means of removing them.

Nor will the enquiry be attended with much difficulty, by one who has read the ſeveral agricultural ſurveys: for there he will find, that a great part of the lands, in every county in England, are occupied by *tenants at will*, who may be thrown out of their poſſeſſion on receiving ſix months notice, whenever the landlord pleaſes; that in caſes where leaſes are granted, theſe generally run from five to ſeven, or nine years endurance only; and that a very ſmall proportion, not perhaps, upon the whole, one thouſandth part of the lands in England, are held under leaſes of nineteen years duration; which, or twenty one years, may be conſidered as the *maximum*. And even thoſe precarious leaſes are full of ſuch reſtrictions, as tie up the hand of the farmer from ever attempting any eſſential improvement.

The conſequences of ſuch a ſyſtem of management, on the community at large, are truly deplorable. A tenant at will is not only debarred from all thoughts of making improvements that might benefit the country;—but he is doomed to a ſtate of humiliating abjectneſs to the will of

another, that degrades the dignity of the human mind: for abſolute power, while under the influence even of the beſt diſpoſitions, tends to corrupt the heart, and lead to abuſes that could not have been otherwiſe thought of. What muſt it then be, when it cheriſhes the perverſe diſpoſitions of a mind naturally prone to domineer! The queſtion anſwers itſelf: the weight of the rod held over the farmer, in theſe circumſtances, muſt be diminiſhed by mean ſubmiſſions, and ſycophantiſh adulation: cunning muſt take the place of wiſdom; and the pleaſures of life muſt be enjoyed by ſtealth, that they may not excite envy: wealth, where it can be picked up, muſt be concealed under the mean garb of poverty; and a ſpirit of deception and chicane, muſt prevade the whole maſs of the people, under theſe circumſtances. Deplorable, indeed, muſt be the ſtate of the nation, where the *country people*, who, of all the claſſes in the ſtate, ought to be naturally the moſt virtuous and upright, are driven, from neceſſity, to ſhelter themſelves under ſubterfuges that are ſo deplorably degrading!

Under a tenure of ſeven, or of nine years, the caſe is little bettered. If the tenant ſhall make an attempt to render the land more productive, it has only a tendency to bring others forward to

offer a higher rent, that they may be permitted to reap the fruits of that enlarged crop which has been ſown by another; ſo that the man who ventures to put himſelf under ſuch a predicament, muſt experience a ſtate of perpetual diſquietude, which prudence requires him to avoid, by refraining from all ſuch *injudicious* attempts: for in his ſituation, aſſuredly, every expenditure that tends to inſure a permanent improvement, muſt be accounted injudicious.

On a nineteen, or twenty one years leaſe, the caſe is a little, and but a very little altered. In the former caſes, no improvements can be attempted. In the preſent caſe, a few may be gone into: but even theſe muſt be carried on upon a ſyſtem that is extremely uneconomical, and eminently productive of national loſs. It is well known by every ſkilful farmer, that land, which is in a poor and exhauſted ſtate, in conſequence of improper management, cannot be put into a proper productive ſtate, without the expenditure of a conſiderable ſum of money, and the lapſe of much time; but that when it is once put into a good and productive ſtate, it may, by a cautious conduct, and judicious mode of cropping only, be continued in that condition for any length of time, without expence. Thus,

the tenant, under ſuch a tenure, is ſubjected to the neceſſity of making a great expenditure at firſt, in order to bring his land into good order, which never would have been neceſſary, if it had not been for the exhauſting mode of cropping that his predeceſſors has adopted; and which he himſelf will aſſuredly adopt towards the end of his leaſe, that he may get ſome return for the money he was obliged to expend towards the beginning of it. By theſe manœuvres, the land is never, even at the beſt, brought nearly to the higheſt degree of productiveneſs of which it is ſuſceptible: but even that moderate degree of fertility which it does thus acquire, it is only allowed to poſſeſs for a very ſhort period of the leaſe; ſo that the total *quantum* of produce, even when under this management, is wonderfully ſhort of what it eaſily might be.

Under this mode of management, however, a phenomenon occurs, which is not experienced where the leaſe is of ſhorter endurance. The landlord has an opportunity of obſerving, that his ground is capable of being brought into a degree of productiveneſs of which he never could have ſuſpected it was ſuſceptible, under the other arrangement. And when he ſees it once more brought back to its former ſtate of ſterility, he

becomes alſo ſenſible of a deterioration he would not otherwiſe have remarked. This circumſtance, it is to be feared, in too many caſes, prejudices him againſt this kind of leaſe, which puts it in the power of the tenant to operate ſuch an obvious deterioration; and he is better pleaſed with thoſe ſhorter leaſes, under which any thing of this kind muſt be far leſs obvious. He forgets that that very fertility, which is thus taken away, was added to the land at a former period, by the exertions of the farmer: that it only has out-run the land farmed under ſhort leaſes, for a ſhort period, and returns again to the ſame pitch, perhaps, nearly from which the former never departed. But not ſatisfied with curtailing the duration of the leaſe, the landlord finds, that, to prevent the total deterioration of the land during the prevalence of that inſecure tenure, it is neceſſary to bind the tenant to certain preſcribed modes of management, which the weakneſs of our predeceſſors, at ſome former period, or the vanity of their ſucceſſors, of the preſent day, had made them believe were the moſt perfect that could be deviſed. The conſequence is, that, however deficient theſe regulations may prove in preventing deterioration, they are found to be ſufficiently efficacious in preventing the

introduction of thoſe more perfect modes of culture, which the ingenuity of man, when put into proper circumſtances, would very quickly deviſe.

While I thus trace, with a painful minuteneſs, the riſe and progreſs of a malady that has been productive of miſerable conſequences to this country in general, and to which it, therefore, becomes the buſineſs of every man in the community to advert, yet I wiſh, in a particular manner, to call the attention of gentlemen of *landed property* to this ſubject; becauſe, of all others, it tends the moſt immediately to affect their own particular income.

It muſt, in the firſt place, appear evident to every conſiderate mind, that the ſlaviſh dependence which a tenure of the nature explained above muſt produce, will neceſſarily drive away, from the profeſſion of agriculture, every young man of ſpirit, ambition, and native energy of mind; who will rather chooſe to engage in ſome other employment, in which there is a better proſpect of availing himſelf of his talents and induſtry. And that this actually does take place, is a deplorable truth, too notorious to be farther inſiſted on in this place.

A neceſſary conſequence is, that thoſe who remain behind, are of a torpid languid frame of

mind, which is rather diſpoſed to ſink into indolence, than to ſpring forward into active exertions; and the ſituation in which they feel themſelves placed, as naturally tends to augment this torpor, as the light of the ſun tends to produce a ſhadow. Why then ſhould we be ſurpriſed, in theſe circumſtances, to obſerve, that the progreſs of agriculture is ſo nearly ſtationary; and that ſo many among this claſs of men, ſhould be contented with blindly following what their fathers have done before them? This ſurely ought to excite no wonder: but the thing which is truly wonderful is, that, under theſe circumſtances, there are ſtill *ſome* men to be found, who can be brought to ſubmit to the hardſhips they are doomed to ſuffer in that ſituation, without abandoning it yet more than has been done; and that there are ſtill ſome rare individuals to be met with among them, who have made ſome faint attempts at improvement. This phenomenon can only be accounted for by that inſtinctive bias which the Creator ſeems to have impreſſed on the human mind, in favour of agriculture, rather than any other occupation, ſeemingly for the purpoſe of producing food at all times for the ſubſiſtence of the human race; nearly of a ſimilar nature to the inſtinctive appetite for ſex

and for food, ſo univerſally conferred on animated beings, for the purpoſe of preſerving the individual in health, and preventing the ſpecies from being annihilated; and which inſtinctive calls are ſo powerful as not to be ſubdued by any other means than the extinction of life itſelf.

It will not be alledged that the agriculture of this country has yet been carried to the higheſt perfection of which it is ſuſceptible. It will be admitted by every one, that there is as much room for improvements in this branch of buſineſs, (perhaps more) as in any that can be named: it will not be denied, that there is as much ſcope for ſpirited exertions here as in any other walk: why then ſhould men of ſpirit be baniſhed from it? Money is univerſally allowed to be abſolutely neceſſary for carrying on its operations properly:—why then ſhould a conſtant attempt be made to keep the occupier of land poor? There is as much ſcope for the exertions of a ſound underſtanding here as in any other profeſſion, had it room to operate with freedom; and that underſtanding, if fully exerciſed, would diſcover a greater variety of reſources for augmenting individual wealth, and national treaſures, in this than perhaps in any other employment:—why then ſhould barriers be every where thrown

in its way to prevent the full and free exercise of its powers? This miserable system of regulation and restraint, has been followed long, very long, after its futility has been fully demonstrated:—why then should it not be abandoned? The welfare of the public demands it; but the interest of landed gentlemen demands it in a still more eminent degree: for, where the public receives a benefit from agricultural improvements in an arithmetical *ratio*, the proprietor's income will be augmented in a *geometrical* proportion nearly.

This assertion will appear paradoxical to those only who have not adverted to this subject; for those who have adverted to it, know well that no rent whatever can be afforded from *cultivated* land, until the produce exceeds the expence of rearing it: and as that expence is in all cases as great in poor land as it is in rich land, (usually greater) it follows, that a considerable proportion of the crop must, in all cases, go to payment of the expences. Let us, for example, say that twelve bushels *per* acre is just sufficient for the expence of cultivating, and no more. If so, no rent whatever can be afforded for *cultivated* land that yields only twelve bushels. But suppose the fertility of the land is increased to thirteen bushels; the farmer will be very well pleased to give

half a bushel by way of rent. Suppose, again, it is brought to yield twenty bushels; the farmer will be content to pay to the landlord six bushels by way of rent. Say it augmented to twenty-six; the farmer will be willing to pay ten, or more, to the landlord. Here then the produce, by being only once doubled, from thirteen to twenty-six, the rent has been augmented twenty-fold: and nearly the same *ratio* will hold in every other case. If gentlemen were, therefore, to consider the case with attention, they would find it much more *their* interest, than perhaps even of the farmer himself, to promote the prosperity of the farmer, and to encourage him to push his improvements still forward without any abatement; because the greater amount the produce can be brought to, the greater will be the proportion of *free* produce; and the greater the amount of that free produce, the greater will be the proportion of it that the proprietor will draw by way of rent.

Thus, in the example above stated, when the amount is thirteen bushels, the free produce is one thirteenth; and the landlord's rent is only one twenty-sixth of the total, or one half of the free produce. When, on the other hand, the whole amount of the crop is twenty-six bushels,

the landlord's rent is *ten* twenty-ſixths of the whole produce; or about $\frac{3}{4}$ of the free produce; and although the tenant's profits would, in this laſt caſe, when compared with the firſt, be as 8 to 1; yet the landlord's profits would be augmented as 20 to 1. The profit to the public, in this inſtance, would be as two—to the tenant as eight—and to the proprietor as twenty to one. It thus appears, that, of all the parties concerned, it is moſt the intereſt of the *landlord* to promote improvements; for it will be found, that in every caſe where there are two fields, the produce of which are nearly as above ſtated, without requiring any immediate outlay for their improvement, the farmer would willingly pay even more rent than is there ſpecified, for the laſt; though he could ſcarcely give ſo much for the firſt. Yet it cannot be expected that, if the ſuperior produce has been immediately occaſioned by his own outlay of capital, and exertions of induſtry, he can pay nearly the ſame *proportion* of it as rent: but after the land has been for ſome time in a permanent ſtate of fertility to that degree, though it even originally derived that fertility from his own induſtry, he will be content to pay ſuch a proportion of rent as is here ſtated, *if no other deductions* are to be taken from his free produce.

It is, therefore, greatly the intereſt of the proprietor, that the profits of his tenant ſhould be thus augmented; for, in this way, his own rents will be augmented in a much higher degree.

It is upon theſe principles that I beg leave warmly to recommend to gentlemen of landed property, the plan of a leaſe deviſed by the late Lord Kaims, which ſeems to me to be perfectly calculated for putting the landlord and the tenant on ſuch a footing, with regard to each other, as is liable to no objection that I can ſee; for, while it gives entire freedom to the exertions of genius and ſound underſtanding, it is perfectly well calculated to excite the farmer to make continued exertions to forward his improvements, and, at the ſame time, inſures to the landlord the certainty of receiving an adequate rent for his land, under every poſſible ſituation of things.

His Lordſhip propoſed that the leaſe ſhould extend to an indefinite number of years, conſiſting of fixed periods, at the end of each of which a riſe of rent ſhould take place; with permiſſion for the tenant, at the period of each of theſe riſes of rent, to give up his farm, if he ſhall ſee proper; and granting a ſimilar power to the landlord, upon proper terms, to reſume his land

if he ſhall think fit. The particulars of this contract, and the grounds on which they reſt, are as under.

Lord Kaims aſſumes it as a poſtulatum, that a landlord and tenant are capable of forming a tolerably juſt eſtimate of the value of the land in queſtion, for a ſhort period of years, ſuch as it is cuſtomary to grant leaſes for in Scotland: ſay twenty-one years. And having agreed upon theſe terms, which, for the preſent, we ſhall call 100l. rent, the tenant expreſſes a wiſh to have his leaſe extended to a longer period. To this the proprietor objects, on this ground, that it is not poſſible to form a preciſe eſtimate of what the value of the ground may be at the end of that period. He has already ſeen that ground, for the laſt twenty-one years, has encreaſed much more in value than any perſon at the beginning of that period could eaſily have conceived it would have done; and therefore he cannot think of giving it off, juſt now, for a longer period, as a ſimilar riſe of value may be expected to take place in future. This reaſoning appears to be well founded; and, therefore, to give the landlord a reaſonable gratification, he propoſes it ſhould be ſtipulated, that if the tenant ſhould agree to give a certain

riſe of rent at the end of that period, ſuppoſe 20l., the landlord ſhould conſent that the leaſe ſhould run on for another period of twenty-one years; unleſs in the caſes to be after mentioned.

But as it may happen that this 20l. now ſtipulated to be paid at ſo diſtant a period, may be more than the farmer will find he is able to pay; an option ſhall be given to the tenant to reſign his leaſe, if he ſhould find this to be the caſe, by giving the landlord legal notice, one year at leaſt, before the expiration of the leaſe; but if that notice be omitted thus to be given, it ſhall be underſtood that the tenant is bound to hold the leaſe for the ſecond twenty-one years, at the rent ſpecified in the contract. And if the landlord does not give the tenant warning within one month after the time that the tenant ought to have given warning, if he was to remove, it ſhall be underſtood, that he too is bound to accept of the ſtipulated additional rent for the twenty-one years that are to ſucceed.

It may, however, alſo happen, that the ſum ſpecified in the leaſe may be a rent conſiderably below the then preſent value of the farm: or the proprietor may have very ſtrong reaſons for wiſhing to reſume the poſſeſſion of that land, or to obtain an adequate rent for it. A power

therefore, ſhould be given to him, in either caſe, to reſume the lands, if he ſhould ſo incline. But as a great part of that preſent value may be owing to the exertions of the farmer, who has laid out money upon the farm, in the hopes of enjoying it for a ſecond period of twenty-one years, it would be unjuſt to deprive him of this benefit, without giving him a proper conſideration for that improved value. On this account, it ſhould be ſtipulated, that in caſe the proprietor at this time reſumes the farm, he ſhall become bound to pay to the tenant years purchaſe, (Lord Kaims ſays *ten*, I am inclined to think that *five* might be ſufficient) of the additional rent he had agreed to pay; which, in the example above ſtated, would be 200l. if ten, and 100l. if five years purchaſe were allowed.

But the land may be worth ſtill more than the 20l. of riſe mentioned in the leaſe, and the tenant may be content to pay more, ſay 10l., rather than remove; and he makes offer accordingly to do ſo. In that caſe, the landlord ſhould be bound either to accept that additional offer, or to pay *ten* (or five) years purchaſe of that ſum alſo; and ſo on, for every other offer the tenant ſhall make, before he agrees to remove from the farm.

In this way, the landlord is always certain that he can never be precluded from obtaining the FULL value for his land, whatever circumſtances may ariſe. And if the tenant ſhall prove diſagreeable, ſo that he would wiſh rather to put another in his place upon the ſame terms, it never can be any hardſhip upon the landlord to pay the ſtipulated ſum; becauſe it would be the ſame thing to him, as if he bought a new eſtate at TEN or FIVE years purchaſe, as the caſe may be, free of taxes: a thing he never can expect to do. It is, indeed, true, that it would be more advantageous for him to allow the preſent tenant to continue, than to force him to remove: and therefore this alternative will be always, unleſs in very extraordinary caſes, accepted of, as it ever ought to be. Thus will the tenant's mind be impreſſed with a conviction that he will continue in his poſſeſſion: a conviction that ought ever to prevail, becauſe it ſtimulates to induſtry in the higheſt degree.

And as the tenant is thus certain, that, at the very worſt, his family muſt be entitled to draw a reaſonable remuneration for the exertions of his induſtry, he can never find the ſmalleſt tendency to ſlacken his endeavours in any way.

By ſtipulating in the original leaſe, in the ſame manner, that at the end of the ſecond twenty-one years, the leaſe ſhall be continued for twenty-one years more; and ſo on at the end of the third, and fourth, and any farther number of periods of twenty-one years, on agreeing to pay a ſpecified riſe of rent; reſerving to each party the ſame privileges as above deſcribed, the leaſe might be continued to perpetuity, without either party ever being in danger of having an undue advantage over the other. The tenant will always be certain of having a preference given him over every other perſon, and will, of courſe, go on with unceaſing exertions to better his land, which will of neceſſity tend to augment the income of the proprietor, much more than could have happened under any other ſyſtem of management.

Such are the outlines of that plan of a leaſe that his Lordſhip has propoſed. By this plan, the tenant's hands are not tied up by reſtrictive clauſes dictated by ignorance, under the pretext of ſecuring the intereſt of the landlord. His intereſt is ſecured in a much more effectual manner, while the tenant is left at full liberty to avail himſelf of his knowledge, his ſkill, and his induſtry. Inſtead of ceaſing to begin any arduous undertaking, as he ever muſt

do where he has no leaſe; or of beginning to improve for a few years only, at the commencement of his leaſe, but ſtopping in a ſhort while in the midſt of his career, and then running it down to the ſame exhauſted ſtate as it was at its commencement, he continues to puſh forward without ever ſtopping; and advances even with an accelerating progreſs, for an endleſs period of years. No perſon, but an experienced farmer, can conceive the difference that would be between the productiveneſs of the ſame land, under this management, at the end of a hundred years, and what it would have been, if let even for detached periods of twenty-one years each. In unimproved waſte lands, the difference would approach to infinity. In lands which were originally very rich, the difference would be leſs conſiderable: but, in all caſes where cultivation could take place, the difference would be very great (*d*).

It is worth remarking here, alſo, that if this arrangement were adopted, a new order of men in civil ſociety would be created, different from any that at preſent exiſts. They would be inferior in point of rank, to that claſs of men who are called *gentlemen*, and ſuperior, in point of wealth and energy, not only to the preſent

order of *farmers*, but even to that claſs of men who are called *Yeomen*. The peculiar political advantage, attached to this order of ſociety, would be, that while their exertions would always inſure affluence, that affluence never could become ſuch as to permit them, by imitating the life of the higher orders, to neglect their own proper concerns; for the moment they did ſo, their exertions in buſineſs would become ſlackened; in conſequence of which, they could not afford ſuch a rent, as others around them would be willing to give, and ſo they muſt quit their leaſe.

Here we are led to perceive the moſt eſſential difference, between *thus* granting, what may almoſt be called a perpetual leaſe, and every other *long* leaſe that ever yet has been tried: for in all other long leaſes, if the rent ſtipulated at firſt ſhall prove to be at laſt inadequate, and the holder of the leaſe be reduced to poverty, by diſſipation or otherwiſe, he may neither be able himſelf to cultivate the ground properly, nor can another be permitted to do ſo; and by this means the proprietor may not only be, for a long period of years, deprived of an adequate value for his land; but that land, alſo, being locked up from improvement, may be doomed long to remain in a degree of comparative ſterility. Nothing of that kind could

here happen. It differs alſo very much from that ſort of tenure which is called yeomanry; in which their ſmall capital, which, if properly applied, would have been juſt ſufficient to give ſcope for agricultural exertions, by being locked up on the original purchaſe of the land, deprives the poſſeſſor of the only funds he had in his power to apply for improving his land. Inſtead of active exertions, and chearful affluence through life, he is thus ſtinted in every exertion; and is doomed to a perpetual hard ſtruggle againſt the haraſſments of poverty. In ſhort, either as a proprietor or a tenant, I ſhould chooſe to let or take land upon theſe terms, in preference to any other I have ever heard of *(e)*.

Several little clauſes have been overlooked by his lordſhip, which it would be neceſſary to advert to. Some proviſion ought to be made reſpecting trees on a leaſe of this kind,—as it is probable the tenant might find it convenient to plant, which, by the common law of Scotland, he cannot do at preſent, with a view to profit. Perhaps the wood, if any was on the farm at the time of his entry, ought to be valued, and he ſhould be bound to leave at leaſt an equal value upon it, or pay the balance. Whatever timber trees he himſelf had planted, he ſhould be at li-

berty to cut at pleaſure, for the uſe of the farm, unleſs it were ſuch individual trees as the landlord, from ſituation, or other cauſes, ſhould think proper to mark for reſervation. He ſhould alſo have permiſſion to fell ſuch trees as he inclined, unleſs as above reſerved, or during the laſt ſix years of any of the twenty-one years of the leaſe. But in caſe of his removal, the proprietor ſhould either permit him to fell the whole trees that were over the value of the ſtock at his entry, or take the whole, or ſuch part as he choſe to reſerve, at an appreciated value. In caſe of his removal, alſo, the tenant ſhould be bound not to out-labour the ground during the laſt ſix years of the leaſe, or to crop it improperly, or to carry off any ſtraw or dung; otherwiſe to pay the damages that ſhould thus accrue to the landlord, at the eſtimate of two honeſt men, to be mutually choſen: and to leave the houſes in a habitable condition, and the fences in good repair. There ſeems to be no other clauſe neceſſary in ſuch a leaſe.

I am happy to be able to add, that, ſince the former edition of this work was printed, Thomas Johnes of Haſod, Eſq. member of parliament for the county of Cardigan, in South Wales; has actually let two large farms on the plan here recommended, and as all the clauſes

in this leaſe have been reviſed with great attention by many impartial perſons of knowledge, with a view to avoid every inconvenience that might accrue to either party, as far as theſe could be foreſeen, it is to be hoped that every objectionable particular will be obviated in this leaſe. I have no doubt but Mr. Johnes, who is actuated by a warm deſire to promote the welfare of his native country, will not object to the publication of this leaſe, that others may have an opportunity of benefiting by it.

§ VIII.

Want of Capital among Farmers, an Obſtruction to the Progreſs of Agriculture.

The want of capital among farmers, is experienced to a very great extent, in almoſt every part of this iſland; but the effects of that want can only be known, by comparing thoſe diſtricts where the evil has been in part remedied, with thoſe where the malady ſtill prevails to its full extent: a compariſon that few individuals have an

opportunity of making; and a fewer ſtill have adverted to circumſtances ſo attentively, as to be able to trace the cauſes and conſequences of this diſeaſe.

Every perſon knows, that if a man ſhall attempt to graſp at an extent of trade or manufacture, beyond the reach of the capital he can command, he muſt do it with ſuch an enormous diſadvantage, as to be involved, in a ſhort time, in certain ruin. The reaſon of this is, that he has to cope every where with rivals, whoſe extent of capital gives them ſuch a decided ſuperiority, in regard to purchaſes and ſales, as to knock down all competition. Were all theſe great capitals withdrawn from thoſe branches of buſineſs, this competition would indeed be removed, and the poor trader, or manufacturer, would then be ſuffered to exiſt; but his efforts would be feeble, and their effects inconſiderable, in proportion to the weakneſs of his means: for innumerable obſtructions, that muſt at once give way to the energetic powers of the one, will oppoſe themſelves as irreſiſtible barriers to the feeble exertions of the other.

The caſe is exactly the ſame in regard to agriculture. Let two farmers, equally alert, ſkilful, and induſtrious, the one of whom has a commanding power of capital, while the other is

ſtinted in his circumſtances, be ſet down upon two contiguous farms of equal quality in all reſpects; and obſerve the reſult. While the firſt, in conſequence of his being able to avail himſelf of every favourable circumſtance that occurs, can obtain every article he wants at the cheapeſt rate,—can purchaſe ſuch manures as may be wanted, to enable him to make all ſuch operations as he ſees neceſſary for meliorating the ſoil, exactly, in the moſt favourable ſeaſon for it, at the beginning of his leaſe, and can procure ſervants and labourers in ſuch abundance, as to carry on his operations without waſte of any ſort, and at the cheapeſt rate; the other muſt have the mortification to ſee the moſt favourable opportunities paſs, without being able to avail himſelf of them:—muſt only purchaſe manures when he can, not when he would:—muſt let ſlip the moſt favourable opportunities for obtaining a great profit:—muſt poſtpone the neceſſary improvements, becauſe of inability to perform them:—muſt content himſelf with only ſuch a number of ſervants and labourers as his limited funds can reach, many of whom are thoſe rejected by the rich farmer; and they muſt, beſides, labour to great diſadvantage, becauſe they are thus thrown into uneconomical arrangements. In conſequence of

this variation of circumſtances, while the rich man carries his farm, at once, forward to a great degree of productiveneſs, which is augmenting from year to year, ſo as to permit him to pay to the landlord a high rent, while he himſelf lives in plenty and comfort,—the other pines on in poverty, becauſe of the unproductiveneſs of his farm, and the unavoidable waſte which that occaſions; and he can afford, with the utmoſt difficulty, a very ſmall ſum to the landlord by way of rent, which is often ſqueezed from him, by means that an honeſt heart would not adopt, could they be fully known to the perſons concerned.

I have put the caſe above, more favourable for the *poor* farmer, than it can actually be in practice, by ſuppoſing that he has equal ſkill, equal induſtry, and the ſame energy of mind, as his rich neighbour: but this is a caſe that can ſeldom occur. The mind, ſtruggling againſt misfortunes, loſes its energy; and it poſſeſſes neither the means, nor even the wiſh to attain knowledge, that the ſucceſsful improver enjoys; whoſe mind, alert in the vigour of ſucceſsful exertions, ſprings forward with alacrity to catch every hint, which promiſes to add to that capital which he has the ſatisfaction to find is daily encreaſing.

It is eaſy to ſee, from what has been juſt ſaid, that a farmer, with an inadequate ſtock, muſt leſs ſtand a competition with farmers around him, who have ſufficient capitals, than a merchant or manufacturer can do; becauſe, in conſequence of the nature of the tranſactions of theſe laſt, artificial credit can be much eaſier procured by them, than by the farmer. It, therefore, invariably happens, that wherever circumſtances have enabled the farmers, in general, to acquire an adequate capital, a perſon attempting to farm among them, without being in ſimilar circumſtances, is inſtantly reduced to beggary; becauſe the rent that his neighbours around him are willing to pay, is far above the ſtandard that he is able to reach.

Such, however, is not the caſe in thoſe diſtricts where the miſerable policy of the landlord has been calculated to deprive their tenants of the means of acquiring that wealth, which alone can produce independance and energy. In ſuch diſtricts, the tenants being all nearly in equal want of means, keep each other in countenance: they live in a deplorable ſtate of inaction; and pay to their landlords a pitiful pittance in name of rent, which a rich farmer would account a mere trifle for ſuch land. Every improvement,

in ſuch a ſituation, is precluded, becauſe of want of power to remove obſtructions. Roads muſt be bad, however burthenſome to the tenants; becauſe they neither know how to make them, nor have the power to do it, if they would. The harraſſments they frequently ſuffer on this account from pariſh officers, in conſequence of indictments, often equally mercileſs and injudicious, take off their attention from the operations on their farms, and render their weak exertions ſtill more feeble. To ward off theſe evils, recourſe muſt be had to ſuppleneſs, chicanery, and cunning. The landlord, if a man of extenſive property, is cheated and deceived: but he is treated with an abject kind of ſervility by them, that a man of capital would diſdain to adopt. No man of that deſcription will ſubmit to conditions which *they* readily agree to; ſo that there is little danger that a man of ſufficient capital, will eaſily be induced to become their rival in their own diſtricts, ſo long as the ſame mode of management ſhall be ſuffered to prevail among them.

I am ſorry to obſerve, that theſe neceſſary effects of the operation of wealth, in the hands of farmers, ſhould have been ſo little adverted to by men of landed property in this iſland as they

hitherto have been, the effects of which have been truly deplorable; and I ſhould conſider myſelf as performing a very meritorious part, if I could flatter myſelf with the hope of being inſtrumental in now directing their attention to this object. I own that I ſee, with much concern, many efforts made by well meaning men, to promote agricultural improvements, which I know muſt ever prove unavailing, ſo long as this circumſtance ſhall be diſregarded. With a view to produce conviction, I avoid entering into abſtruſe reaſoning of every ſort; and only wiſh that gentlemen will open their eyes, and attend to facts that muſt every day fall under their obſervation, if attentive; and draw their own concluſions from theſe, without prejudice of any ſort. If gentlemen have property in remote diſtricts where tenants are poor, let the native ſtaple of the ſoil be what it may,—I only deſire, that they will look at the rent they draw for their lands, and compare it with that which is given for lands of the ſame extent, whoſe ſoil is not intrinſically better than it is in thoſe diſtricts, if they know any ſuch, where the land is farmed by men of ſubſtance in general: and I have no heſitation in ſaying, that they will find the difference aſtoniſhingly great. I muſt, however, beg leave to put

them on their guard againſt one circumſtance that may induce them to make a fallacious concluſion; which is, that in comparing the ſoil of the two diſtricts, they will advert to their former ſtate, rather than their preſent condition: for if the practice of agriculture has been ſpirited in the one diſtrict, for a number of years backward, that ſoil, which was originally poor, will now have become highly productive; and, of courſe, is capable of affording a rent greatly higher than it ever could, if it had remained all that time under the management of the *poor* farmers.

I ſhall beg leave to give one example of the truth of what I now ſay, by ſtating facts which any one, who will take the trouble of examining the caſe, will find no difficulty in verifying.—Nor can I help regretting, that I ſhould, on this occaſion, find it neceſſary to call the attention of Engliſh proprietors to Scotland.

It has happened, in conſequence of a concurrence of circumſtances which may be gathered from the general tenor of this Eſſay, that the farmers, in ſome diſtricts in Scotland, have been enabled gradually to acquire, during the laſt forty years, an adequate ſtock for the purpoſes of agriculture; in conſequence of which, the land, in theſe diſtricts, has been meliorated to a degree

that no man at that period, could have believed poſſible; and the rents have riſen with that melioration, to a height that aſtoniſhes the proprietors themſelves; who, unable to form any conjecture at the riſe which will be given them at every renewal of leaſe, are forced to leave the tenants themſelves to name it,—as they thus obtain much more than they could have a face to demand. During the currency of the year 1795, many farms have thus been let in Eaſt Lothian, at rents much beyond what any perſon, a few years ago, could have dreamt of. Whereas, in other diſtricts, where wealthy farmers do not yet abound, landlords find difficulty to let land, of a ſoil intrinſically as good, at leſs than one fourth part of the rent which is there readily given for it.

In regard to the improvement which time produces on land, when under the management of farmers who have capital, and who have not their hands tied up by injudicious reſtrictions, I would refer the attentive obſerver to Eaſt Lothian and Berwickſhire, where he will find many thouſands of acres, which, from ten to forty years ago, carried nothing but heath, and that of a very poor quality, now producing abundant crops of wheat, and every other kind of grain that the

climate can ripen, with graſs and green crops of all kinds. It was in conſequence of theſe crops created by the efforts of induſtry, that Scotland, which not many years ago ſcarcely produced any wheat at all, was able laſt year, not only to ſupply her own conſumption, but even to ſend conſiderable ſupplies to England. There is one farm, in particular, in Berwickſhire, which, leſs than forty years ago, was rented at thirty pounds, which is now let for three hundred pounds a year. The improvement of this farm has been effected entirely by the exertions of the farmers, who became much more wealthy towards the end than at the beginning of that period. It is reckoned at preſent rather low rented than otherwiſe.

Let theſe facts be attended to: they ſpeak a language that ought to rouſe every landed proprietor in the iſland from that deſtructive dream which has deluded ſo many of them for ages. Let Engliſh landlords advert, that while England, which poſſeſſes a richer ſoil, and finer climate than Scotland, was labouring under a ſcarcity that raiſed the price of wheat, to a rate unexampled in modern times, Scotland had plenty, and to ſpare: that while the one part of the

kingdom is rapidly progreſſive, the other is rather retrograde in agricultural exertions; owing chiefly to this circumſtance, that from chimerical notions, which have been ſucked in with their mother's milk by men of landed property, and injudicious fiſcal regulations that have been tolerated in conſequence of it, they have contrived to baniſh from their domains, ſpirit, energy, and capital, among farmers; and thus to leſſen the value of their lands, and to diminiſh the produce of the country to a moſt deplorable degree.

§ IX.

Incloſures, conſidered as an Obſtruction to Agriculture.

I AM aware that public prejudice runs at preſent ſo high in favour of incloſures, that what I have to offer under this head, runs a riſk of being received with very little favour. Indeed, incloſures are ſo far from being ſuſpected in any caſe to be a retardment to agriculture, that men, in general, ſeem to think, that the incloſing and the improving of ground are ſynonimous terms; it

ſeems to be conſidered by them as a magical circle, which, if once drawn round their fields, encreaſes their produce to an aſtoniſhing degree, ſo that, if the lands be only incloſed, ſcarcely any farther improvement can be wanted.

I do not, however, complain of incloſures *univerſally*, as being an obſtruction to agriculture. All I mean to inſinuate is, that ſimply incloſing of land cannot be accounted ſuch an eſſential branch of improvementas is commonly ſuppoſed; and that, under certain circumſtances, incloſures may become pernicious.

When land is to be kept under corn crops, incloſures can be of no other uſe than to prevent the corn while it is growing, or the ground after the corn is removed from it, from being hurt by treſpaſſes from cattle getting upon it A ring fence therefore, around a corn-farm, ſtrictly ſo called, ſeems to be all the fence that can be wanted for ſuch; and even that, where it marches with an adjoining farm of the ſame ſort, appears to be unneceſſary. But if it ſhould be admitted that it might be in ſome ſort deſirable, on account of the neatneſs and comfort fences ſeem to afford: it would become merely a matter of calculation to a ſtrict economiſt, whether the benefit to be derived from them, would repay the expence at

which that benefit muſt be purchaſed; or whether the fence was actually capable of affording that benefit.

In ſome meaſure to aſcertain this point, let us ſuppoſe that a farm, conſiſting of an hundred acres of good corn land, *uninclo ſed*, was put under the management of one who was deſirous of making the moſt of it;—the queſtion is, ſhould he continue it ſo, or divide it into ſmall incloſures?

In its preſent ſtate, we ſhall ſuppoſe it ſuch as that, on an average, it yields a crop equal to twenty-four buſhels of corn *per* acre; of courſe the hundred acres will produce two thouſand four hundred buſhels, or 300 quarters of corn *per annum*.

If this field were incloſed in the uſual manner, and divided into thirty incloſures; (and this is more than the average ſize of incloſures in many parts of England and Wales:) let us now ſee what would be the amount of the crop, ſuppoſing the quality and condition of the ground to be the ſame as before. And that the caſe may be as favourable for the encloſures as poſſible, we ſhall ſuppoſe it to be a regular four-ſided field, conſiſting of thirty chains in breadth, and thirty three chains and one third in length; and that it was divided into five diviſions the ſhort way, and ſix

the other. The whole fences in this caſe would meaſure 430 chains; or 9460 yards.

I find that the moſt uſual kind of fence in England conſiſts of a mound with a ditch on each ſide. This mound, we ſhall ſuppoſe, is eight feet wide at the baſe, with a ditch of four feet on each ſide; which is eight feet more. In plowing ground, it is well known that the plough can ſeldom come within leſs than two feet of the ſide of the ditch, which makes four feet more of ground abſtracted from tillage,—in all twelve feet, or four yards of ground loſt, for every yard in length. Of courſe, 9460 yards multiplied by four, gives 37,840 ſquare yards; which is eight acres and a half nearly. Thus is the hundred acres of arable land with which we ſet out, reduced to ninety one and a half only; and the produce, of courſe, is diminiſhed, to the amount of 25½ quarters *per annum*; which, at the rate of 32 ſhillings *per* quarter, amounts to 40l. 16s. *per annum*. If the incloſures were of a ſmaller ſize, the proportion of ground waſted would be the greater; and if it were of a richer quality, its value would be farther augmented, as is moſt evident.

Again,—ſuppoſe that, at an average, the expence of incloſing, ſecuring, cleaning, &c.

amounts to the rate of one ſhilling *per* running yard; the ſum that muſt be thus ſunk on 9460 yards will be 473l.; which, at the rate of 5 *per cent.* only, amounts to 23l. 13s. *per annum.* This is, ſuppoſing the incloſure to be made by the landlord, he would require this much additional rent to make up his loſs. But if the tenant ſhall make the incloſure, it will ſwallow up ſo much of the capital that ought to have been laid out on other modes of improvement, as to retard his operations in an amazing degree. It will be a moderate calculation to ſuppoſe, conſidering his ſhort tenure, that money expended by him on improvements ought to have returned fifteen *per cent.* In this caſe, the annual loſs actually ſuſtained by the farmer, and virtually by the public, will be no leſs than 70l. 19s. under this head. Theſe two ſums, when added together, make £111. 15s. *per annum*

To this muſt be added, the ſums expended in annual repairs of fences; and the loſs that the farmer incurs, in conſequence of the ſeeds of weeds being blown from among his fences into his fields; and the deſtruction done by birds and other vermin, that find ſhelter in the hedges: which three articles, not to mention the loſs from waſte labour in plowing, where the inclo-

ſures are ſmall, and of an irregular form, will do much more than counterbalance any little benefit he may derive from the loppings from the hedge, and the pickings of graſs he obtains from the hedge ſides; ſo that the ſuppoſed benefit that is derived from the mere preventing intruſions from cattle, is purchaſed at the price of more than at the rate of twenty ſhillings *per* acre for arable land. Can any damage it might be ſuppoſed to ſuſtain from the want of fences, in any caſe, amount to one fourth part of this ſum? And, after all, theſe are only *nominal* fences over the greateſt part of England: for I will venture to ſay, that there is not one incloſure in a hundred that is a compleat fence all round. For the moſt part, the mounds are only uſeleſs cumberers of the ground, and nurſeries of weeds and vermin, which conſume and greatly diminiſh the amount of the produce of the land. Nothing but inattention, ariſing from the prejudices which mankind imbibe in their youth from the converſation of men whoſe minds have been biaſſed in the ſame manner, could prevent ſuch obvious conſiderations from being adverted to. How many millions of acres of incloſed land are there in the kingdom, whoſe whole rent does not amount to the half of twenty ſhillings *per* acre? Were

I to attempt to make an eſtimate of the total amount of the encreaſed products of land, that might have been produced by a judicious outlay on ſolid permanent agricultural improvements, of the ſums that have been expended on uſeleſs incloſures which have been made in this iſland, within the ſpace of two hundred years paſt, the amount would be ſo great as to appear to be incredible. For this reaſon, I omit it here. My object here, is not ſo much to eſtimate the loſſes we have already ſuſtained by a blind adherence to ancient cuſtoms, as now, that the evils ariſing from theſe cauſes are felt, to direct the attention of the public to ſuch circumſtances as may tend to ward off ſimilar evils in time to come; and I ſhall be happy if any thing I ſhall here ſay, ſhall tend to make the ſubject of incloſures only an object of deliberation. In that caſe, men will ſoon diſcover other facts, which I think it here unneceſſary to bring forward, that will furniſh additional arguments for heſitating with regard to their utility. As I ſhall, perhaps, have occaſion to reſume this ſubject, where it will have occaſion to be conſidered under another point of view, in an eſſay intitled Conſiderations on the moſt economical mode of conſuming the produce of a farm,—I ſhall not proſecute the ſubject farther

in this place; but refer the reader to that eſſay for farther ſatisfaction reſpecting ſome doubts which will naturally occur to his mind on this occaſion. Here I ſhall only obſerve, that whatever annihilates a conſiderable proportion of the beſt lands of the kingdom, as incloſures may juſtly be ſaid to do; and abſtracts from the purpoſes of productive melioration, a large proportion of the capital appropriated to agricultural purpoſes, as the erecting of fences undoubtedly does; ought certainly to be productive of benefits that are by no means problematic: for the evils originating in this ſource, are at firſt ſight obvious, and of great magnitude.

§ X.

Church-lands, Lands in Mortmain and Entails, conſidered as an Obſtruction to the Progreſs of Improvements.

CHURCH lands, and other lands in mortmain, prove a much greater obſtruction to the laying off of roads and canals, or making exchanges for the mutual accommodation of parties, than lands

equally circumſtanced belonging to individuals; inaſmuch as they are more unalterable by any perſon exiſting: for though all the parties ſhould be ſenſible of the utility of the propoſed change, and willing to agree to it; yet it is doubted, if any authority, ſhort of an act of parliament, can make a change that is not liable to future challenge. In other caſes, too, when a property is ſmall, it frequently happens that one or other of the proprietors who hold it, become willing to ſell it in the courſe of no long tract of years; ſo that the inconvenience reſulting from theſe troubleſome holdings is gradually done away: but when ſuch ſmall property is in mortmain, it becomes a perfect nuiſance to the neighbourhood. It may be compared to one of thoſe incurable wens that ſometimes grow on the human neck, from which there is no hope of deliverance, but by death itſelf. No leaſes of a proper kind for promoting induſtry, can be granted upon ſuch lands; and they muſt remain ſmall, detached, unimproveable patches for ever.

It is by no means my wiſh, to make unneceſceſſary encroachments on the property of the church, or of any other individual whatever:— but where evils that affect, in a ſtrong degree, the community at large, have been the reſult of

a combination of circumſtances that were not foreſeen at the time when the inſtitutions from which they ſprang were adopted; it would argue a great want of underſtanding to ſay, that no attempt ſhould be made to remove thoſe evils when they come to be ſeverely felt by the public; although, in every attempt of this ſort, as much care as poſſible ſhould be taken, that thoſe regulations which public conveniency call for, ſhould not tend to hurt the private intereſt of individuals.

On that principle I would humbly beg leave to ſuggeſt, as a matter for conſideration by the public, whether the inconvenience complained of, in regard to this particular, may be removed, and the holders of lands in queſtion be at the ſame time benefited, merely by a law authoriſing ſuch lands to be ſold under proper regulations: or, if this were deemed too great an innovation, by permitting all patches of ſuch lands, being disjoined property, if not exceeding in yearly value the ſum of l. to be ſold by public auction, under due forms; and requiring that the money ariſing from ſuch ſales, ſhould be veſted in the public funds; the intereſt of ſuch ſums to be applied, in all time coming, to the ſame purpoſes as thoſe to which the rents of theſe lands, held in mortmain, are at preſent allocated.—

Many would be the advantages that would thus reſult to thoſe having a right to theſe funds: for it is a truth well underſtood, that the rents drawn for ſuch lands at preſent, are, for the moſt part, very much beneath their real value. And, under pretext of repairs, dilapidations, arrears, and charge of management, prodigious abatements muſt be made from the groſs rents. From facts that have come to my knowledge, I think it would be a moderate eſtimate to ſay, that, taking all the mortmain-lands of this deſcription in the kingdom, the free income drawn by thoſe who have a right to it, is not above one half of what the groſs rent of theſe lands would be, at the preſent moment, if they were let on leaſes of a proper ſort; and are leſs than one fourth part of what it might be brought to in a very ſhort courſe of years, if under a judicious management. The inference I draw from this fact is, that were theſe lands ſold, they would in general bring a much higher price in proportion to their preſent rent, than other lands in the vicinity: partly on account of the profit that a perſon may hope to derive from becoming owner of a ſmall bit of property, and partly on account of the deſire that the great landed proprietors beſide them would have to acquire theſe lands. When that money

was thus acquired, it would purchaſe an annuity in the funds, much higher than ever before was drawn from the lands; and the expence of managing that fund would be greatly leſs than that of landed property. The following ſtatement will ſhew what the probable encreaſe of income would be, to the perſons having now a right to theſe funds.

If land ſells, on an average, as it does at preſent, at about thirty years purchaſe; mortmain-lands would ſell at forty years purchaſe, at leaſt, of the groſs rent.

Lands yielding 100l. *per annum*, of groſs rent, at forty years purchaſe, would bring 4000l.; the neat free rent of which is at preſent, on this ſuppoſition, 50l.: but call it 60l.

This ſum, if employed to purchaſe three *per cents*, at the rate of 60l. *per cent*, would purchaſe an annuity of 200l. (At preſent, February 1798, the three per cents are at 49, conſequently, the annuity would exceed 240l.)

From which deduct for management, and this would be a very large allowance, 1½ *per cent*, there would remain 197l., (above 236l.) which is more than three, (nearly four times the amount of the ſum at preſent drawn.)

I am myſelf convinced that the above calculation will be found to be very near the truth; but ſhould any one be inclined to think it erroneous in ſome degree, let him deduct what he ſhall think proper. It is certain, the balance, never can be turned to the oppoſite ſide of the account with the ſmalleſt pretenſions to truth; ſo that, at all events, the income of thoſe who have a right to theſe lands muſt be conſiderably augmented; and they muſt, of courſe, have an intereſt to promote, and not to retard the meaſure propoſed.

With regard to other lands in mortmain, appropriated to charitable purpoſes, which are neceſſarily put under the management of perſons who have no right to apply any part of theſe funds to their own uſe; the benefit that would reſult to the objects intended to be ſupported by theſe charities, would, by this means, be immenſe. Parliament has of late had this ſubject under conſideration; but though they have diſcovered abuſes to an aſtoniſhing extent, it does not appear that any radical meaſure for preventing the like abuſes in future has been adopted. It is ſubmitted, whether conſiderable benefits would not reſult from the ordering theſe lands to be ſold, and the money to be applied as above; with this expreſs injunction from parliament, that the agent

ſhould iſſue no payments from this fund, for the uſe of the current year, until the accounts of the money for the former year, in which all the *items* ſhould be *ſeverally* ſtated, and the vouchers tranſmitted to a proper perſon to be appointed to act as auditor of theſe accounts, were paſſed by him; eſpecially if it ſhould, at the ſame time, be enacted, that all perſons in the management of theſe funds at the time, and their heirs, ſhould be made liable, conjunctly and ſeverally, to make up, out of their own private funds, whatever deficiency could be inſtructed to have accrued from any mis-ſtatement by them, or falſehood in theſe accounts; if it ſhould be detected any time within forty years of the period when the faulty tranſaction took place. There ſeems to be, indeed, no way of curing this evil, but by thus ſeparating the management of the mortmain property from the application of the money ariſing out of it, to the purpoſes preſcribed by the donator.

One agent might be appointed for the management of the church funds, on whom the reſpective claimants ſhould be impowered to draw for their reſpective ſhares, at ſtated periods; and another, if it were thought neceſſary, for the other mortified funds. Theſe agents to be entitled to retain a ſpecified *per centage* for their trouble;

and to find ſureties to a proper extent for their intromiſſions.

With regard to entails, I do not find they are much complained of in England. But in Scotland they operate nearly in the ſame manner to the retardment of improvements, as the church-lands in England. The time is not, perhaps, as yet arrived, when a modification of theſe can be attempted. And as eſtates, under this kind of tenure, are uſually of conſiderable extent, they come leſs in the way, as obſtructions of other improvements, than the former. But ſhould a time ever come, when very ſmall eſtates ſhall be laid under this kind of reſtraint, I can have no doubt but a meaſure of the ſame ſort as that recommended above, would be found expedient as to them. Indeed it would be, for very obvious reaſons, a much more eligible plan to grant a power by law, to entail to a certain line of heirs the annual rent of this kind of property, or the value of ſo much corn ſpecified, than that of land itſelf; as it would remove many very heavy obſtructions to agriculture, and would provide with equal effect for the preſervation of a name, and the continuation of a fixed income, to a certain line of heirs *(f)*.

To forward ſuch a beneficial change as this would occaſion,—might not a law be paſſed authoriſing any owner of entailed property, to ſell

that property, under the authority of the Court of Seſſion, if in Scotland, or other competent court if in England, whenever the proprietor ſhould apply, after having aſcertained, under due forms, the preſent free rent of the eſtate, whether in money or in kind; the judges being authoriſed and required to allocate ſo much of the price, as ſhould be ſufficient to purchaſe an annuity in the funds of the ſame amount as the free rent of the eſtate ſold; there to remain untransferable, except to the line of heirs preſcribed by the entail; the remainder of the price to be at the diſpoſal of the vender of the lands; or, at the will of the court, to be applied as a fund for younger children. Particular regulations would, in this caſe, be neceſſary to be adopted, for ſecuring the intereſt to the true line of heirs, which it would be eaſy to deviſe: but of which it is unneceſſary to ſay more in this place.

§ XI.

Indefinite claims upon Land, conſidered as an Obſtruction to Agricultural Improvements

To this head are referable tithes, poor's rates, and ſome other claims of leſs conſequence.

Tithes.

It appears that the drawing of tithes in kind, is *univerſally* complained of as a grievance in England; as there is ſcarcely a ſingle ſurvey of a county, in which it is not mentioned as an evil that ought to be remedied. Nor, indeed, is it a wonder, that this ſhould be complained of as a grievance: for the drawing of tithes in kind, when it is examined with attention, will be found to operate directly, in the ſtricteſt ſenſe of the word, as a tax upon induſtry; and to be at the ſame time more vexatious in the mode of collecting, than perhaps any tax that has ever been adopted. And if it be alſo adverted, that the mode of collecting it is ſo expenſive as to afford much leſs to him who receives, than it takes from him who pays, it will not be ſo much a wonder that it excites univerſal diſguſt, as that it has not long before this time been ſo modified, as to afford relief to the parties intereſted in it: for it is certainly not beyond the powers of man to deviſe ſome expedient, where both parties, are ſufferers, to give *one* of the parties, at leaſt, relief, if it cannot be extended to both.

There are four different deſcriptions of perſons, who may be affected more or leſs by the drawing

of tithes in kind; viz. 1*ſt*, the farmer; 2*d*, the proprieror; 3*d*, the parſon or the impropriator of the tithe; and, 4*th*, the public at large; each of which I ſhall beg leave ſeparately to conſider.

The farmer. He is more or leſs affected by it, according to the ſituation and circumſtances of the land he occupies. If it be a corn farm, (and I beg that all the remarks here offered may be underſtood as applying to this deſcription of land) and if the land be of a rich and fertile quality, ſo as to require no extraordinary expence in cultivating it, nor any purchaſe of manure from without; eſpecially if he has no leaſe, or only a very ſhort one; the drawing the tithes in kind can be conſidered as a matter, to him, of comparatively ſmall moment; ſeeing he is precluded, by other circumſtances, from extraordinary exertions of induſtry. The amount of the tithes, in this caſe, can be as nearly aſcertained as is neceſſary to enable him to make a calculation ſufficiently accurate for his purpoſe: and the tithe, as to him, can only be conſidered as a part of his rent; ſo that whatever be its amount, he will be able to pay a rent to the landlord, juſt that much leſs than he would have done, if that tithe had not been drawn: and he can carry on his opera-

tions nearly in the ſame manner he would have done, if no tithe had been drawn. It only proves diſagreeable to him, on account of ſome vexatious interferences that may occur in regard to the drawing of the tithes, which he can ſometimes convert to his own emolument.

But the caſe is very different to the farmer who occupies land of an inferior quality, which ſtands in need of extraneous manures, and expenſive diſburſements before it can be made to yield abundant crops. His efforts might, in this caſe, be compared to thoſe of a labourer, who ſhould make conſiderable exertions during the hours of relaxation throughout the day, in order that he might obtain a bit of ſomething hot for ſupper; but when he was juſt preparing to enjoy his hard earned morſel, he had it taken away from him by a neighbour who had ſtood by idle all day, and now came, by means of a legal authority he had obtained, as a reward for ſome exertions of his predeceſſors, when the ſtate of ſociety rendered ſuch a mode of remuneration the eaſieſt of any that could then be deviſed, to ſeize that which the poor man had ſo hardly gained by the ſweat of his brow. Though the poor man is forced to give up his morſel in this caſe, it is impoſſible for him to yield it without reluctance: or ever after-

wards to view his neighbour with a favourable eye.—It provokes an invidious parallel to be drawn between the two parties, which eſtranges them the more from each other. The conſequence is, that although, in this particular circumſtance, the one gains juſt as much as the other loſes; yet it tends very little, upon the whole, to the emolument of the receiver; becauſe the loſer ſays within himſelf, ſince I cannot enjoy my own morſel myſelf, I can at leaſt prevent my neighbour from getting it; for nobody can compel me to earn it but if I pleaſe. So down he ſits in indolence; and neither of them enjoy the bleſſing that might have reſulted from induſtry.

That this is no fanciful caſe, but an exact repreſentation of what muſt and actually does happen every day, in regard to tithes, will appear evident from the following ſtatement of facts.—Before a farmer can make any expenditure upon his land, he muſt have a reaſonable certainty of drawing it back; or, if he does not, his own ruin muſt be the conſequence. If he is a ſpirited man, however, and finds that by the outlay of twenty ſhillings npon manures, or extra labour, or other means of improvement, he has a reaſonable proſpect of augmenting his crop to the amount of twenty-two ſhillings, he may venture to go on:

but with leſs than that he muſt be a loſer. He accordingly lays out his money. His crop is augmented as far as he expected: but, when ready to be brought into the yard, the tithe-gatherer carries off one tenth of his produce; which is nearly to the value of two ſhillings; and the profits which he had ſuch a good reaſon to expect, are taken entirely away: thus he muſt finally abandon all attempts at improvement on this plan.

Had the farmer been permitted to go on, he could have continued the practice without loſs at leaſt; and the public would have derived a benefit for ever, from ſuch annual outlay, to the amount of *two and twenty ſhillings* of increaſed produce: and this twenty ſhillings of expenditure for purchaſed manures or labour, would have put in motion an immenſe maſs of induſtry. This, again, by being annually returned in the ſame channel, and augmented, as the moderate profits he derived from this outlay enabled the farmer to extend his efforts wider, would have gone regularly forward, till it naturally muſt have at laſt become a ſource of a prodigious augmentation of the produce, and an infinite addition to the national proſperity. But all theſe things are entirely ſtopped, at the very moment it was beginning to be put in motion, *by this deſtructive*

regulation of police. Under this point of view, tithe-drawing in kind operates exactly like the grub which deſtroys the germ of the ſprouting corn; ſo that inſtead of a plentiful crop of grain, which the land ought to have produced, it is allowed to remain a waſte, covered with thiſtles and other deſtructive weeds.

The caſe of the farmer thus circumſtanced, is even harder than that of the poor labourer above ſtated. If the labourer was not permitted to touch his well-earned meal, he was not at leaſt deprived of any part of the property that had once been poſitively his own, and of which no one had a right to deprive him; but it may very often happen, that the farmer who ſhould venture his money as above ſtated, would not only be deprived of the profit he ought to expect, but even of his capital itſelf, by one who could have had no right to touch that capital, but in conſequence of theſe his public ſpirited exertions. Though the farmer had a reaſonable proſpect of drawing twenty two ſhillings inſtead of his twenty of expenditure, yet he can have no *certainty* of it. No inſurer can here be found, as in mercantile concerns, to guard againſt riſk. He muſt run that riſk himſelf. Inſtead of twenty-two, he may reap only fifteen ſhillings. To this, as to

the will of Heaven, he muſt ſubmit, in hopes that a more abundant return at another time will make up the loſs. But even in this afflictive caſe, the tithe-man comes, and takes from his fifteen ſhillings one ſhilling and ſixpence, ſo as to reduce his original twenty ſhillings to thirteen ſhillings and ſixpence. Is it a wonder that he feels this deduction as a cruel hardſhip? And if the tythe be demanded with haughty imperiouſneſs, inſtead of ſympathetic lenity, can we be ſurprized if he feels ſore, and deems it a burthen that is cruelly oppreſſive? And can it fail that ſuch an impreſſion will operate moſt powerfully in checking every future attempt at expenditure, with a view to augment the produce of his farm? No man, who thinks at all, can believe it poſſible theſe impreſſions will not be felt, and that very diſagreeable conſequences will reſult from theſe feelings.

Other caſes might be ſtated abundantly illuſtrative of the pernicious tendency of tithes; but I wiſh not to enlarge on a ſubject that is ſo evident. I ſhall only beg leave briefly to obſerve, that experience clearly confirms the truth of theſe deductions. In England, not to mention commons and waſtes, much very fine land is allowed to remain in graſs in a very unproductive ſtate, which, with a very moderate degree of induſtry, and outlay of

money upon it, might be made to yield abundant crops of corn: and the reaſon univerſally aſſigned for this diſgraceful ſtate of management (I call it diſgraceful, becauſe, were it altered, even the graſs land might be eaſily made twice as productive as it is, by a judicious uſe of the plough,) is, that the tithe of corn-land is ſo very heavy, as deters the farmer from having recourſe to the plough: whereas in Scotland, where a corn-tithe is never drawn in kind, immenſe tracts of country, which thirty years ago were covered with heath, and totally unproductive even of graſs itſelf, are now converted into fertile fields that yield abundant crops of corn and graſs; and which, if the tithe-laws had there exiſted, muſt, in all probability, have continued unproductive till the end of time. This is a contraſt that is very ſtriking to every one who travels theſe countries; and it brings forward a practical fact, which ought to outweigh a million of ſpeculative arguments. It will not be alledged that this difference proceeds from the ſuperior energy of the Scottiſh nation. This is obviouſly not the caſe; for it is well known, that in mercantile and manufacturing enterpriſe, where no ſuch checks on induſtry are experienced, the Engliſh clearly take the lead. In every other ſpecies of exer-

tion, but in this alone, their ſuperiority is admitted. And even in the line of agriculture itſelf, it will not perhaps be diſputed: for many of the men who have made a conſpicuous figure in theſe enterpriſes in Scotland, are actually Engliſhmen. It can be aſcribed to no other cauſe but the operation of the tithe-laws, and ſome of the other obſtructions to agriculture taken notice of in this eſſay, which do not operate on Scotland. The operation of the tithe-laws, then, upon the *actual farmer*, is undeniably pernicious.

Proprietors. But if the tithe-laws are hurtful to the farmer, they are perhaps ſtill more ſo to the proprietor. Whatever checks the induſtry of the farmer, muſt, in a direct manner, diminiſh the income of the landlord; and as the energy of a farmer, when once excited, is well known to augment in proportion to the advances he has made, whatever checks that energy in the bud, occaſions in time a diminution of income to the proprietor, much greater than can eaſily be conceived.

It was remarked, in a former part of this eſſay, that the proportion of rent which can be afforded for arable land, encreaſes with the productiveneſs of that land in a much higher degree than in the *ratio* of the *quantum* of the crop; ſo that what-

ever tends to render land permanently more productive than before, if no deduction be made from it, tends, at the ſame time, to augment the income of the proprietor in a ſtill higher degree than that of its produce.

But as it is obvious, that the tithe operates as a dead bar to the commencing improvements in agriculture upon a ſoil of no great degree of fertility, ſo as to prevent the beginning of that motion, from the acceleration of which alone the proprietor can hope to derive conſiderable encreaſe of rent; in all caſes, his rent is diminiſhed in a much higher *ratio* than one tenth, as it might ſeem to do by thoſe who take only a ſlight view of the matter.

Should the proprietor of *poor* lands, ſeeing the impoſſibility of the tenants improving them, attempt to render theſe lands more permanently fertile by the outlay of ſtock upon it, that he never expected to draw back; but would content himſelf with a reaſonable return of intereſt of the capital in name of rent, he would not find the caſe much altered. He ſets out, we ſhall ſuppoſe, with this principle, that if he can ſecure a permanent rent, equal to five *per cent.* of the money expended upon it, he will be very well ſatisfied with it. Let us ſay, then, as before

that twelve buſhels was the neat expence of culture, &c. which, on an average of all ſorts of corn, was valued at 4s. *per* buſhel; and that he had expended 20l. *per* acre, the intereſt of which, at five *per cent.* is twenty ſhillings, or in other words, five buſhels. But before he can draw this rent free of tithe, the average produce muſt be, at leaſt, eighteen buſhels, out of which muſt be taken one buſhel and nine tenths; ſo that inſtead of five, his rent will be reduced to three *per cent.* nearly; while the tithe-owner will be entitled to draw nearly two *per cent.* for ever, on the capital the improver had thus expended. It is needleſs to add, that under ſuch circumſtances it is vain to look for a general ſpirit of agriculture, either among proprietors or tenants, to both of which deſcriptions of men, the operation of the tithe-laws are highly oppreſſive.

In one other reſpect does the tithe become ſingularly pernicious to proprietors of land. The importance of preſerving the whole produce of the ground upon the farm where it was reared, for the purpoſe of making dung, ſeems to be very generally underſtood; as I find a clauſe to that effect is univerſally inſerted in the leaſes in every county of England, wherever leaſes are granted at all. What puniſhment would the proprietors

of theſe lands deem adequate to the crime of ſelling off the whole produce of the farm every tenth year? Yet great as this crime would be, it would not be adequate, in point of damage, to them, to the right of drawing tithe in kind from their arable lands; becauſe the farmer who *ſold* the produce, would at leaſt become poſſeſſed of money to replace, in ſome degree, by means of extraneous manures, the loſs he had incurred by the abſtraction of the home-dung. Thoſe who are intitled to draw the tithe in kind, are, in fact, by this means, veſted with a power of enriching their own private property, if they ſhall ſo incline, at the expence of every other proprietor around them. In this point of view, therefore, tithes are ſingularly pernicious to proprietors of land.

Tithe owners and impropriators of tithes.—Tithes were evidently intended ſolely for the benefit of the perſons of this deſcription; but it has been ſeen above, that in the ſtate of ſociety which prevails at preſent, they have a more direct tendency, in many caſes, to prove hurtful to others, than beneficial to them. In a thinly peopled country, where lands are fertile and not fully occupied, and where every man cultivates his own corn, and finds no ready ſale for it,

this would not be the caſe. In theſe circumſtances, no expenditure could ever be made on agriculture, but merely for ſeed and labour; and, as the fields would be abandoned by the plough, as ſoon as they became in a ſmall degree unproductive, and other richer fields be broken up in their ſtead, the expence of cultivation would bear a ſmall proportion to the returns; and where corn could not be readily ſold at all times, the payment of a part of the produce would perhaps be the eaſieſt way that any kind of aſſeſſment could be raiſed upon the people. This was evidently the ſtate of Europe, when tithes were firſt eſtabliſhed; but the ſituation of things is now changed, and from that change the evil complained of derives its origin.

Where tithes are to be drawn in kind, the expence of collecting, at different times, as the crops become fit to be carried to the yard, ſmall parcels of corn from a number of individuals at a conſiderable diſtance from each other, and from the perſon who is to receive it, muſt be very conſiderable, and muſt make a defalcation in their amount.

The trouble likewiſe attending this kind of collecting, muſt be very great; and to a clergyman of a retired diſpoſition, addicted to literary

purſuits, and ſtudious of quiet, it muſt prove one of the moſt unpleaſing taſks that can be impoſed upon him: ſo that, of all employments that could be deviſed, it is in every reſpect the moſt unbecoming a clerical character: more eſpecially when it is conſidered that, from the cauſes above ſtated, every perſon concerned will feel himſelf diſpoſed to pay it with reluctance, and will throw every obſtruction in the way, that he thinks will tend to render it diſagreeable and troubleſome. To avoid this heavy train of evils, moſt of the ſober-minded, well diſpoſed, worthy men among the clergy, wiſh, at all events, to free themſelves from it. If they attempt to draw the tithe themſelves, unable to cope with thoſe who are accuſtomed to tranſactions where cunning and chicanery are exerciſed to their utmoſt ſtretch, they are impoſed upon at all hands, and receive but a very ſmall proportion of what they have a legal title to draw. If they attempt to transfer their right to another, that perſon muſt be very well paid for executing an office which is attended with ſo much trouble, and ſo many diſagreeable interferences with their neighbours. Few, indeed, will undertake the taſk, unleſs it be perſons of a turbulent diſpoſition, who are diſpoſed to graſp at all advantages; and who will

not perhaps be very ſcrupulous at impoſing on the clergyman as readily as others. In this way, I have reaſon to believe, that a worthy clergyman of primitive ſimplicity of manners, does not, in many caſes, realize much more than one half the ſum he has a legal claim to exact. To *ſuch* men, this mode of providing a living for them is perhaps among the worſt that can be deviſed.

But if the perſon having a right to the tithes, be one of a turbulent diſpoſition; one who is eager to graſp at all advantages; one who is regardleſs of the circumſtances of others; one who is little ſcrupulous about the means he adopts for obtaining an aſcendency over his neighbours; and who, laying aſide the decorum becoming a clerical character, engages in a perpetual buſtle and wrangling, determined to exact with the utmoſt rigour every *item* that the law authoriſes him to levy; the living, that would be a poor one in the hands of the perſon of the former deſcription, will be, to him, abundant; and he will live in affluence; while the family of the other is condemned to comparative poverty. In acting thus, however, he loſes all influence in his clerical capacity. His practice belies the doctrines he is obliged to preach. He becomes deteſted and deſpiſed. In the performance of religious duties

he is deſerted: the morals of his pariſhioners are corrupted, and the fineſt bands of ſociety are diſſolved. He becomes, in ſhort, a diſgrace to the venerable body to which he belongs: and the whole order, becauſe of his improprieties of conduct, falls into general diſreſpect.

Such are the natural effects of the operation of this law on the body of clerical tithe owners; and here too it muſt be conſidered as equally, perhaps more, pernicious on the public than we have felt it on former occaſions. Every law ought to be "a terror to evil doers, and a protection to thoſe that do well." But this law operates in a manner directly the reverſe; for it protects only the evil doers, but leaves thoſe that do well to be pillaged at all hands (g). Miſerable, then, muſt be the deluſion of thoſe who wiſh blindly to ſupport a ſyſtem of police, ſo directly oppoſite to the principles of common ſenſe, ſo contrary to the ſpirit of the religion we profeſs, and ſo deſtructive of ſound morals. It is ſurely a praiſe-worthy attempt, to endeavour ſo to modify it, as to protect the innocent, at leaſt, if not to puniſh the guilty.

With regard to lay impropriators, the complaints againſt them, when compared with the

clergy, are loud from every quarter: nor do I recollect a ſingle inſtance to the contrary in any of the agricultural ſurveys. From hence I think it fair to infer, that the clergy in general do not, at the preſent moment, on an average, draw from the tenants, either by themſelves or ſubſtitutes, nearly the full amount of what they have a title to exact; and that, of courſe, after the allowance to ſubſtitutes, and the expence of collecting, are deducted from the payments made by the occupiers of land, the ſums that are actually paid into the hands of the clergy will be greatly ſhort of what ought to be paid by the farmers.

It has been ſaid by a very ingenious gentleman, (I believe Mr. Howlet,) that the clergy are in general very liberal in regard to the tithes: and that if they were rigidly to exact what they have a title to claim they would ruin half the farmers in England. I am inclined to believe that the ſtatement is juſt; and it brings to light a moſt alarming truth: viz. that the farmers in England are in a ſtate of the moſt humiliating dependence, and are obliged, for the ſake of procuring even ſubſiſtence for themſelves and families, to court favour of the tithe owners, by every compliance they can exact. The more abatement they have been accuſtomed to receive, the greater muſt be

their dependence, and the more ruinous to the proprietor; becauſe whenever the tithe-owner chooſes to be rigid, the farmer muſt be ruined, and the landlord muſt ſuffer by his calamity. Better were it for all the parties, that the tenant were obliged to pay the full tithe on all occaſions, ſo that it were but fixed in ſuch a way as not to admit of being augmented in proportion to the degree of his induſtry.

The Public. With regard to the effect of drawing tithes in kind upon the *public at large*, enough has been ſaid, in the courſe of the foregoing remarks, to ſhew that theſe are pernicious in the extreme: inasmuch as they put almoſt an unſurmountable bar to agricultural improvements of every kind;—ſtop, to an aſtoniſhing amount, the circulation of money that would be expended in purchaſing extraneous manures, and in proſecuting other means of improvement;—diminiſh the quantity of corn that would be reared, to an inconceivable amount;—and put a check, in the bud, upon thoſe exertions of induſtry, which would ſpring up from innumerable ſources that would be opened, were this great bar to improvements removed, or at leaſt ſo altered by judicious modifications, as to ſecure the intereſt of the parties for whoſe behoof the

inſtitution was originally made, without being productive of the evil conſequences that in its preſent ſtate reſult from it.

With this view, I humbly beg leave to propoſe as a proper, if not a neceſſary meaſure, in the preſent ſtate of ſociety, that the tithes in England and Wales ſhould be converted, ſo as to make a payment in money be univerſally received in lieu of the payments in kind that are exigeable at preſent; but under ſuch modifications as to prevent the poſſibility of thoſe who are entitled to draw the tithes from ſuffering, by that depreciation in the value of money, which we have ſeen for a long time paſt has been going on in a regular progreſſion; and may be expected to continue; or may, perhaps, as at this time in France, be ſunk almoſt to nothing, by ſome political ſhock that cannot at preſent be foreſeen.

With theſe views, might not a law be obtained, authoriſing the valuation of tithes, in every caſe where either of the parties intereſted in it ſhould ſo incline? This might be done by a ſummons raiſed againſt all the parties concerned, either before the ſheriff of the county where the property lay, or before any other judge that ſhould be thought more proper for executing this office; who, after hearing parties, ſhould

proceed to make a legal inqueſt to obtain a clear proof of what had been the amount of the tithes actually paid and drawn, for five, ten, or twenty years paſt, as ſhould be judged beſt, out of the ſeveral lands in queſtion; ſpecifying diſtinctly the quantity of each denomination of grain, or other titheable produce. But as it may eaſily be foreſeen, that it would be a matter of great difficulty, in many caſes, to get at theſe facts with preciſion, might it not be put in the power of the judge, if the parties could not agree as to that particular, to appoint two or more perſons of good character, in the neighbourhood, to gather up the tithes in kind themſelves, fairly and honeſtly, for five years next to come, without favour to any perſon; the amount to be delivered to the perſon having a right to receive them, after the quantities had been reſpectively aſcertained, ſo as to admit of the collectors making up an account of the whole, upon oath, to be delivered to the judge; who, from that account ſo made up, ſhould cauſe an average to be ſtruck of the quantities of each particular article; which average quantities, after deducting a juſt proportion for the expence of collecting, and taxes affecting the tithe, ſhould be declared by him to be the

legal tithe exigeable from the lands in queſtion in all time to come.

But as there is room to ſuſpect, that the money prices of corn, wool, &c. of different denominations, may riſe to be much higher in ſome future period than it is at preſent; inſtead of now aſcertaining the price of theſe articles, let it be declared, that the quantities of grain and other articles reſulting from the averages reſpectively, are payable out of the reſpective lands, leaving the average prices of ſuch grain, &c. to be aſcertained each year, as ſhall be ſpecified below; declaring, that the money which ſhall ariſe from the average prices thus aſcertained, ſhould be in lieu of the whole tithe that could be exacted each year: the time of payment to be ſpecified.

And to prevent all diſputes as to the average prices of theſe articles, in time to come, let the ſheriff of each county be authoriſed and required to make an inqueſt at Candlemas or Lady-day each year, of what had been the actual ready money ſelling price of corn of the preceding year's crop, from the time the corns were reaped, till the preſent time, and of wool, and all other titheable articles for the preceding year, by examining witneſſes before a jury to be appointed for that purpoſe; which prices, after being thus aſ-

certained, ſhould be publiſhed, and declared to be thoſe by which the quantity of tithe-corn of each particular deſcription, and other titheable articles, contained in any degree of valuation, ſhould be payable for the crop of the preceding year. Thus would the tithe-owner be entitled to receive payment of his tithe, without any extraordinary expence or trouble, or unjuſt deduction or diſpute whatever: the farmer would be allowed to carry on his operations uncramped by thoſe galling reſtraints which the tithe-laws at preſent perpetually throw in his way. The proprietor would be at liberty to apply ſuch part of his capital as he might incline, towards promoting agricultural improvements, with a reaſonable proſpect of being benefited by his exertions; and the public would become poſſeſſed of a quantity of ſurplus produce of land, which it can have no proſpect of ever otherwiſe enjoying, that would be the means of diffuſing a perpetual plenty through every corner of the land.

The converſion of the tithe has been ſimplified in the law enacted for that purpoſe in Scotland; which, though eaſier in the execution, and perhaps equally juſt with that above ſtated, I have not ventured to propoſe; becauſe the principle upon which it is founded is not quite ſo

obvious as the above. By that law, it is enacted ſimply, that the rents of the land actually payable by tenants at the time the valuation is made, or the rent that ought to be paid by lands not tenanted, as aſcertained by a jury of honeſt men competent to judge in theſe caſes, being clearly aſcertained, one fifth part of that rent, whether it be payable in money or in kind, ſhall be declared to be the tithe payable for ever out of the lands in queſtion.

Many conſiderations induce me to believe, that were this rule adopted in England, the reſult would ultimately be not very different, in moſt caſes, from that mentioned in the text; and therefore, as being more ſimple, and more eaſily executed, I ſhould, myſelf, be inclined to prefer: but as I ſuſpect the general opinion would not coincide with mine in this reſpect, I thought it better to give way to that; and therefore only mention it in this caſual manner.

Among all the perſons intereſted in this particular object, no one of them, it would ſeem to me, would receive ſuch a benefit from this change, as thoſe eſtabliſhed clergy having a right to tithes, who are of a quiet inoffenſive diſpoſition, and who are ambitious of diſcharging the ſacred functions of their office with decorum of

character and purity of heart. I have no doubt, but, in moſt caſes, theſe men would thus receive an immediate addition to their income, of from thirty to forty, in many caſes more than *fifty, per cent*; and to that would be ſuperadded the ſatisfaction of living in peace and quiet with all around them, without being under the neceſſity of guarding againſt the chicanery of thoſe who had ſet themſelves to prey upon them. To ſuch men, then, the inſtitution propoſed cannot fail, I ſhould think, to prove highly acceptable; as it provides for them an effectual ſhield to guard them againſt all injuſtice, which they never could otherwiſe have obtained.

To the boiſterous diſturbers of the public tranquility among the clerical order, and the cunning and avaricious lay-impropriators of tithes, the regulation would prove leſs acceptable, becauſe it would curb their powers, which they take pleaſure in exerciſing; on which account, although it would doubtleſs augment their income, yet that augmentation would be in a leſs proportion than to the others; and, therefore, it is not impoſſible that ſome of this deſcription of perſons might be rather inclined to oppoſe this ſalutary change. But are the wiſhes of *ſuch* men to have influence with the public? As ſoon might the wiſh of the

ſwindler, to oppoſe the laws by which he was to be reſtrained in his wicked courſes, be attended to by the legiſlators of this land.

The farmer is the only deſcription of perſons which could in any reſpect ſuffer by the change. At preſent, it is not doubted that many farmers fall upon ſhifts for getting a compoſition for their tithes conſiderably below their real amount. This they could not hope to enjoy in future; for the agents appointed to draw the tithe in kind for the five years, would no doubt execute their duty with a ſtrict impartiality, ſo as to prevent any thing of this ſort from taking place during that period: to him, therefore, the change might be immediately for the worſe. But our view here is not to protect any one in a ſyſtem of fraud or impoſition of any ſort, but to do ſtrict juſtice between man and man; ſo that he could have no real cauſe of complaint in this caſe: and for the trifling loſs he might thus, in ſome caſes, ſuſtain, he would derive a power of benefiting himſelf to a much greater event, by the more dignified exertions of a manly induſtry.

The farmer may, in this inſtance, be compared to the ſmuggling manufacturer, who ſometimes gains a little money by fraudulent means, but is ſeldom ſeen to become wealthy. His riſks are ſo

great, and the attention he is obliged to beſtow to guard againſt theſe, is ſuch as to call off his attention from the mode of conducting his proper buſineſs in the beſt manner; ſo that his goods are often of a bad quality, which forces him to adopt unbecoming modes of putting them off; and this, at the ſame time that it gives his mind a bias to little arts of chicanery, renders him ſlovenly in buſineſs, that cramps every exertion; ſo that he continues in general both poor and abject; which would not have been the caſe, had he continued to exert himſelf fairly in the candid and honeſt line of procedure. Nothing tends ſo much to lower that honeſt blunt dignity of mind, which ought to form the principle feature in the character of a farmer, as that of being in the habit of having recourſe to little arts of deception and fraud, which the practice of drawing tithe *in kind*, ſo neceſſarily cheriſhes. If a man is in the habit of thinking lightly of one kind of fraud, he will gradually come to be leſs ſcrupulous than he otherwiſe would have been in regard to others: but where is the farmer who thinks it a crime to defraud the tithe owner? Do they not in general glory in it as a meritorious proof of their ingenuity. Thus are the morals of country men perverted, and their minds debaſed by this injudi-

cious regulation of police. Can any thing be more becoming the clerical character than to remove from ſociety this ſtumbling block which has ſuch a powerful tendency to pervert the mind of unſuſpecting individuals? On this account I ſhould ſuppoſe that the whole of the clergy who have the conſcientious diſcharge of their duty at heart, would be, to a man, ſtrenuous in their exertions to forward that commutation I have recommended. From what has been already ſaid, it is clear that none of them could poſſibly be hurt by it, and that moſt of them would be greatly benefited by the meaſure. They themſelves, as well as their ſucceſſors, would be benefited yet in another way that has not been hitherto pointed at. To avoid the payment of a corn-tithe, which is found to be the heavieſt of all, a practice has been begun, and prevails more and more every day, of converting tillage land into graſs. Wherever this takes place, the tithe owner's income muſt ſuffer a conſiderable diminution; nor is it in the power of the tithe owner to prevent this, as to him, pernicious alteration, by any other plan, except that of the converſion above recommended. Let them, therefore, be ſtrenuous in promoting this meaſure and they will thus, at the ſame time, benefit themſelves and free their body from the

general imputation which has been thrown upon it in conſequence of the tithe laws. In the preſent ſtate of the public mind in Britain, nothing could have ſuch a ſalutary tendency as a conduct of this ſort in the clergy.

Upon the whole, I know perhaps no regulation of police that would have a more direct tendency to promote public tranquillity in the State,—to excite a ſpirit of induſtry among the great bulk of the people,—or to augment the proſperity of the kingdom, than the abolition of tithes: ſo that one would naturally ſuppoſe, that, after the public ſhall have had time to conſider of it, ſcarcely could any ſerious oppoſition be expected to be made to a meaſure of ſuch an obvious beneficial tendency.

I have above endeavoured to obviate all ſuch objections as might be expected to originate with men who conſider the ſubject with a candid deſire to promote the meaſure, if it can be ſhown to have no tendency to prove hurtful to honeſt individuals having intereſt in it. But I am aware of a train of conſiderations that will influence a variety of claſſes of men to oppoſe this propoſed improvement; though theſe, as originating from ſecret and ſiniſter motives, will not be avowed: but, that they will operate as an

irreſiſtible bar I have no doubt, againſt the adoption of ſuch a propoſal, ſhould it ever be ſeriouſly brought forward in parliament.

I have already hinted at the reluctance with which many farmers would give ear to ſuch a propoſal; becauſe they have been in a train of profiting by artifices and chicanery, which they would think they could no longer exerciſe, were this paſſed into a law. To theſe muſt be added, for the ſame reaſon, the farmers of tithes in general through the kingdom. The weight of this kind of influence will be greater than, at firſt ſight, will ſeem to be obvious: for theſe men, by giving occaſionally hints and innuendoes to their landlords, of the inutility or ineligibility of the meaſure, will ſlacken their zeal in the cauſe, ſo as to render other objections of great weight.

But the curſe of this country is, that a view to parliamentary intereſt operates through a thouſand unobſerved channels, to retard almoſt every uſeful improvement, though it dares not be openly avowed. It is this overpowering influence that will, I fear, ſwallow up every other conſideration in the preſent caſe, and render all arguments, however ſeemingly irreſiſtible, of no avail. In vain do we now (1796) hear innumerable cries of the ſcanty produce of this iſland, and the amazing

exertions that ought to be made to remove it, this influence, I have no doubt, will make the very obvious means of effecting it, above developed, be entirely disregarded. Tithe-owners of every description find, that the influence this give them over a very numerous body of voters, is an engine they will not readily wish to part with. And however much a few clergymen, of pure hearts, and primitive simplicity of manners, may wish for the change I have proposed, yet there is not a doubt but the great dignified clergy, and their numerous connections, will all behold such a proposal with jealousy, and probably reject it with contempt. It is easy to perceive that those descriptions of men, also, who exercise political sway over them, will eye it with the same jealousy. Under these circumstances, what room have we to hope that the voice of *reason* will prevail? I expect no such thing. But let it be understood, that this is the *real* cause which opposes the measure, whatever shall be the *ostensible* reasons brought forward to oppose it, if ever it should be brought under the consideration of the legislature; which, from the above considerations, I have not the most distant hope of seeing done. Futile attempts may be adopted, apparently to encourage agriculture; but, in reality

to give a little popular fame to individuals, while the only effectual incitements to it that ever could be given, will thus be entirely ſet aſide.

Poor's Rates.

A more ſtriking example cannot be found of the limited extent of the human faculties, than what regards the law impoſing a poor's rate in England. There is not perhaps to be found, in the annals of legiſlation, another inſtance in which ſo many circumſtances concurred to give perfection to any inſtitution, as this. The idea of it was conceived at that period of the Britiſh hiſtory in which was diſcovered as great a ſtrength in the reaſoning faculties of the legiſlators of this country as at any other. The object they had in view was worthy of a great and a virtuous people: they aimed at ſecuring for the feeble and helpleſs part of ſociety, a permanent fund of ſupport, which might render their lives as comfortable to them as human aid can afford. The ſubject was conſidered by the legiſlators with the moſt anxious attention. Their deliberations were uninfluenced by party zeal, and were calm, moderate and conſiderate. They placed the ſubject in every point of view that could occur to

them; and guarded, with a cautious foreſight, againſt every evil that they expected would originate from it. At laſt they were ſatisfied they had deviſed a law, which would compel all thoſe unworthy members of ſociety, who were not endowed with the tender feelings of humanity, to contribute in the ſame *ratio*, in proportion to their means, towards the ſupport of the poor, as others of more generous principles; ſo that, by making the load preſs equally on the whole, it could never become oppreſſive to any part: they conſidered it as a law, which, while it would enable the induſtrious perſon, who was rendered feeble by age, to repoſe in peace under the aſſured certainty of a competent ſupport, would afford no inducement for the licentious and debauched orders of men to hope for a ſhare in it: they conſidered it as a law, in ſhort, which was to encourage a ſpirit of induſtry, and to promote the well-being of ſociety, in ſo great a variety of ways as to diſtinguiſh England above all others as the wiſeſt of nations, and to render her people the moſt proſperous and happy of any in the univerſe. Any one who looks into the debates of parliament, and the political writings of the times, will eaſily be ſatisfied that the above is a fair repreſentation of the judgment that was

formed of the operation of that law about the 43d year of Elizabeth, when it was firſt enacted. Experience however has proved that all theſe high expectations were entirely unfounded. It is now diſcovered that the mode of levying this tax is ſo far from reaching all denominations of perſons, in exact proportion to their means, that it is in its operation more unequal than perhaps any other tax of the ſame magnitude that can be named: it tends greatly to repreſs induſtry, in an immenſe variety of ways: it promotes diſſipation, extravagance and immorality among the lower claſſes of the people, to an aſtoniſhing degree; and has given riſe to a ſyſtem of peculation, among ſome of better rank, that has degenerated into a kind of legal robbery, againſt the effects of which no adequate means of defence have yet been diſcovered. This kind of legal pillage has at length ariſen to ſuch an amount, as to have attracted the attention of parliament; in conſequence of whoſe reſearches it has been diſcovered that the evil has been of late encreaſing with ſuch rapid ſtrides, as to threaten, in a ſhort time, to prove the ruin of the country, unleſs ſome adequate means ſhall be diſcovered for checking its progreſs. This has at length excited a very general alarm; and gentlemen of property, in many diſtricts, have ſet themſelves ſeriouſly to

try to moderate this evil. In ſome inſtances, they have ſo far ſucceeded as to moderate it for the preſent. But whether theſe meaſures will prove to be a permanent cure, or only temporary palliatives time will diſcover.

It would lead me into too wide a field to enter minutely into the conſideration of this ſubject; which is the leſs neceſſary, as it has been ſo well done of late by ſeveral very able hands. My object here is only to ſhow in what reſpects it affects the farmer, and thoſe who are connected with landed property and its improvement.

The firſt point that here demands attention, is the vaſt proportion of this tax which falls to be borne by land-holders: for I believe it will be found, that nearly three-fourths of the whole amount of the tax is paid by the landed intereſt alone.

To give a clear idea of the unequal manner in which this tax affects property of different kinds, it will be neceſſary to arrange all the property into claſſes, which, for our preſent purpoſes, may be theſe three; viz. 1*ſt*, landed property, including farmers; 2*d*, mercantile and manufacturing property, which may here be conſidered as one; and 3*d*, moneyed property.

From the mode of levying the tax, which is by a certain *per centage* on rents, it is clear that

the value of every ſhilling-worth of property belonging to a landed gentleman, is rated to the utmoſt extent of the tax; ſo that if it be at the rate of ſix ſhillings in the pound, a landed proprietor who draws an income of one thouſand pounds, (out of which is alſo to be taken, in many caſes, the land tax,) pays, of poor rates, to the amount of three hundred pounds.

Property employed in merchandiſe or manufactures is rated to the poor in a much lighter proportion: for I ſuppoſe it is no uncommon thing for a man, in either of theſe branches of buſineſs, who draws at the rate of one thouſand pounds a-year of clear income, not to pay above one hundred pounds of rent. Suppoſing he pays the whole of the rates on theſe premiums, he would only be rated at thirty pounds; preciſely one-tenth the rate at which the land-owner pays of that fund! Though this be little, ſtill he pays ſomething. But as to the money-lender, let him have an hundred thouſand pounds, or ten hundred thouſand in the ſtocks, or at intereſt upon mortgage, he pays not one ſingle farthing to the poors' rates. This is a ſtriking inequality, which loudly calls for redreſs. But this is not the worſt caſe that may occur.

The man who is entitled to receive one thouſand pounds a-year of land rent, may have con-

tracted debts by mortgage, for the payment of younger brothers' or ſiſters' portions; or, perhaps, by his own extravagance, during the giddy years of youth, to the amount of twelve thouſand pounds, the intereſt of which will amount to 600l.; ſo that he has only 300l. of free rents; yet, in conſequence of the money-lender being totally exempted of poors' rate, this poor man ſtill pays out of his eſtate 300l. *per annum* to the poor! Thus it appears, that inſtead of being a burthen, which, by being equally divided among all claſſes of people according to their means, preſſes lightly upon the whole, as we muſt ſuppoſe the original framers of the bill intended it ſhould be; and as many perſons, who obſerve not things with accuracy, believe it does, and vaunt of it for this ſuppoſed equality, it is the moſt unequal tax, I believe, that can be named in this iſland: for while it deprives one claſs of men ſometimes of half the means of their ſubſiſtence, it allows other claſſes of men to wallow in wealth, without paying one ſingle ſhilling to the poor.

It may appear to us ſurpriſing, that a law, which has ſuch an obviouſly partial influence, ſhould have been paſſed without adverting to this circumſtance; but we have not ſo much

reaſon to wonder that theſe conſequences ſhould eſcape the legiſlators, as to be ſurpriſed that a ſet of ſenſible men ſhould believe it poſſible to deviſe a permanent ſyſtem of ſettled coercion, to be limited by rules fixed by them,—or ſhould not have adverted, that as there is a perpetual change in the circumſtances of all ſublunary things, thoſe very meaſures, which are ſalutary at the preſent moment, may, in the courſe of time, become highly pernicious. At the time this law was enacted, neither mercantile nor manufacturing property bore any proportion worth naming to that of landed property; and as to property in the funds, it did not then exiſt; and that which is now called moneyed-intereſt, was but of ſmall account, compared to what it now is: ſo that theſe funds might be then diſregarded, as of too trivial importance to be worth notice: but things, in this reſpect, have ſince been greatly changed. Nor is this the ſingle caſe in which particular claſſes of men have come to be affected in a very ſevere degree by the poor-laws, in conſequence of a change of circumſtances in this country.

It was not then adverted to, that a ſpirit for manufacture might ariſe, which would render it proper to erect machinery in many places where nothing of that kind then exiſted, and to plant

numerous bodies of men, for carrying on theſe manufactures, in places which were before uninhabited: nor were the conſequences that the poor laws would have in this caſe obſerved. It is now, however, well underſtood, that in conſequence of the difficulty of obtaining a ſettlement in any pariſh, from a juſt apprehenſion that theſe new ſettlers or their deſcendants may come upon the pariſh at ſome future period, the operations of manufacturers are, in many caſes, very much hampered. It is but a few years ſince a very ſpirited manufacturer in the iron branch, found himſelf ſo much incommoded by this circumſtance, that he thought it neceſſary to apply to parliament for redreſs. In his petition he ſet forth that he had been at a great expence in erecting works of various ſorts on the premiſes that belonged to him, for carrying on the different branches of his buſineſs: that he had alſo engaged from a great many places in this iſland and in foreign parts, many hundreds of perſons well ſkilled in their buſineſs, and brought them there at a vaſt expence; yet, after all, he found his labour fruſtrated by the proprietors in the pariſh refuſing to allow them to ſettle in it. And although he had made offer to come under an obligation to free the pariſh from all the perſons he had ſo brought from other places ever be-

coming a burthen upon the pariſh, yet that this offer was rejected; the pariſhioners poſitively refuſed to admit theſe perſons to a ſettlement; ſo that he found himſelf in danger of being ſubjected to vaſt loſs from that cauſe: and praying that parliament would grant him ſuch relief as to their wiſdom ſhould ſeem meet.

To this it was anſwered, on the part of the land-holders, that as, by the poor law, as it at preſent ſtands, the whole burthen of ſupporting the poor in every pariſh, reſts on fixed property affording an annual rent, which is thus mortgaged for the ſupport of the poor, to any amount that might at any future period be deemed neceſſary for them, were it even at the rate of twenty ſhillings in the pound, (the pariſh of in Eſſex, I am aſſured upon the beſt authority, is at preſent aſſeſſed at twenty three ſhillings in the pound of rent! ! !) it became their duty to prevent, in time, all ſuch meaſures that might be adopted by others for their own immediate emolument, which ſhould run a riſk of deteriorating the property of land-holders to ſuch an amount: that the offer made by the proprietor was by no means adequate for their ſafety; becauſe, although he ſhould ſupport the immediate emigrants themſelves, all the deſcendants of theſe emigrants would have a claim for their ſupport,

upon the property of the parishioners, even to the hundredth generation and more: that though it should be granted that the petitioner was, at present, in such circumstances as to enable him to support the whole of the persons in question out of his own funds, yet as the property of every manufacturer was of a fluctuating nature, so that what seemed to day as stable as the mountains, might to morrow be dissipated entirely, his offer afforded them no adequate security: that were he even to purchase lands for that purpose, these could not be so secured as not to be attachable, in many cases that could be stated, so as to be carried off, and leave the objects of the present contest upon the parish; and even if lands to a certain extent could be so secured, who could pretend, at this moment, to ascertain what might be the amount of the sum that would be wanted, at some future period, for their support? On all these accounts, they contended, that no person ought to have a right so to affect their property without their consent; and parliament found it was not proper for them to interfere in this case. Thus it is clearly established, that these poor laws occasion such a clashing of interest between the manufacturing and the landed interest, as to prove highly injurious to both. And these mutual in-

tereſts muſt continue to prove a moſt powerful bar to the proſperity of the nation, ſo long as they ſhall be permitted to exiſt.

But though it be eaſy to ſtate theſe evils which are already felt, (and many others might be added,) it is by no means ſo eaſy a matter to ſay how they ought to be redreſſed. Indeed, it would appear to be not a little preſumptuous for a private individual to take upon him to preſcribe a remedy for that which has baffled the wiſdom of parliament itſelf: I ſhall not therefore attempt it. All that I ſhall add, on this ſubject, is barely to obſerve, that in many diſtricts the land-owners have already taken this ſubject under their conſideration; and, by their joint efforts, applying remedies to ſuit the locality of the caſe, they have ſucceeded in moderating the evil. But men of landed property have ſo many other avocations, and are ſo frequently called from home, that it cannot be expected that they will be able to fix their attention ſo long on this ſubject, as to produce any thing like a permanent reform. But were they to grant long leaſes to able and wealthy tenants, they would thus create a phalanx of watchful forces, who would be able to oppoſe, with a firm and ſteady effect, every meaſure that tended to encreaſe, without

a juſt cauſe, the amount of the poor rates. For being, from the nature of their employment, always upon the ſpot; and being immediately and chiefly intereſted in every augmentation or diminution of the poor's rates that ſhould take place during the currency of their leaſes, they would watch over every circumſtance that had an effect that way, with a degree of attention that no other perſon could give; and would ſcrutinize every claim, and examine every particular, with ſuch a minute degree of attention, as would prevent, even before they took place, every beginning enormity. This attention being foreſeen, would even prevent attempts at many improprieties of conduct in pariſh officers, which are ſeldom now attended to till long after they are paſt; at which period, an attempt to correct abuſes is much more likely to produce additional abuſes, than to remedy thoſe that are already eſtabliſhed.

The above is one conſideration which ought to induce gentlemen of landed property to be deſirous of granting long leaſes on all their lands. Under ſhort leaſes, the poor's rate comes, at every renewal, to be conſidered by the tenant as part of his rent; ſo that he deducts preciſely as much from the rent he would willingly give to his landlord, as the rate amounts to. If the land

can afford twenty ſhillings *per* acre rent, and no more, it is the ſame thing to the tenant whether he pays the whole of that twenty ſhillings to the landlord, or ten ſhillings to him, and ten ſhillings to the collectors of the rate; and he acts accordingly at each renewal of his ſhort leaſe. The whole poor's rate in this caſe, falls to be borne entirely by the landlord. But as the tenant under a *long leaſe*, muſt take the whole burthen of the poor's rate upon himſelf, without having it in his power to throw any part of it upon his landlord till the leaſe expires, it becomes his intereſt ſtrongly to prevent any undue riſe of the rate.

The meaſure above recommended, would mitigate the evil in *country* pariſhes; and as to *towns*, they are not ſo properly within the object of my preſent enquiry, as to claim a ſeparate conſideration. But the land-owners of the country parts of town-pariſhes, are in a ſingularly unfortunate ſituation; for they muſt at all times be loaded with a heavy poor rate, which they cannot mitigate; becauſe, in all queſtions reſpecting this ſubject, they muſt be out-voted by a number of perſons who can be but little affected by the poor's rates, whatever they may be. At all events, a law ſhould be enacted, requiring, under the ſevereſt penalties, that the account of the

diſtribution of the poor's funds in every pariſh ſhould be printed, and a copy of theſe accounts be delivered to each houſe-holder in the pariſh. In theſe accounts ſhould be ſtated every *item* by itſelf, without being in any caſe confounded with others. And alſo it ſhould be enacted, that a committee of three reſpectable perſons in the pariſh, who have had no concern with the diſtribution of the poor funds for that year, ſhould be choſen, by a majority of votes of the heads of families at large in the pariſh, for the purpoſe of examining theſe accounts; to whom ſhould be conſigned all the vouchers, and who ſhould be empowered to examine perſons upon oath reſpecting any particular concerning theſe accounts. They ſhould be required either to paſs the accounts, or to give reaſons for refuſing to do ſo, within three weeks at fartheſt, from the day of their nomination. And let it be at the ſame time enacted, that in caſe of any objection being made to the accounts by the auditors aforeſaid, the perſons who had been in office while the errors complained of took place, ſhall be, *ipſo facto*, prevented from having any ſhare in touching the pariſh money, until the matter be ſettled by a legal deciſion; which ſhould be immediately commenced at the expence of the pariſh, unleſs they were exonerat-

ed from it by a majority of votes of the heads of families in the pariſh, at a meeting to be held for that purpoſe. And if any concealment, wilful error, or falſe ſtatement in the accounts, ſhould be diſcovered, within twenty years after the event happened, it ſhould be competent for the pariſh to bring a ſummary action at the quarter ſeſſions againſt the parties concerned; who ſhould all be liable, conjunctly and ſeverally, to make up, from their own private funds, the damage ſuſtained; together with ſuch a fine, not exceeding the ſum of as the judge ſhould ſee proper to award. Were ſuch a law as this enacted, and were it competent to bring a ſummary action, in theſe caſes, before judges in the country, and at a ſmall expence, many good conſequences would reſult from it.

The meaſures here recommended, might, indeed, tend to mitigate the evil; but before a radical cure could be effected, many other circumſtances ought to be adverted to, and cautiouſly weighed, which the limits to which I muſt here reſtrict myſelf, prevent me from enumerating. It is a ſubject of *vaſt* importance, and requires the moſt ſerious conſideration of every perſon in the kingdom; becauſe, unleſs ſomething effectual be ſoon done in this reſpect, there can

be no doubt, that before long, ſome dreadful revolution muſt take place in this iſland reſpecting property. It affords but a melancholy proſpect to thoſe who have viewed the ſubject in this light, to obſerve the futile nature of thoſe meaſures, which have of late been brought forward to public notice on this very important ſubject.

§ XII.

Want of eaſy means of Communication, conſidered as a Retardment to the Progreſs of Agriculture.

WHENEVER the ſubject of roads and canals, comes to be diſcuſſed, this ſubject will neceſſarily be pretty fully conſidered, and the importance of it will then appear. Little more is neceſſary, than barely to bring it under view in this place, by referring to what may be afterwards ſaid, that it may not be allowed to eſcape notice. I ſhall only farther add, that the importance of this ſubject is ſuch that it cannot be too often brought under review.

§ XIII.

Want of Markets hurtful to Agriculture.

THE advantages of local ſituation, in reſpect to the conveniency of markets, is in general known; but it is by no means ſufficiently underſtood; and there are innumerable caſes in which induſtry is greatly retarded in this caſe, which are ſcarcely ever adverted to, although, by a little attention and care, the evil might be remedied. To lead the attention into a train of inveſtigating this ſubject, I ſhall beg leave to offer a few ſlight hints with that intention.

To acquire diſcriminative ideas on this ſubject, it will be neceſſary to conſider ground, 1*ſt*, as being applied to tillage, and 2*d*, to paſturage.

In a corn farm, acceſs to market with its produce muſt be obtained, either, 1*ſt*, by means of roads; or, 2*d*, canals; or, 3*d*, by ſea.

Where all the produce of a farm is to be carried to market by means of roads only, the expence of carriage becomes ſo great, when at a moderate diſtance from market, as to reduce the

farmer's profit to ſuch a degree, as to put it out of his power to cultivate corn to any conſiderable extent, unleſs where the rent is very moderate in proportion to the amount of its produce. Corn can, in theſe caſes, be, in prudence, only viewed as cultivable, merely as a preparation for graſs; but as farmers are frequently inaccurate calculators, it often happens that, in this kind of mixed farm, where the practice of the diſtrict has been in favour of tillage in old times, land is, on many occaſions, in theſe circumſtances, kept much longer under the plough than it will pay. But as men are now a little more accurate in matters of this ſort than formerly, they begin to diminiſh the proportion of their corn lands conſiderably. And this is one, among other reaſons, that have concurred to render the quantity of corn raiſed in this iſland ſo much ſhort of what it uſed to be in ſome former periods.

But wherever canals have been made, the carriage of corn to market, and of manures back in return, becomes ſo much more eaſy than on roads, that it may be ſaid to bring the markets proportionally nearer to diſtant places, ſo as to enable the occupiers of ſuch diſtant corn grounds to rear much corn with advantage, where it muſt before have occaſioned loſs; ſo that were the

tithe taken off, the augmentation of national produce in corn would, from this cauſe, be greatly augmented. And if ever the time ſhall come, when ſmall agricultural canals ſhall become univerſal; and the modes of facilitating the intercourſe on theſe canals, (that will fall to be enumerated under that head, whenever it ſhall come to be diſcuſſed) ſhall be univerſally adopted, the produce of this country in grain may be augmented to almoſt any aſſignable degree.

With regard to the tranſporting of agricultural produce by ſea, it is liable to ſo many variations from local circumſtances, that no adequate judgment can be formed of it, unleſs all theſe circumſtances ſhall be taken into conſideration: for it is eaſy to find two places, which are equally diſtant from a good market, that is alike acceſſible by ſea, and ſubject to ſimilar hazards; in the one of which places, the market for corn is nearly as good as if the conſumers were at the door; and in the other, it is little better than if no ſuch market had an exiſtence. For example:

Lynn, in Norfolk, is nearly at an equal diſtance from London as Cardigan in South Wales is from Briſtol or Liverpool; both of which markets are equally acceſſible by ſea, and with as little

riſk as the navigation from Lynn to London Yet it ſo happens, that at Lynn, a farmer can at all times diſpoſe of his corn, in whatever quantities he may chooſe, let it be one quarter, or one thouſand quarters, and carry home the price in his pocket, if he pleaſes, with nearly the ſame certainty as he could draw money from a banker on whom he had a credit. But at Cardigan, no ſuch thing can be found. He muſt wait times and ſeaſons, and watch opportunities with care; and, after all, muſt often take an inadequate price, or ſubmit to ſuch ruinous deductions, as to render it abſurd in the farmer to think to rear corn in quantities, or to give a tolerable rent for land to be applied for that purpoſe, on account of the precarioufneſs of the market.

A very little attention to the circumſtances of the two countries, will be ſufficient to explain the cauſe of this diverſity. Norfolk has been long a corn county, and merchants have, by degrees, found it for their intereſt to eſtabliſh themſelves at Lynn: to rear ware-houſes there, eſtabliſh correſpondences in different places; and, in ſhort, are in a condition to receive and to pay for any quantity of grain that may be offered to them: and they know how to diſpoſe of it again to advantage in the ordinary courſe of their bu-

fineſs. Ships are ſailing from thence every day during the winter ſeaſon, loaded with corn, for London and many other ports; and it never needs to lie upon their hands almoſt an hour longer than they incline.

But at Cardigan the caſe is very different. Little more corn has been in uſe to be raiſed there than ſerves the internal conſumption; ſo that a corn merchant could not find ſufficient employment to eſtabliſh himſelf there, or to erect the conveniencies neceſſary for his buſineſs. No one can buy there but when a chance ſhip ſhall come in the way; and then he can purchaſe only grain of a certain deſcription, and in a limited quantity. The merchant is only to be found at particular times; and then he affords not a general, but merely a ſpecial demand for a particular ſort. The price too will be limited and low: for where there is no general competition of buyers, an adequate price can never be expected. It is, from theſe, and ſimilar cauſes, that the diſtance between London and Lynn, for the corn farmer's purpoſe may be ſaid to be ſhortened almoſt to nothing; while between Briſtol and Cardigan it may, for his uſe, be ſaid to be little ſhort of infinite. Thus it very often happens, that two things, which are alike phyſically poſſible,

are exceedingly diverſified in their actual practicability.

In the preſent caſe, the two places in queſtion may be compared to two places inland, equally diſtant from a good market, and equally ſuſceptible of an internal communication with it by means of a canal; but to one of which only a canal has been already made. Though they were alike ſuſceptible of this improvement, one of them only has obtained it. Before the other can obtain the ſame advantages, ſome perſons, who are intereſted in the buſineſs, and capable of compleating the undertaking, muſt make the canal: for then, and only then, can the farmers and others who are to uſe it, but who have neither the knowledge nor the means to make it, be benefited by it. It belongs to the proprietors, in ſhort, to create a market in all ſuch places if they hope ever to derive an adequate rent for their land: and ſo long as they ſhall leave this object unattained, they muſt content themſelves with a very ſmall proportion of that rent they might otherwiſe eaſily obtain.

From what has been juſt ſaid, it will appear, that the poſſibility of bringing diſtant corn farms within reach of a market, muſt depend upon local ſituation. It muſt either be within a reaſon-

able diſtance of a ſea-port; or an inland canal muſt be practicable near it. In every diſtant ſituation differently circumſtanced, it is impoſſible that corn can ever be reared with advantage for a diſtant market. The principal produce of all ſuch farms muſt neceſſarily be graſs, which muſt be conſumed by live ſtock, that can be carried to market along roads that would be altogether impracticable by carriages loaded with corn.

It is by no means neceſſary for us here to enter into a conſideration of the different kinds of live ſtock proper for particular ſituations; but it may be neceſſary to obſerve here, alſo, as in the former caſe, that all places which are *phyſically* alike, are not *practically* alike benefited by the market. In one county, for example, proper and well frequented markets or fairs for ſales of live ſtock of all ſorts, have been long eſtabliſhed; ſo that animals of every denomination may be there diſpoſed of at an adequate price, for ready money, at almoſt any ſeaſon of the year, without difficulty; whereas, in the other, it is only beaſts of a certain deſcription that can be there ſold, at particular times, and to a few individual perſons, *upon credit*; who have it in their power not only to keep down the prices, but alſo to be-

come bankrupts, when they pleaſe, and defraud the poor ſellers of ſtock to a very great degree. Wherever this practice prevails, it is obvious that the tenant cannot afford to give half the rent for ground of the ſame quality that he could have done in the other diſtrict, where the markets are good. There are many of the diſtant hilly parts of Britain, whoſe proſperity is much repreſſed by want of markets ariſing from this cauſe; and it much behoves the owners of land in thoſe diſtricts, to remove an evil which diminiſhes the income they have a juſt title to expect from their land, to ſuch an aſtoniſhing degree.

I might mention ſeveral other circumſtances that tend to affect the price of live ſtock, and to influence the choice of the kinds to be kept, and the modes of management of theſe, reſpecting the peculiarities of market; but this would lead to too great a length. What has been ſaid may be enough to lead the mind into a train of obſervation, that may enable any one to form a tolerable judgment of different caſes of the ſort that may occur.

§ XIV.

Fiſcal Regulations that retard Agricultural Improvements.

UNDER this head, as under many others, where the internal proſperity of the country is an object of conſideration, *the ſalt laws* ever preſent themſelves under a moſt inauſpicious point of view. Here, to avoid repetitions, it becomes neceſſary to refer to the eſſay on the economical conſumption of the produce of a farm, in this volume, in which it will be ſhewn, that by the liberal uſe of ſalt in feeding of cattle and ſheep, not only many diſeaſes of the latter might be prevented, but alſo that the ſame quantity of food might be made to go much farther, by the judicious uſe of ſalt in feeding beaſts, than it can do without it; ſo that were the duty on ſalt removed, and the free uſe of that condiment univerſally adopted, it might be ſaid to augment the quantity of food for beaſts, I will not ſay one half, but in a proportion ſomewhat approaching to it, over the whole iſland; which is an article of ſuch

immenſe magnitude, as almoſt to baffle all attempts at calculation.

Under the head *manures*, too, it might be ſhewn what prodigious benefits might be derived from its application to that uſe, eſpecially in places that are at a great diſtance from other manures, and to which they are inacceſſible, on account of bad roads, and difficult acceſs, but into which this manure, which can be made to operate powerfully, though in ſmall quantities, might eaſily be brought: ſo that the public would derive a very great benefit from it under this point of view alſo.

Salt would likewiſe prove highly beneficial, in many caſes, were it brought within reach of the farmer, by enabling him, on many occaſions, to procure a market for the produce of his farm, of which he muſt for ever be deprived without it. This might have been equally well brought under the former head of this chapter as the preſent; but I reſerved it for this, that all the baneful effects of the ſalt laws on agriculture might be brought under view at once. Were I to extend this, to give a view of all the other pernicious effects on the community, it would enlarge this ſection to the ſize of a volume; and would, beſides, be deemed foreign to the ſubject in hand.

There is ſcarcely a market for fat cattle in this iſland, that may not be greatly overſtocked by the beaſts that can be fattened within reach of it, except London alone; of courſe, it may be ſaid that every farmer who lies beyond the reach of that market, has the value of his property diminiſhed in a certain degree, from the want of proper markets. In ſome caſes, this inconvenience is but little felt; as there are other markets which, if not equally good as London, are ſtill conſiderable: but there are other remote counties, as in Wales, and in the Highlands and northern parts of Scotland, where the poſſeſſors of land can *in no way* find a market for cattle that are in a condition for being ſlaughtered. In theſe ſituations, the farmers can never attempt to fatten cattle for the butcher. They muſt confine themſelves to the rearing them only for the grazier. But when it happens that graſs, in the feeding diſtricts, fails, or the crops of turnips are deſtroyed by the fly; or when the demand for fat cattle from the grazier, is, from any accidental cauſe ſuſpended, he finds it impoſſible to purchaſe the ſtock from the breeder that he uſed to do. This ſtagnation in the market throws the diſtant breeder into the moſt embarraſſing circumſtances. He is not only deprived of the mo-

ney he had a right to expect from the ſales of his ſtock, on which alone the farmer, in a breeding country, can rely for payment of his rent; but he is overloaded with a quantity of live ſtock, ſo much diſproportioned to the winter food he has provided for them, that many of them actually die for want; and he feels himſelf reduced, in a few months, from a ſtate of comfortable independence, to the moſt abject poverty. I paint not here from imagination, but from nature. In my own time, I have ſeen at leaſt half a dozen of ſeaſons, in each of which many hundreds of families have been reduced to the moſt abject miſery from this cauſe. If thoſe who ſhall read this, had, like me, ſeen, with their own eyes, the miſery which the families of thoſe poor perſons, without any fault of their own, had been made to ſuffer, they would not have wondered that I ſhould, with ſo much anxiety, embrace every opportunity that occurs, of endeavouring to obviate evils of the ſame ſort that may be expected in future times to occur; but would heartily have lent their aid to have added force to my feeble exertions. Were the duty on ſalt removed, all theſe evils, with a train of others, that would fill a volume fully to enumerate, would be effectually removed. The grazier, whenever a ſtagnation of market occur-

red, could cauſe his cattle to be ſlaughtered, and barrelled up for a future market. The breeder too, who has always at the end of ſummer a conſiderable proportion of his beaſts that are in good order for the butcher, could, in like manner, have them ſlaughtered at home in caſes of urgent neceſſity, and barrelled up for market. The very offals of theſe ſlaughtered beaſts would prove a reſource to the poor people, for the ſubſiſtence of their families in ſuch diſaſtrous times; and much of that ſecret diſcontent, which is apt to provoke either civil commotions, or to awaken a ſpirit of emigration, would be entirely obviated. I cannot help, therefore, recommending this ſubject in the moſt earneſt manner to the ſerious attention of the Board of Agriculture, through whoſe means the ſovereign himſelf, who ſo warmly intereſts himſelf in the welfare of all his ſubjects, but who cannot poſſibly have an opportunity of obſerving ſcenes of this nature with his own eyes, may come to be made acquainted with them; who will, doubtleſs, in that caſe, moſt gladly lend his concurrence to any plan for affording relief, that has not a tendency to involve any other deſcription of his ſubjects in ſimilar diſtreſs. He will, doubtleſs, learn, with ſome degree of aſtoniſhment, if the perſons who ought to inform

him ſhall take the trouble to do it, that while Ireland is ſupplied with ſalt and coals from Britain, *duty free*, by which means they are enabled to carry on a very lucrative manufacture to a great amount, in conſequence of a very extenſive trade in *ſmuggled* ſalt to the coaſts of Britain, the Britiſh ſubjects themſelves are prohibited from the uſe of theſe articles, except when burdened with heavy duties; in conſequence of which difference of duties, ſuppoſing freſh beef were to be ſold at the ſame price in England as in Ireland, the Iriſh could afford to ſell their barrelled beef in England, full thirty *per cent* cheaper than Engliſh beef could there be afforded!!! That this is a fact, I undertake to prove, whenever I ſhall be called upon for that purpoſe: and I make that offer in this place, becauſe I am ſenſible it will appear to be a fact of ſuch an aſtoniſhing nature, that every one who reads this, and who has had no opportunity of inveſtigating the ſubject, will be inclined to believe it utterly impoſſible. But notwithſtanding this apparent impoſſibility, the fact is certain and incontrovertible.

The law reſpecting pariſh ſettlements, the regulations reſpecting wool, and the corn laws, as they now ſtand, are all pernicious to the intereſts

of agriculture. But it would lead us far beyond the limits to which we muſt confine ourſelves in this eſſay, to enter upon the inveſtigation of theſe particulars, each of which would form an ample ſubject for a ſeparate diſſertation.

§ XV.

Want of means of circulating Agricultural Knowledge.

HAVING thus brought under the eye of the reader, and the Board of Agriculture, a conciſe view of thoſe obſtructions, of a poſitive kind, which have, for ſo many ages, operated as an irreſiſtible bar to the advancement of agriculture in this iſland, I ſhall conclude this chapter with ſome hints for removing an inconvenience of a negative kind; which, if the former obſtructions were firſt removed, would accelerate the progreſs of agricultural knowledge in this iſland to an aſtoniſhing degree, and give an energy to practical exertions that is unexampled in any other nation.

The ignorance and the obſtinacy of farmers, is an inexhauſtible theme of declamation, on which many philippics have been written in our age. With what knowledge a great deal of that invective has been written, a due attention to what has occurred in the foregoing ſections of this eſſay will ſufficiently ſhow. There can be no doubt, that while the obſtructions above enumerated ſhall continue to operate, it would be nearly with equal juſtice, that we ſhould revile a man for his indolence and averſion to work, while he was bound hand and foot ſo as to render him incapable of moving, as to complain of the determined obſtinacy of farmers, for not doing thoſe things that were equally beyond their power. Let theſe obſtructions be once removed, and they will be in a condition to beſtir themſelves; and there can be no doubt but they will be then ſeen to do it with effect.

From the nature of the buſineſs he follows, a farmer muſt be neceſſarily confined pretty much to one ſpot. This limits the ſphere of his own practical obſervation to a narrow extent. He has neither money to ſpend in buying many books, nor much inclination to put reliance on directions that are publiſhed in books, many of which he knows are written by men who have had as

little knowledge of the *practice* of agriculture, as he has of the *theories* with which they bewilder him. Finding himſelf unable to diſcriminate between the good and the bad; and being ſometimes impoſed upon by a ſpecious title page, to look into performances that promiſe much, but which he finds upon trial to be worth nothing, if not pernicious, he generally concludes that all writings on that ſubject ought to be deſpiſed. In this way, his knowledge of the practical parts of agriculture neceſſarily remains limited, as to him and his heirs, for ages entire, to the narrow ſphere of his own obſervation nearly. It is in this way we are to account for a phenomenon that has been long obſerved by intelligent men, and which is made very apparent in reading the ſurveys of the different counties laid before the Board of Agriculture; viz. that a particular and beneficial practice in agriculture may have been followed for ages in one diſtrict, while it has never ſo much as been heard of during all that time in many other parts of the country, where it might be adopted to the great advantage of the parties concerned, and the community at large *(h)*. To diſſeminate the knowledge of theſe practices univerſally among the claſs of farmers in every diſtrict of Britain, through a chan-

nel that was not liable to the ſuſpicion of miſleading either through ignorance or fraud, and to bring that information to their hand, without trouble or much exertion on their part, and at ſuch a moderate price as to be within the reach of every one, is as yet a *deſideratum*; and it would probably have continued to be one till the end of time, had it not been for the inſtitution of the Board of Agriculture, which is in its own nature ſo perfectly adapted to the purpoſe, and it ſeems to be ſo congenial to the wiſhes of that Board, in as far as they have been hitherto indicated by their proceedings, that it is to be hoped that a plan for obviating this inconvenience will be adopted, as ſoon as other preliminary arrangements can admit of it.

What is wanted, is an agricultural journal, to be compiled under the direction of a judicious man, who is well acquainted with the practice of agriculture himſelf; who has had a liberal education, and opportunities of obtaining a more enlarged knowledge of the practice in different places, than can fall to the ſhare of moſt farmers to acquire; and who is in ſuch circumſtances as to enable him to examine with accuracy any particular about which he may be in doubt, and to ſtate it with preciſion; and who is, at the ſame

time, ſo anxious to guard againſt leading the unwary into errors, as to be extremely cautious how he holds out hopes to the lower claſſes of practitioners that he was not certain could never prove deluſive. Under the ſanction of the Board of Agriculture, ſuch a man could have acceſs to every fact that it was of general importance to be known; and under that authority, ſuch a body of *practical* knowledge could be univerſally diffuſed among all the farmers in every part of this iſland, as never has been yet known in any other country in the world. This would excite an univerſal ſpirit of exertion, and that would give riſe to new diſcoveries every day. And diſcoveries, if publiſhed as they were ſucceſſively made in the ſame journal, under the controul of the whole practical farmers in the iſland, would, in the courſe of a few years, carry this art to a height of perfection that has been hitherto deemed unattainable.

To render this work univerſally uſeful, it ſhould be publiſhed, not gratis, for that would make it be deſpiſed; but at a price below what it could be afforded by a bookſeller, or other perſon who muſt look for profit from their undertaking. This profit the Board has no occaſion to look for, and ought to ſacrifice, together per-

haps with a ſmall ſum annually, for moderating the price ſtill farther; becauſe it ſhould be adapted to the circumſtances, not of the moſt wealthy farmers, many of whom ſtand in little need of inſtruction; but of the inferior orders, who have had fewer opportunities of having their minds enlarged.

In order to render this publication acceſſible to thoſe, alſo, who have the moſt occaſion for it, by living in remote diſtricts where literary information is rare, this journal ought to be permitted to be ſent by poſt, free, to every part of Britain; and, doubtleſs, for ſuch a national benefit, where private emolument is out of the queſtion, parliament would have no difficulty in granting this exemption under due precautions for preventing the abuſe of it. To render this exemption nothing burthenſome to the mail, two devices might be adopted: the *firſt* would be, to have this journal publiſhed at ſhort intervals, by which the weight of the ſame number of copies would be leſs, and more equally divided, than if the ſame matter were put up in thicker numbers. The *ſecond* would be, to forward it from London in ſuch a way, as that it might reach the place of its deſtination in every part of the iſland upon the ſame day: of courſe, the parcels of the ſame

number would not all go by the mail in one day, but on different days, according to the diſtance of the places from the capital: and the beſt day that could be fixed on for the delivery, would be Sunday, or on the market day in a town; becauſe, in diſtant parts, the whole packet for one pariſh, if ſent to the pariſh church, or the market town, could eaſily be conveyed from thence; and, in other places, it would, in general, be the moſt convenient day for receiving it. Under theſe two regulations, no inconvenience could reſult to the mail. The revenue could ſuffer no loſs; becauſe it is very plain the work could never be publiſhed ſo as to go by poſt as letters. It would even prove a conſiderable augmentation to the revenue, by the additional duty on the paper it would conſume; ſo that no objection from the Revenue Board could lie againſt the meaſure.

If a man could be found, who was capable of keeping himſelf perfectly independent of all parties; and who ſhould invariably direct the attention of his readers ſteadily towards objects of agricultural and georgical reſearch alone, regardleſs alike of thoſe objects which for a time ſeem to affect the intereſt of the miniſter or his opponents, it would prove one of the moſt valuable

performances that has appeared in any language; and would form an intereſting epoch in the hiſtory of Great Britain. But is it in Britain that ſuch a man is to be found? perhaps in the preſent age it may be deemed impoſſible.

It may, indeed, perhaps be difficult to find ſuch a man: but I fear it will be ſtill more difficult to find a body of men of high rank in this iſland, who will take an active hand in promoting any public undertaking, that does not ſeem to be calculated, in one way or another, to be converted into a political engine capable of forwarding the views of a party, or the private aims of individuals. In the preſent times, it would perhaps even be a matter of ſome difficulty, to find a very large body of readers, who would be ſo much intereſted in any publication that did not enter into political diſcuſſions, or ſcandalous anecdote, who would peruſe it with continued attention for ſuch a length of time, as would be required fully to effect the purpoſes here propoſed. From theſe conſiderations, I fear the plan will have too much of an Utopian perfection ever to be carried into practice; or, if ever it ſhall be attempted, it will require a greater degree of ſteadineſs in the conductor of that work, than can reaſonably be expected in man,—to ſuppoſe that, aſſailed as he

would be by ſo many tempting lures on every hand, he ſhould be able to perſevere, without wavering, in the right path for any conſiderable length of time. But though the utmoſt degree of perfection can never be attained in this life, men ought not to be deterred from proceeding as far in the right path as they can. It is with this view, that the foregoing hints have been thrown out to the public on theſe numerous topics which have come under review in the preſent eſſay.

The above propoſal has now (Feb. 28, 1798) been before the public for the ſpace of more than one year, without ſeeming to have attracted the notice of the preſident or any member of the Board of Agriculture; and from the unlucky turn in politics, that the preſident of that board has lately taken, it is much to be feared that little cordial co-operation can be expected between him and the miniſter on any ſubject, ſo that the efforts of that Board, if, even directed by ſuperior wiſdom, muſt be conſiderably cramped compared to what they otherwiſe might have been. There is not then the moſt diſtant probability that ever this propoſal will be carried into execution under the auſpices of the Board of Agriculture. That ſuch a deſirable object, however, may not be left wholly unattempted, I intend to make agricul-

ture a particular department of a periodical work that I have ſome view of engaging in at preſent. And tho' this muſt fall greatly ſhort of what might have been accompliſhed, if the above plan had been carried into effect; it may ſtill be of ſome uſe.

THE END OF ESSAY FIRST.

ESSAY SECOND.

ON

WASTE LANDS,

AND THE

MEANS OF THEIR IMPROVEMENT.

Labor omnia vincit: ſed ſine lucro induſtria languit.

ANONYM.

ESSAY SECOND.

On Waste Lands, and the Means of their Improvement.

Lands, whether private property, or commons, lying in a neglected ſtate, may be denominated waſtes. Theſe lands may be improved either by being brought into cultivated fields, or by being planted with trees, which will require to be ſeparately conſidered.

PART FIRST.

On the Improvement of Waſte Lands, by means of Culture.

AS I have had occaſion to conſider the influence of the right of commonage, in the foregoing eſſay, my views ſhall here be confined to the conſideration of the practical means of improving waſte lands, ſuppoſing the perſon who undertakes this task, to be at liberty to adopt the meaſures that ſhall appear to him to be moſt expedient for that purpoſe.

§ I.

Preliminary Obſervations on the circumſtances that require to be adverted to, before the Cultivation of Waſte Lands ſhould be attempted.

THERE are very few ſoils that may not be converted into corn-fields by human exertions judiciouſly applied; but there are many caſes in which that melioration cannot be effected, but at a greater expence than will afford a reaſonable indemnification to the improver: it therefore behoves every one, who has ſuch improvements in contemplation, cautiouſly to conſider all the circumſtances that can affect his operations; to weigh deliberately the influence that each may ſeparately have in his particular ſituation, and, after having taken a complex view of the whole, to adopt thoſe meaſures only that afford a reaſonable proſpect of indemnification for the outlay of ſtock and labour upon the undertaking. The following are among the principal circumſtances which ought to be adverted to in a caſe of this ſort, as any one of them, being in favour of the undertaking, or in oppoſition to it, may have the effect of turning the balance either to the profit or loſs of the account.

1*ſt*, The nature of the ſoil, and ſubſoil of the ſubject in queſtion.

2*d*, The phyſical obſtructions that ſtand in the way of cultivating that ſoil, as ariſing from rocks or ſtones, bruſhwood, trees, &c.; hurtful moiſture, whether ariſing from ſprings or ſurface water, whether temporary floodings, or permanent ſoaking; inequalities of ſurface, whether occaſioned by pits dug out, or heaps raiſed up, or from the natural ſwell of mountains or great acclivities, that may retard the operations of agricultnre.

3*d*, The climature, whether reſpecting the general quantity of rain that falls, or the particular ſeaſons of the year at which theſe rains uſually happen; the degree of heat or cold that there prevails, and the particular modifications it admits of from the peculiarity of circumſtances; the quantity of ſnow that falls, and the time it uſually lies; the winds that chiefly prevail, and the ſhelter or expoſure that the form of the ground offers in that reſpect.

4*th*, The vicinity or the diſtance of the place from towns or markets of any kind; the ſize of theſe towns, and the extent and univerſality of the markets within reach.

5*th*, The kinds of extraneous manures that can be purchaſed; the price at which they can be

obtained; the diſtance from whence they muſt be brought; the times at which they can be got, and the quantities that can be procured at once, or in a certain order of ſucceſſion.

6*th*, The nature of the roads or other means of communication, to or from the premiſes; whether theſe be ſteep and hilly, or level and plain; whether they be hard and rough, ſmooth and firm, or deep and miry; whether they be equally paſſable at all times of the year, or during particular ſeaſons only; or whether, from the ſtate of the country, they are in a train of amelioration or the reverſe.

7*th*, What conveniencies the premiſes afford for erecting houſes, rearing fences, making drains, and other neceſſary operations.

8*th*, How the premiſes ſtand affected reſpecting water; whether for the purpoſe of flooding the lands at pleaſure, or of fencing it off for the purpoſes of amelioration; whether for family uſes, or for the conveniency of live ſtock in incloſures at all ſeaſons.

9*th*, The ſtate of the premiſes reſpecting fuel, the kind and quantity that can be commanded, and the price at which it can be afforded.

10*th*, The ſtate of the country reſpecting ſervants and labourers; the wages and mode of en-

tertainment that prevails in the diſtrict reſpecting ſervants; the way in which they have been accuſtomed to work; the practices that are there eſtabliſhed, in regard to working hours, management of teams, carriages and home labour of every ſort; the kinds of work that the cuſtom of the place has rendered too ſervile to be performed by particular deſcriptions of ſervants; the manner in which aſſiſtance can be procured in theſe reſpects; whether extra-labourers can be obtained for hire, in ſufficient numbers, when a particular puſh happens; or whether they muſt be engaged afar off, and kept in employment when not wanted, to ſerve at that particular puſh; whether it is the cuſtom to pay labourers wholly in caſh, or partly in victuals and drink, and in what proportions, denominations and quantities: whether work can be got done by the piece, or by time only, with many other items reſpecting this head.

11*th*, The ſtate of the country reſpecting mechanic arts; the facility, or the reverſe, with which labouring utenſils of all ſorts of a good conſtruction can be made or repaired, and the ſtile of expence that cuſtom has eſtabliſhed in regard to this department of rural economy.

12*th*, The nature of the tenure by which the lands are held; the rent that is exacted from him, and the nature and amount of other claims that he muſt expoſe himſelf to in conſequence of his occupancy or operations, whether this be under the name of land-tax, tithes, poor's rate, road-money, repairs of houſes or fences; the length of his leaſe, the probability or the reverſe of his being made to incur expence by law-ſuits, in conſequence of arbitrary exactions; and every other circumſtance that may render his tenure more precarious, or his property leſs ſecure: for, in moſt undertakings of this ſort, a man may be ſaid to "caſt his "bread upon the waters, which can only return "to him after *many days*;" and he ought well to conſider, before he throws it out, what is the riſk of its being ſnatched from him or his family before it can be returned again.

A man, who attentively conſiders all theſe circumſtances, may be able to form a tolerable idea of the *kind* of improvement the ſubject admits of, and the *degree* of amelioration of which it is ſuſceptible, on the ſuppoſition that he himſelf is capable of conducting the requiſite operations in a proper and judicious manner; but any perſon who ſets about agricultural improvements, without having previouſly weighed all theſe particulars, may be compared to that man who ſhould

embark on board a veſſel in an unknown ſea, without a compaſs, who may land he does not know where; and ten to one if he is not wrecked upon ſome unlooked for ſhore.

To give particular directions how to proceed under every variation of circumſtances above enumerated, would greatly exceed the bounds to which I muſt here confine myſelf: nor does this ſeem to be abſolutely neceſſary, ſeeing it would be the wildeſt ſcheme imaginable, for any man who was totally unacquainted with the practice of agriculture, to engage in an extenſive undertaking of this ſort, were he even furniſhed with the moſt minute and accurate directions that could be given; becauſe he would find it impoſſible to apply theſe directions properly in all caſes. To ſuch a man they would be uſeleſs; and to a man who is already acquainted with the practice of agriculture, many of them would be quite unneceſſary. All that can be done, then, in this caſe, with any ſeeming degree of propriety, is to mark the great outlines of practice that may ſafely be purſued in a few caſes that are widely diſcriminated from each other, leaving the judicious cultivator at liberty to exerciſe his judgment, in properly varying his practice ſo as to make it apply to the intermediate

caſes according to every gradation of circumſtances.

The neighbourhood of great towns peculiarly favourable for the improvement of Waſtes.—The greateſt enterpriſes in regard to the improvement of waſte lands, may be made with ſucceſs in the near neighbourhood of a large town which, from its ſituation, is cut off from having ready acceſs to a fertile ſoil on any ſide. In ſuch a ſituation, a price ſo very tempting is held forth to the perſon who ſhall bring to market freſh eſculent productions for the table, and ſucculent food for cows, horſes, and other animals, and for other weighty productions that cannot admit of being brought from a diſtance, unleſs at a great expence, as affords a ſtrong allurement to men of property to riſk their capitals in agricultural improvements, in the hope of benefiting their families by a permanent income out of the land which they thus reclaim from barrenneſs, at the expence of a fair purchaſe price. In theſe arduous enterpriſes, which can only be undertaken to their full extent, where perſonal property is ſecured from the danger of caſual attacks from any quarter, which might render the permanency of that income doubtful, the very poſſibility of

ſucceeding often depends on the one hand, upon the great quantity of manure, that can be obtained from from the city, in proportion to the extent of ground that can be cultivated near it; and, on the other hand, upon the price that can be obtained at hand, for articles, ſuch as ſtone, ſand, clay, ſtubs of tree-roots, &c. which could not have been otherwiſe cleared off the ground with the ſmalleſt proſpect of reimburſement. In ſituations ſuch as that I here deſcribe, the utmoſt poſſible proportional melioration of waſte ground cannot be eſtimated with accuracy. There are few, if any ſoils ſo bad, as that, in theſe circumſtances, under a ſkilful management they may not be converted into rich fields permanently productive. I have certainly ſeen many fields thus ſituated, which, in the courſe of a few years, have been put into a train of yielding an annual produce of perhaps *one thouſand* times the amount of what they ever could have done if left in a ſtate of nature.

The importance of this fact, in regard to the welfare of a ſtate, deſerves to be carefully adverted to. It brings forward, under a ſtriking point of view, at the ſame time the *poſſibility* of augmenting the ſubſiſtence of man to an aſtoniſhing degree, and the facility with which this kind of *creation*, if the phraſe be allowed, might for ever

be prevented from taking place. For if all the waſte grounds in the neighbourhood of the town had been a *common*, no improvement could have ever taken place upon it ſo long as that common remained. And if the perſons having intereſt in that common are numerous, it will be impoſſible ever to bring them to conſent to an amicable diviſion of it: and if it be attempted to be divided by the authority of Parliament, the expences that muſt be incurred before it can thus be effected, will be very great; in conſequence of which that improvement, which without this obſtruction could have been made with a proſpect of a reaſonable profit, cannot now be attempted without a certainty of loſs. For this reaſon, the enterpriſe muſt be abandoned; and the land muſt be doomed to remain for ever an unprofitable waſte.

No expence ſhould neceſſarily be incurred, but that which tends to remove phyſical obſtructions only.—The ſame reaſoning will apply to every caſe where the improvement of waſte land, under any circumſtances, is in contemplation. In the neighbourhood of large towns alone, the expence incurred in improving *the moſt barren* waſtes can be repaid. As you recede from theſe great marts, it is neceſſary that the ſoils be of a

greater degree of fertility, before the expence of cultivating them can be repaid; and ſtill the farther you recede, and the more unfavourable the markets, and the leſs abundance of extraneous manure that can be obtained,—the richer and richer muſt the natural ſoil be, before the expence of cultivating it can be repaid; and conſequently, the ſmaller will be the proportion of waſte land that can be brought into cultivation. In all caſes, however, whatever extraneous expence comes to be added to the ſum that is required to remove the abſolute *phyſical* obſtructions to the cultivation of the ſoil, muſt of neceſſity make a proportional narrowing of the poſſible ſphere of improvement. This is a propoſition as plain as any in Euclid; and an unavoidable corollary from it, is, that every ſhilling that is laid out by individuals, in their private capacity, for procuring acts of parliament for the diviſion of commons, and for removing other *political* obſtructions to the progreſs of agricultural improvement, is a moſt impolitic diminution of the actual productions of the country,—a defalcation from the ſubſiſtence of the people,—a cauſe of enhancing the price of proviſions beyond the rate that nature had intended,—and of thus retarding the manufactures, the trade, the national proſperity

of the country;—and, by the abſtracting of them, producing a diminution of the population and the revenues of the ſtate.

No ſhare of the profit ariſing from the improvement of Waſtes ſhould be abſtracted from the undertaker.—The ſame reaſoning will apply to every other circumſtance, under whatever form it ſhall be brought forward, that tends to narrow the ſecurity, or to diminiſh the profits of the operator on waſte lands. It is evident, that no man can cultivate waſte lands, unleſs where he can have a full return for the outlay of his ſtock and labour. In every ſituation, there is one certain degree of fertility of ſoil, which will barely admit of a return for the money that muſt be expended in removing the mere phyſical obſtructions to improvement, and no more. In all ſuch ſituations, if the undertaker has a permanent ſecurity, that he ſhall be allowed to reap the *whole* profit that he can derive from the ſale of its *total* produce, he may proceed in that improvement; but if he knows that he will not be allowed to diſpoſe of that produce, he *cannot* proceed: and thoſe ſoils which, in the firſt inſtance, might by his induſtry have been converted into productive fields, muſt, in the other caſe, be doomed to remain, till circumſtances alter, in the ſtate of barren waſtes.

On this principle, the pernicious tendency of that ill-judged tax upon induſtry called *tithe*, comes once more in our way as an evil that is very apparent; a tax that, without producing any good in theſe circumſtances to thoſe who claim a right to demand it, has operated, perhaps more than all the other taxes in this country, to retard the progreſs of agriculture, and to diminiſh the national proſperity: yet, wonderful to tell! there are men in this enlightened land, who are not aſhamed to ſay, that they do not conceive the drawing the tithe in kind can be accounted the ſmalleſt obſtruction to agriculture! ! !

It was neceſſary that I ſhould thus ſtate, with as much clearneſs as the brevity to which I confine myſelf will permit, the circumſtances that have operated, and muſt for ever operate, in a moſt powerful manner, ſo long as they ſhall be permitted to exiſt, towards the preventing the improvement of waſte lands. For, without taking theſe circumſtances into the account, to preſcribe rules for overcoming the mere *phyſical* obſtructions to the improvement of waſte lands, and to talk as if that were all that was neceſſary for eſtabliſhing a general ſpirit of vigorous enterpriſe in the cultivation of them, would be a ſpecies of

charlatanerie that it would be as unbecoming in the Board of Agriculture to countenance, as it would be unworthy of my own private character to adopt. That Britain is ſuſceptible of very great improvement, there can be no doubt: that it is *phyſically* capable of being brought to afford, to ſpeak in the moſt moderate terms, *ten* times at leaſt the amount of its preſent produce, admits of the cleareſt demonſtration: but that it *will* advance in productiveneſs, while the preſent ſyſtem in reſpect to the private management of agricultural concerns, and of legiſlation affecting rural affairs prevails, ſeems to me to have not the ſmalleſt degree of probability. On the contrary, it will be diſcovered, at laſt, that the diminution of agricultural produce, which has been ſo obviouſly perceptible for ſome time paſt, will become ſtill more and more apparent, in proportion as men ſhall withdraw their capitals and ſkill from the practice of agriculture, and apply them to ſome other profeſſion that will render them more independent members of ſociety, and afford them more adequate returns for their induſtrious exertions.

Agricultural enterpriſes in England leſs profitable than thoſe in trade or manufactures.—In

the foregoing eſſay, I had occaſion to take notice of the circumſtances that chiefly obſtruct the agricultural enterpriſes in *England*, by means of which the induſtry of that active people is forced into another channel: ſome of which not affecting Scotland, it there becomes, in ſome caſes, a matter of calculation, to aſcertain whether it will be moſt adviſeable for an individual to apply his capital and ſkill in agriculture, or in trade or manufactures.

Difference between England and Scotland, in regard to agricultural improvements.—Upon theſe principles, there are many inſtances of men in Scotland, veſting a *ſmall* part of their capital in the purchaſe of waſte lands, and appropriating the remainder of that capital towards the melioration of the ſubject, with a view to future profit, as they would do in any other employment; and, as might have been expected, it has been done with greater or leſs ſucceſs according to circumſtances. In many caſes where this has been attempted, the undertaking has been both arduous and hazardous. The original purchaſe-price of the land has, in ſome caſes, not amounted to one hundredth part of the neat expence incurred, before the ſubject could be let for a

ſteady permanent income. A great part of the expence incurred, in many inſtances I have known of this kind, has been occaſioned not ſo much by the melioration of the ſoil itſelf, as by ſteps that were merely preparatory to admit of thoſe operations which were neceſſary for its actual melioration. The clearing the ground of ſtones, in particular, is a very heavy charge in moſt caſes; and, in ſome caſes, eſpecially where large hard bullets of whin-ſtone or granite abound, which muſt be blaſted by gunpowder before they can be brought to a manageable ſize, the unavoidable expence is exceedingly great: and as thoſe ſtones are often concealed beneath the ſurface, the amount of that expence admits of no previous accurate calculation. But as theſe ſtones muſt all be cleared away, at whatever expence it may be, to the full depth of a plough furrow at leaſt, thoſe who engage in undertakings of this ſort, uſually find it moſt economical, upon the whole, to trench the ground to the requiſite depth, by which means alone the ſtones can be accurately diſcovered at once, ſo as to avoid a ſeries of endleſs future operations. Under this mode of improvement, I have ſeen fields cleared where the ſtones were in ſuch quantities, as that, finding no other mode of conſuming them, but by putting them

into walls reared as fences round the fields, there was a neceſſity for making the walls from ſix to nine feet in thickneſs, on purpoſe to conſume the whole of the ſtones, although the fields were divided into incloſures not exceeding two acres in each. In caſes of this ſort, the undertaker never looks for a return of the *capital* ſunk on the premiſes by the *annual* produce; but is perfectly ſatisfied with this ſucceſs, if he can let the lands at a permanent rent, which ſhall be equal to five *per cent.* of the whole money thus expended; being either ſatisfied with the legal intereſt of his money, if his circumſtances admit of it; or, if he requires his capital, he has only to ſell the ſubject, when he is certain of receiving from 25 to 30 years purchaſe of the groſs rent,—which improved capital he may either apply to another undertaking of the ſame kind of ſtill greater extent than the former, or to any other purpoſe he may incline.

The cultivation of waſtes a ſort of buſineſs in Scotland.—In this way, the improvement of waſte land becomes a regular buſineſs, of the ſame nature with that of trade or manufactures, that a man may look up to with an aſſured hope of profit. It is in fact a ſpecies of manufacture itſelf;

and a manufacture too, which, being of a more beneficial tendency, deſerves to be encouraged above all others. By its operations, employment is given to a great number of hands; and the perſons thus employed, inſtead of being crowded into towns,* (as in moſt other manufactures) where their health is injured, and their morals corrupted by the infectious contagion of bad example, are allowed to retain the primitive ſimplicity of manners that the habits of a country life ſo neceſſarily inſure; their whole exertions meanwhile are employed in augmenting the quantity of human food, and in adding, in the moſt direct manner, to the population and wealth of the ſtate, and internal proſperity and ſtability. Should this kind of employment be encouraged, who can ſet limits either to the population, or to the productiveneſs of theſe kingdoms?

Illuſtrated by a practical example.—I wiſh to impreſs the mind of the reader with a ſtrong conviction of the neceſſity of adverting to the circumſtances which prevent ſimilar exertions being made in that part of the iſland which is moſt ſuſceptible of it, when compared with thoſe that often occur in that part which is leſs favourably circumſtanced. In the laſt ſituation, it is no un-

common thing for a man to expend at the rate of ſixty pounds *per* acre, before he can bring his lands to be let to a tenant, and the undertaker thinks himſelf abundantly repaid, if he can get three pounds of *groſs* rent. In Scotland there are few or no deductions to be made from rent. The land tax, in this caſe, having been fixed before the improvement took place, when the land was worth next to nothing, is ſo ſmall as to be of no account: and neither tithe, nor poor's rate, nor any other pariſh taxes, are exigeable from ſuch lands; ſo that the whole of the groſs rent the lands can afford comes directly into the pocket of the undertaker; in conſequence of which he draws a free annual income of 5 *per cent.* for the money he has thus expended, and he is thus encouraged to proceed.

In England the caſe is different. There are ſo many deductions to be made from the groſs rent the farmers pay, that the proportion of free rent which remains to the landlord, is much leſs than in the caſe above ſpecified. An example will make this plain. Let us ſuppoſe that 60l. *per* acre has been expended, and that the productiveneſs of the improved land is equal in both caſes; taking then the uſual computation, that the rent of an arable farm ſhould not exceed one

third part of the value of its total produce, the total value of the crop in this caſe would be *nine* pounds *per* acre; the tithe of which, if drawn in kind, will of courſe be equal to 18 ſhillings. If the poor's rates, and other pariſh charges be equal to 6 ſhillings in the pound, (and it appears by the ſurveys that theſe rates are higher in many places,) this, upon 3l. of rent, would amount alſo to 18 ſhillings; in all 36 ſhillings to be deducted from the original 3l. which would leave a free rent to the undertaker in England of 1l. 4s. only, inſtead of the 3l. which the tenant actually pays, and which the improver, in Scotland, actually receives. At this rate, inſtead of the five *per cent.* he had actually drawn for his money, he would be entitled to draw in England only *two per cent:* of courſe, that buſineſs which it might have been practicable to purſue, in the one caſe with a reaſonable profit, would be, in the other caſe, productive of the moſt certain ruin; and muſt be totally abandoned: and abandoned for what? Not for the benefit of the tithe-owner; for, in this caſe, the tithe-owner can never be benefited by the land in queſtion one ſhilling; nor for the benefit of the poor, who never can derive any emolument from it, while it is allowed to remain in its unproductive ſtate: The power

therefore conferred by law, to exact both these taxes, is calculated to produce only mischief. Doubtless it could never be the intention of the legislature to authorise laws of such a pernicious tendency, with an intention to destroy, in such a direct manner, the effective industry of the nation. It can only be ascribed to that kind of imperfection, arising from want of foresight, to which all human institutions are liable. It is experience alone that can discover evils of this sort; but, after they are felt and pointed out, it is the province of a wise and beneficent legislature to correct these oversights, and to redress the grievances to which they have given rise.

Lands to be appropriated in lieu of tithes, considered.—A device has been adopted in England, in *some cases*, with a view to mitigate the evil pointed out above, respecting tithe. Where commons are divided by authority of parliament, a certain proportion, usually I think one ninth part, of the soil has been set apart for the tithe-owner, in lieu of tithes from the whole. This doubtless does diminish the evil, because it at least allows the owners of the remaining eight ninths to proceed with their improvements in as far as respects the tithe. But besides that this remedy

can only be applied in caſes where a ſpecial act of parliament is obtained for the purpoſe, and therefore can never afford relief to thoſe who might find a propenſity to improve their own undiſputed property, the cure itſelf produces a diſeaſe which is little leſs fatal, in many caſes, than that for which it affords a remedy: nor does that remedy afford ſuch a radical national relief as a beneficent legiſlature ſhould aim at.

It is very plain, that if the tithe-owner be a clergyman, the portion of waſte ground allocated to him can prove of no emolument whatever. He has not the right to ſell it for the trifle it would bring, in its preſent uncultivated ſtate, were he even to find one who was willing to purchaſe it: the laws of the church prevent that. He cannot improve it himſelf; for, had he the money at command, common ſenſe would prevent him from ſinking a great capital of his own with a certainty of being able to draw perhaps not legal intereſt for it during his own incumbency, and, at his removal or death, to deprive his heirs for ever of the capital ſunk on that improvement. This portion of the waſte then is locked up from all proſpect of melioration for ever; and neither can benefit the clergyman to

whom it has been awarded, nor any other perſon.

All the reaſoning above is on the ſuppoſition that the waſte is of the very unproductive nature of the caſe adduced, and is merely illuſtrative: but whatever be the ſtate of the ſubject in queſtion, the ſame reaſoning applies, *in kind*, though not in *degree*; as that will be varied by the productiveneſs of the ſoil, and other circumſtances. This is indeed very evident; but I think it neceſſary thus to ſtate it, to obviate the remarks of haſty inconſiderate cavillers, who, on an intricate queſtion of this kind, may be expected to be ſufficiently numerous. There are caſes of a more favourable nature, which I need not here ſpecially particularize.

The improvement of waſte lands ſhould be conducted by actual farmers.—Though very ſpirited exertions have been made, in ſome caſes, in the improving divided commons in England, yet, from the obſtructions above ſtated, and others that will come under review in the ſequel of this diſquiſition, the influence of theſe exertions has been much circumſcribed, in compariſon of what it would have been. Every agricultural exertion that is to be attempted by men who do not

make a profeſſion of that buſineſs, muſt be conducted with an uneconomical expenditure of capital, which would have been much diminiſhed, had the operations been conducted by a profeſſional man. It were unneceſſary to add, that ſuch expenditure tends to diminiſh the rate of profit on ſuch enterpriſes conſiderably below that which it otherwiſe might have been. This conſideration plainly indicates, that in all caſes where the expenditure required for cultivating waſte lands is not beyond the faculties of the *farmer*, ſuch arrangements ſhould be adopted, as to throw the burthen of theſe improvements upon him, if it be poſſible.

Apathy of farmers, circumſtances which occaſion it.—But, it is a pretty general rule, that perſons, who follow the profeſſion of agriculture have little more money than what is barely ſufficient to purchaſe ſtock for the farms they rent, and to carry on the uſual operations of a farm; ſo that it would be vain to expect that they could afford to make the advances for the amelioration of waſte lands, that are *nearly* in the ſame ſtate of unproductiveneſs with thoſe above enumerated. Their higheſt views are, for the moſt part, directed to thoſe immediate *annual* returns which can

be got from their farms by means of home manures, and an economical arrangement of their domeſtic management, without looking forward to thoſe national benefits that might in many caſes accrue from their ſpirited exertions in meliorating waſte lands, in proper circumſtances. This kind of apathy I am far from imputing to theſe men as an object of blame. It is a neceſſary conſequence of that ſtate of inſecurity in which the prejudices of the times has contrived to place them. So far am I from blaming theſe men for their inactivity in this reſpect, that I ſhould think them highly culpable, indeed, if they did adopt another mode of conduct: but of this there is little danger to be apprehended, ſo long as they ſhall be kept in that ſpecies of depreſſion to which they are at preſent ſubjected; for common ſenſe has wonderful power, when ſupported by neceſſity.

Inſecurity of tenure ſtops the improvement of Waſtes.—It may perhaps be deemed a tautology, but I hope to be pardoned for once more remarking, that leaſes for an uncertain period, or for a ſmall number of years, clogged with injudicious reſtrictive clauſes, are productive of the ſame effect upon the conduct of the farmer. They all

tend to produce a ſordid kind of dependence upon ſuperiors, which ſinks the ſpirits into a grovelling depreſſion that is perfectly deſtructive of that elevated ardour of mind on which every active purſuit muſt ultimately depend. Were farmers allowed a reaſonable length of tenure, and were they at the ſame time freed from ill-judged reſtrictions, the caſe would be very much changed in a ſhort ſpace of time. They would ſoon perceive that, from a judicious outlay of ſuch money as they could command, towards the melioration of ſuch ſoils within their reach as were ſuſceptible of it, very conſiderable profits might be derived: this would ſoon produce aſtoniſhing efforts;—for none but thoſe who have particularly adverted to it, can conceive what energy the drawing a little profit, with the agreeable proſpect of obtaining more, gives to the exertions of man. This rouſes all the faculties, keeps the attention continually awake to mark every little circumſtance and incident, and to turn it to advantage. When once put into this train, the farmer may be fairly left to himſelf. Is he ignorant, he will ſoon acquire knowledge through a thouſand channels that he alone can diſcover: and every day will add to his skill and his energy. It is impoſſible not to perceive, though it is unneceſſary for me to

ſtate it particularly, after what has been ſaid in the preceding eſſay, that the conſequence of this energy muſt redound greatly to the emolument of the proprietor, and the productiveneſs of the country.

Incloſed lands may ſometimes be called Waſtes. —It is not merely in regard to the improvement of thoſe lands which are called *waſtes*, in the common acceptation of the word, that the alteration above propoſed would prove a great national benefit: there are many millions of acres, lying ſcattered throughout the different counties in England, which, though incloſed, and the property of individuals, may be fairly entitled, as I conceive, to the name of waſtes; becauſe they do not, in their preſent ſtate, afford one fourth part of the produce that they might eaſily be made to yield. Theſe fields, by an injudicious ſyſtem of management, having been laid down to graſs without being brought into a ſtate of productiveneſs ſufficient to allow them to admit of their being meliorated by that management, are now prevented from being broken up ſo as to bring them to a proper degree of fertility, and have thus degenerated into a deplorable ſtate of ſterility. Many of theſe fields, conſiſting of a

poor thin hide-bound clay, produce only a very ſcanty quality of four unwholeſome graſſes, which no domeſtic animal will eat, unleſs when at the point of ſtarving. Others are covered with a a full coat of fog, (moſs) that excludes almoſt the very appearance of any other plant whatever; and others are ſo thickly overſpread with ant hills, as ſcarcely to let the appearance of the natural ſward be ſeen in any part of the field. Under the unreſtrained management of a perſon whoſe knowledge was improved by a ſenſe of his own immediate intereſt, all theſe crying abuſes would be quickly corrected, and in a few years thoſe fields, which are now a diſgrace to the country where they are ſuffered to remain, would be converted into a fertile ſtate, affording abundance of wholeſome produce both for man and beaſt.

Were this judicious ſyſtem of management univerſally adopted, the profeſſion of agriculture, like that of manufacture or of trade, would be looked up to as an employment in which a moderate ſtock might be applied with a reaſonable proſpect of acquiring, by induſtry and good conduct, both a comfortable ſubſiſtence to one's family, and a moderate competence of wealth. In that caſe, a farmer would find it uſeful in general not to lay out his whole ſtock on cattle and im

plements,—for ſeed, and ſervant's maintenance, as at preſent; but rather to reſerve a part of that ſtock, for the purpoſe of purchaſing manures, making drains, embanking rivers, levelling high ridges, removing ſtones, grubbing up uſeleſs ſtumps or bruſhwood, and other ſubſtantial improvements that the ſtate of his farm might render neceſſary. He would not then be under the neceſſity of abſtaining from ſuch operations as could not make a full return to him, *within the year*, but would find himſelf enabled to reſt ſatisfied with ſuch moderate returns as would only clear his capital to him *after many years*. In that caſe, there would be no need for gentlemen of great landed property trying to inſtruct their tenants in the proper mode of proſecuting their own buſineſs; for they themſelves would ſearch for it, and obtain that knowledge in a much more perfect manner than any other perſon could deviſe for them. Plenty would abound in every corner, if, with that ſuperabundant plenty, a ready acceſs to markets, on reaſonable terms, be not prevented; and peaceful content would be the natural reſult.

Neceſſity of adverting to the foregoing circumſtances.—Let not theſe obſervations be accounted an unneceſſary digreſſion in this place. It is,

doubtleſs, the intention of the Board of Agriculture to point out to the public the moſt effectual means of rendering the waſte grounds of this country productive to the ſtate. Had I proceeded merely to give direction how theſe waſte lands *may* be managed ſo as to be rendered productive, while I was conſcious, at the ſame time, that there are thouſands of honeſt farmers in the kingdom who know that part of the buſineſs as well as myſelf, and therefore ſtand in no need of ſuch inſtructions, but who are prevented from acting, becauſe of the operation of the cauſes above aſſigned, I might thus have made a vain and idle diſplay of knowledge which might have tended to impreſs a few with an advantageous idea of my own acquirements, while theſe directions, like thouſands of others that have been diſtributed with a laviſh hand to the public, could have proved of very little avail. Applauſe, upon theſe terms, I ſhall ever deſpiſe. Before inſtructions can be of real utility, circumſtances muſt be ſuch as to render it practicable to carry them into effect; ſo that, without adverting to the circumſtances above ſtated, I conſider all that follows merely as words of no effective importance, which I ſhould never have taken the trouble of putting upon paper, as it would be only a pain-

ful exertion without any beneficial tendency. In hopes that men may be put into ſuch circumſtances as to be able to avail themſelves of the hints that follow, which are the reſult of a pretty extenſive practice in the melioration of waſte grounds, I ſhall communicate them to the public with pleaſure; conſcious, in the firſt place, that they will not prove a ſnare to thoſe who are ignorant; and hoping that they may, perhaps, in ſome caſes prove uſeful even to thoſe who are better informed.

§ II.

Practical directions for bringing waſte lands into cultivation.

PART FIRST.

Of the improvement of waſte lands as connected with a cultivated farm.

THE moſt favourable circumſtance for the improvement of waſte land, by thoſe exertions that are within the reach of a farmer, is that the

waſte is in the near vicinity of an arable farm, and connected with it. In this caſe, the farmer, by a ſmall addition to the ſtrength of his labouring animals, can annually cultivate a portion of the waſte land without much inconvenience to himſelf. Many are the advantages ariſing from this arrangement: the expence of erecting new houſes is avoided; food for ſuſtaining his labouring cattle is already within his reach; which, on a compleat new undertaking on waſte lands, is an obſtruction that is extremely difficult to be ſurmounted; a ſtrength ſufficient can be ſpared to labour the waſte ground that is under cultivation, or in its progreſs towards it, at once, when the proper ſeaſon requires it, while the ſervants and horſes have employment at ſeaſons when they could not with propriety have touched the new ground. Lime or other manures can be brought in abundance for the newly cultivated fields, at the ſeaſon of the year when circumſtances render it otherwiſe moſt convenient; manures can be afforded from the farm, for bringing the waſte more quickly into tilth, than in other caſes. In ſhort, there are a variety of other leſſer circumſtances, which all tend to ſmooth the diffiulties that would otherwiſe be experienced in an undertaking of this ſort.

How to bring waſte lands as ſoon as poſſible into the ſtate of profitable graſs lands.—The object that an improver of waſte lands ought to have chiefly in view, ſhould be, to have it laid down into *profitable* graſs land as ſoon as that can be *properly* accompliſhed; for the moment it is laid into graſs, in theſe circumſtances, it ceaſes to be a burthen upon the operator: it no longer requires manures, but rather furniſhes manure to the leſs improved fields; and affords, at the ſame time, food for the beaſts that are required for the proper management of the land.

But do not omit to obſerve, that it ought not to be laid into graſs, until this can be *properly* done. No ground can ever be laid into graſs with a judicious attention to economy, but when it is in a ſtate of great productiveneſs and high *tilth*. I know not any one branch of huſbandry in which more people err than in that which reſpects the laying down ground into graſs. When agriculture was in its infancy in this iſland, an idea ſeemed to prevail, that no ground, which ever had been under tillage, ſhould be laid down to graſs, ſo long as it was capable of producing a crop of grain that would pay for ſeed and labour. That notion is now pretty much exploded; but even, at this hour, there are only a few

perſons who are ſufficiently aware of the very great difference of profit that the farmer is able to draw in the courſe of a ſeries of years, from a field laid out to graſs, in the *richeſt ſtate poſſible*, or in moderate condition only. Were I here to ſtate this particular to the *full* extent, it would appear to be exaggeration, for which reaſon I omit it: but I hope the inexperienced reader will take my word for it, when I ſay that it is much greater than he can eaſily imagine; and that, therefore, he ſhould be very cautious never to looſe ſight of this maxim, in his attempts to reclaiming waſte lands.

The neceſſity of not attempting to do too much inculcated.—To obtain that high degree of fertility as quickly as poſſible, the undertaker ſhould be cautious not to puſh forward with his improvements faſter than the circumſtances he is in will permit: and, in particular, never to go beyond the bounds that the manures he can command are ſufficient to accompliſh *compleatly*. More people have been ruined, in enterpriſes of this ſort, by attempting to do *too much*, than by any other circumſtance whatever. There is ſomething ſo pleaſing in the idea of going forward with rapidity, that many ſenſible men have

been ſeduced by it to their own undoing. "Do "what you do *compleatly*," is the maxim of wiſdom in this caſe. If you can do twenty acres well in a ſeaſon, good, go on with it. But if you are ſtinted in manures, go juſt as far as they go, giving a full, rather an under allowance; but go not an inch farther. If theſe cover ten acres, five acres, one acre only, ſeek to do no more. this will repay your expences fully, and afford you pleaſure as well as profit. But to beſtow much labour and expence on a large ſurface of unproductive ſoil, is attended with great waſte of funds; and the hungry appearance of the crops is irkſome to behold.

Lime, the moſt univerſal manure for unproductive lands.—Of all the manures that can be obtained for improving waſte lands, nothing is equal to lime, or other calcareous matters. In every undertaking of this ſort, therefore, the firſt conſideration ought to be, where can lime be obtained *(i)*, at what price, and in what quantities? Unleſs this or ſome other calcareous manure, can be obtained in ſufficient quantity, and at a reaſonable price, I ſhould conſider the improvement of an unproductive waſte of conſiderable extent, as a very hopeleſs undertaking; but where that

manure can be obtained in abundance, and at a cheap rate, there are very few ſoils ſo barren, as, under a proper management, may not by degrees be very much meliorated.

But lime, *on poor* ſoils, is a trifling and ineffacious manure, unleſs where it is applied *in very conſiderable quantities at once*. A chaldron, or half a chaldron *per* acre, I ſhould conſider as nearly as efficacious, in this caſe, as ſprinkling a pinch of ſnuff. Six hundred buſhels of ſlacked lime *per* acre, I ſhould conſider as not an overdoſe; and leſs than three hundred I ſhould account too little, in almoſt any caſe.

Great as this quantity of manure may appear to ſome perſons, I ſhould by no means conſider it alone as an abundant dreſſing for poor ground, newly broke up from waſte fields. To bring it into the proper heart, I would require, if it *can be obtained*, from 50 to 60 cart-loads of yard dung, as much as two horſes can properly draw upon ploughed land, *per* acre. With this dreſſing, if the ground be not brought into proper tilth, the ſoil will be very indifferent indeed, and ſubjected to bad management, if it be not made fertile for ever.

Dung ought to be conjoined with lime.—Many perſons will think it unneceſſary to employ both dung and lime at the ſame time; as they would think that either of them ſeparately would be ſufficient. This is upon the *ſtarvation* ſyſtem, which I conſider as the bane of farming. The fact is, that when lime and dung are thus conjoined, (I do not mean to ſay mixed together, before being uſed, but only employed in the ſame ſeaſon), they produce more powerful and aggregate effects, than if either had been ſeparately applied: ſo that much benefit reſults from this practice. Lime, as I have elſewhere ſaid, [Agricultural account of Aberdeenſhire, and Eſſay on Quick-lime as a manure, in the firſt volume of theſe eſſays], acts both as an alterative and a fertilizer. In its alterative capacity, it not only enables the ſoil to produce crops it never otherwiſe could have yielded; but it alſo enables dung to operate upon the ſoil, in a manner it never otherwiſe would have done. Of the two, lime alone is better than dung alone, on unproductive ſoils. I have ſeen ſome ſoils on which dung alone produced very little effect.

To apply theſe manures, then, in *great quantities together*, is beneficial; but it is chiefly beneficial, if care be taken not to exhauſt the ſoil

after it has been thus enriched, before it be laid down into graſs. This I hold to be a fundamental maxim in farming,—"Where you have waſte grounds to improve, take the earlieſt opportunity you can to enrich your ground to the full; and when you have it ſo enriched, and brought into proper tilth, lay it down immediately into graſs, to remain in that ſtate till you have brought the whole of your fields into the ſame condition."

Newly broke up land ſhould be kept under tillage, for ſome time, and old corn land laid into graſs.—But before ground that has been broke up from the ſtate of waſtes, can be laid into graſs with full advantage, even after this abundant manuring, certain precautions are neceſſary, which ought by no means to be overlooked. Moſt land that never has been cultivated is, to a certain degree, in a ſour crude ſtate, that renders it unkindly, in a ſpecial degree, for the production of *graſs*. To fit it for that purpoſe in the moſt perfect manner, frequent plowing, long expoſure to the air, and repeated dungings, are required. In the ſituation here deſcribed, this can often be done by converting part of the old arable farm into graſs, and continuing the new broke up lands for ſome time in tillage, under a judici-

ous rotation of crops, and an enriching ſyſtem of management. This ſyſtem of making an interchange between graſs and corn land, is extremely beneficial: for old corn land, that has been unfit in ſome meaſure, for the production of healthy grain, and abounds in deſtructive weeds, which are extremely prejudicial to the farmer, is in the very fitteſt ſtate that can be deviſed for the production of fine graſs, on the ſuppoſition that it gets a proper dreſſing to free it from root weeds, and is abundantly enriched with manure at the time; and newly broke up land, under a proper management, is, on the contrary, much better fitted to produce healthy, firm, and luxuriant crops of corn than graſs.

Summer-fallowing,—uſes of it.—But as it may frequently happen that manures, for keeping the ground under crops for a length of time, cannot be obtained, it is neceſſary for the cultivator to try to bring theſe crude ſoils into a proper tilth for graſs, as quickly as poſſible; and his operations muſt be adapted for that end. Summer-fallow is the moſt obvious meaſure for this purpoſe; and, in moſt caſes, the operations muſt be commenced by that proceſs. If the ſoil be very mellow, and the ſeaſon favourable, perhaps it may

be poſſible, if the ground be broke up early in the ſeaſon, to get it reduced ſo far in the beginning of ſummer, as to admit of its being ſown with turnips that ſeaſon; but this will ſeldom be the caſe; and, in general, it will be better to give it a compleat year of fallow firſt, and content yourſelf with taking a crop of turnips the ſecond ſeaſon only, by which time the field will be reduced to that huſband-like ſtate, which a good farmer ought ever to aim at.

Deep ſtirring of the ſoil, importance of.—In whichever of theſe ways the ground is to be managed, it ought to be an invariable rule, to make the *ſecond* plowing as deep as the nature of the ſoil and other circumſtances will admit. If the ſubſoil be retentive, and the ſtratum below of a good quality, eſpecially if it be better than that which lies on the ſurface, (which is a very common caſe where heath abounds,) it ought, on this occaſion, to be opened up to the depth of twelve inches at leaſt; and, if it be to fourteen or ſixteen inches, the ſoil being ſtill good, ſo much the better.

Trenching, its utility.—No plough, in ſuch ſtiff ſoils, will be capable of going to ſuch a

depth at once; and, therefore, reliance muſt be had upon other aids for that purpoſe. Where ſtones are at all to be found, this operation will be beſt performed by a clean trenching with the ſpade. Where ſtones are wanting, and the mold moderately friable, it may be done by means of two ſtrong ploughs, the one following the other in the ſame furrow. In this caſe, the firſt plough muſt have its mold-board ſo ſet as to make a very wide furrow; and the plough that is to follow it, ought to have a narrower mold-board, ſo as to lift up the earth, looſened by its ſhare, to the top of the other furrow. But if the bottom be ſtiff, and there be any obſtructions, inſtead of the ſecond plough, it will be more adviſeable to have it done by the ſpade. To do this, the whole length of the furrow ſhould be divided into equal portions, and allotted to different men, each perſon being obliged to have his portion cleared out by the time the plough comes round. This is not a very expenſive operation; as I have found, that from ſix to ten men, in proportion to the hardneſs of the ſoil, and the alertneſs of the operators, will be ſufficient to looſen the bottom as faſt as one plough can turn over the ſurface.

The Miner, its uſes.—But where the ſurface ſoil is better than that which would come to be

turned uppermoſt by the trenching proceſs, eſpecially if that difference be conſiderable, it may be prudent to omit it; but never omit opening the ſoil to the propoſed depth, if it can be done at all. In this caſe, it will be adviſeable to make uſe of an implement that has been lately introduced into Lancaſhire, under the name of a MINER. It is a ſtrong kind of plough, having a ſhare only, without a mold-board for raiſing the earth; ſo that it looſens, without turning up the ſoil, (and to do this the more effectually, ſometimes two ſhares, or coulters, [cutters] are added.) This implement is made to follow the plough in the ſame tract, ſo as to penetrate to a conſiderable depth below the bottom of the furrow. I conſider this to be one of the moſt uſeful implements that has of late been introduced into the practice of agriculture, which every farmer, who has a ſoil capable of admitting it to work, ſhould have.

A particular kind of wet ſoils, how to drain and cultivate.—I am thus particular in expreſſing a ſolicitude about this deep looſening of the mold, becauſe I have remarked innumerable bad effects that have reſulted from the general want of attention, which prevails throughout

every part of the iſland to this particular.—Where the mold has only been opened to the depth of a few inches above a ſtiff clay, or other retentive ſubſoil, obſerve the conſequences!—Whenever rain falls in great quantities, a great part of it muſt be quickly carried off, or the ſoil will be drowned, and rendered unfit for the purpoſes of vegetation, in whatever ſtate it may be in other reſpects. For this reaſon, every farmer is aware of the neceſſity of having a ſufficient number of open furrows upon all retentive ſoils, for carrying that ſuperfluous water as quickly and compleatly off the ground as poſſible.—This water flows partly along the ſurface, until it falls into the furrows, and it partly ſinks through the mold till it reaches the open furrow; but unleſs it be during very heavy daſhes of rain, the greateſt part of the moiſture ſinks gradually through the pervious mold, until it meets with the impervious ſubſtratum that lies below it. When the water reaches that ſubſtratum, it forms a kind of ſubterranean lake, which finds no iſſue, until by its gravity it forces for itſelf a paſſage laterally through the crannies of the mold, till it at laſt reaches the open furrows prepared for that purpoſe, which afford it then a ready outlet, through which it can flow off the ground. In

theſe circumſtances, it is obvious that the portion of the mold which lies immediately contiguous to the ſubſtratum, muſt be, for ſome inches in depth, more or leſs in proportion to the quantity of rain, and the tenacity of the ſoil, in a ſtate of bog or watery quagg, that is unfit for ſuſtaining any of thoſe plants which it is the aim of the huſbandman to cultivate in this climate. In this ſtate, too, the mold there being ſo long ſoaked in water, and ſo frequently drenched by it, muſt have every material it contains that is ſoluble in water, compleatly waſhed out of it in a very ſhort time, and its particles ſo frequently and thoroughly ſoaked, as to reduce it to a kind of paſte, fitter to be converted into a brick on drying, than to become a friable mold. If the earth be looſened by the plough, only for a few inches depth on the ſurface of ſuch ſoils, the whole of this paſting proceſs muſt take place among the only mold in which the plants that grow upon it, can ſeek their nouriſhment; ſo that this ſoil muſt be at one time in the ſtate of a pap, that would be too thin for the mortar in a maſon's tub; and, at another time, it muſt be as dry, and nearly as hard, as a ſun-made brick. In this condition, what ſort of crops can be expected of any kind? It is this ſort of management which, for the moſt part, is

the cauſe of that kind of ſtarved unproductiveneſs of ſoil, which is known among farmers by the name of *hide-bound*, which many men believe it would be throwing away money to attempt to reclaim. And it is certainly true that, ſo long as men ſhall continue the practice of ſuch ſcratching of plowing, as that I here take notice of, they judge rightly. But under the ſyſtem of management above deſcribed, many of theſe ſoils may, in time, be rendered amongſt the moſt productive in the iſland, and with great profit too to the judicious operator.

When the ſoil is opened up by the proceſſes recommended above, it is rendered pervious to water to the whole of the depth to which it is looſened; while at the ſame time, the water is allowed to find its way off the ground at a depth ſo far below the ſurface, as not to injure that portion of the mold in which the principal roots of the plants abound. Indeed, a great part of that moiſture, in theſe circumſtances, never finds its way off the ground at all; but ſoaking gradually downwards, that water, which, if it had only been allowed to ſink three inches, muſt ſoon have reached the bottom, and there have been regorged back upon the ſoil, will require at leaſt five times as long a period to ſink to fifteen inches

deep, and in its progreſs will be only gradually moiſtening, inſtead of drenching the ſoil; ſo that if the rain ſhall ſubſide before it has reached the bottom, no part of that water will be carried off the field, unleſs what flows over the ſurface; but it will there remain to moiſten the earth only to a ſalutary degree; and, like the water in the ſtomach of the camel, will afford a ſupply when drought comes on and parches the ſurface of the ground: for the deep fibres of the roots penetrating downwards, there will find moiſture, which thoſe near the ſurface would then be deprived of. Thus does the practice recommended operate alike as a cure for the exceſs of wet as of drought, and produces a healthy vegetation in all circumſtances. One would wonder, that ſeeing the effects of this proceſs ſo univerſally in our gardens, to which theſe owe in a great meaſure their ſuperior degree of fertility, men ſhould ſo ſeldom have adverted to the benefits they would derive from the ſame proceſs being extended to the fields. They ſee that in gardens, even where the ſoil is very retentive, good crops are produced without water furrows at all; whereas, in fields of the ſame nature, they know that nothing of this ſort could be expected. The rationale of this phenomenon being now explained,

it will be no longer a myſtery to any one; and it is to be hoped the Board of Agriculture will purſue ſuch meaſures as ſhall render it practicable for the agriculturiſt to adopt it univerſally, where neceſſary; which it certainly is not in his power to do, throughout the greateſt part of England, under the preſent ſyſtem of management.

Deep plowing, on ordinary occaſions, not neceſſary.—But though the benefits to be derived from the opening up of the ſoil to the depth propoſed be very apparent, I conceive it by no means neceſſary to attempt to plough, on ordinary occaſions, to a great depth: on the contrary, unleſs it be for very particular purpoſes, if the *miner* be from time to time employed for looſening the ſoil to a proper depth, I am ſatisfied that ſhallow ploughing would be, for the moſt part, more beneficial than the reverſe. In that caſe, the ſurface-ſoil, in which all ſeeds muſt germinate, and draw their nouriſhment for a conſiderable period of their growth, will be rendered much more fertile by the ſame quantity of manure, than if it were mixed with a much greater depth of mold; and as it is known that the fertilizing qualities of all manures are carried downward by moiſture, where the ſoil is ſo porous as to admit

of a ſlow abſorption of that water, the under-ſoil will gradually become more fertile by this proceſs, which will ſtill tend to nouriſh the crop. From theſe conſiderations, inſtead of adviſing the manures to be buried to a great depth, by very deep plowing, I ſhould much rather recommend, when the trenching or mining proceſs is connected with it, that the plowing ſhould be of a moderate depth. Though on retentive ſoils, where that practice is omitted, deep plowing is doubtleſs extremely neceſſary.

Lime ought to be ſpread while in a dry powdery ſtate.—In every caſe, the ſooner the lime is laid upon the ſoil, after the trenching proceſs has been compleated and the ſurface ſmoothed, and the more quickly and intimately it can be blended with the mold, the better it will be on every account. For as the lime never acts till it becomes blended with the ſoil, and acts the more powerfully in proportion as this mixing is the more compleat, it ſhould be applied as early as poſſible, that it may have the full benefit of the ſubſequent plowings for blending it thoroughly. For the ſame reaſons, the lime ſhould always be ſpread while it is yet in its dry and powdery ſtate, and ſhould be plowed or harrowed in as

ſoon as poſſible after it is ſpread, to prevent it running into clots by moiſture; as theſe become afterwards ſtoney maſſes that never can be properly divided. I take notice of this circumſtance ſpecially, becauſe I have obſerved that it is a very common practice to lay down lime that has been brought home in the ſtate of ſhells, in heaps to ſlack by the air; in which caſe, it ſeldom fails to be converted into the clotty ſtate I here reprehend; and in which it will not produce the ſame effect upon the ſoil that half the quantity of lime, judiciouſly applied, would have done. To lay down the ſhells where water can be had for ſlacking them, and driving the lime to the field as ſoon as ſlacked, can uſually be done at a ſmall additional expence, which will be repaid more than an hundred fold by the ſuperior luxuriance perhaps of even the very firſt crop only: ſo that the contrary practice is extremely uneconomical.

Turnip a proper crop for unmellowed ſoils.—No crop ſucceeds better on harſh unmellowed ſoils than turnip. Perhaps it thrives better on theſe, with a ſufficiency of manures, than on thoſe ſoils that have been long under cultivation. This is therefore the beſt crop for the *firſt* on all

newly broke up waſtes, that are not of too clayey a nature. It not only mellows the ſoil even perhaps more than a fallow, but affords a great deal of dung, which is an article of ineſtimable value in enterpriſes of this kind. It is a great miſtake to ſuppoſe that turnips will grow only upon light land: they thrive exceedingly well on ſtiff loams. Even upon clayey ſoils, as good turnips can be reared as on any other, particularly the Swediſh kind, called *ruta baga*; *(k)* but the difficulty of carrying them off from ſuch ſoils is an objection to their culture on that kind of ground.*(l)* By conſuming the turnips in the end of autumn, and early in winter, this inconvenience may be greatly diminiſhed; and though the profit to be derived from them, at that ſeaſon of the year, is leſs than if they could be reſerved till farther on in winter, it deſerves to be well conſidered whether this crop, with all the inconveniencies attending it, may not be more beneficial, in the particlar caſe under conſideration, than any other.

Turnips ſhould be ſown early.—In all caſes of this nature, the turnips ought to be drilled, and thoroughly horſe-hoed. The dung ſhould be applied in the drills immediately before ſowing.

It is unneceſſary to be more particular here, in regard to the culture of this crop. I ſhall only barely obſerve, that it is of great uſe, in every caſe of this nature, to ſow the turnips very early in June; as thus the crop will never fail to be much larger than if ſown later. The apprehenſion that early ſown turnips run ſooner to ſeed in the ſpring, than thoſe that were ſown later, is a mere groundleſs chimera, that has too long diſgraced our books of agriculture. If turnips do not ſhoot during the ſummer in which they are ſown, (which will ſeldom happen, if not ſown before the middle of May,) they will be juſt as late of ſhooting in the ſpring, as if the ſeeds were ſown in Auguſt or September.

Two crops of turnips may be taken in ſucceſſion.—Turnips are ſo uſeful an article in improving waſte lands, that, in many caſes, it may be adviſeable to take even two crops of theſe in ſucceſſion, from the ſame land, one year after the other. This will reduce it into fine tilth, and render it in excellent condition to be laid down with graſs ſeeds, along with the firſt corn crop.

Peaſe or vetches may be ſown on ſtiff ſoils.—Where turnips cannot be ventured, peaſe or

vetches may be adopted in their ſtead. This never ſhould be attempted, except in ſtiff ſoils; and here, thoſe kinds which run much to haulm ſhould be preferred. The longer the lime has been applied to the ground, and the more thoroughly it has been mixed with the ſoil before the peaſe are ſown, the better. The dung ſhould be plowed in with the ſeed furrow. The ſeed may be either drilled or ſown broad-caſt; but if there be no danger of their failing, broad-caſt is fully as adviſeable, for, in ſoils of this nature, few weeds are ever to be found. Potatoes may alſo, in many caſes, be advantageouſly reared as a firſt crop from waſte lands.

Oats ſucceed well on crude ſoils.—The culmiferous crop that ſucceeds beſt on unmellowed new ground, is oats. If the ground has been ſufficiently manured, this crop will ſeldom fail to be an abundant one, even where the culture has not been ſo perfect as could be wiſhed. If the ſoil has been made very mellow, barley will alſo ſucceed tolerably. Rye, I have been told, does very well, and may on ſome occaſions be adopted, where a market for it can be found; but, upon the whole, oats will, in moſt caſes, prove the moſt profitable crop. It frequently

happens in England, that *wheat* is ſown for the firſt crop, after even an imperfect fallow. No farmer can ſurely ſtand in need of directions how to manage ground that can produce a good crop of wheat under theſe circumſtances. It is a ſevere reflection upon the country to ſay, that any land, of a quality that can afford a tolerable crop of wheat in theſe circumſtances, ſhould have been ſuffered to remain till our time under the diſgraceful denomination of waſtes.

Graſs ſeeds ſhould be ſown with the firſt corn crop.—Along with the firſt corn crop where the improver of waſte lands has not the conveniency of an adjoining farm to permit the newly cultivated lands being continued for ſome time in corn, as already ſpecified, graſs ſeeds ſhould be ſown, with an intention to allow the field to remain in graſs till the whole portion of waſte has been brought under culture. After which the ſkilful farmer, if he ſee it neceſſary, may go over it with a ſecond ſeries of dreſſings to make it ſtill richer graſs than before. But it is foreign to our purpoſe, to purſue this proceſs farther in this place.

The kinds of graſs ſeed I would adviſe to be ſown in theſe circumſtances, are white clover,

(ten pounds,) yellow clover, (ten pounds,) and clean rye graſs ſeeds, (two buſhels per acre.) If yarrow ſeeds were to be bought, I ſhould adviſe four or five pounds of theſe to be added; diminiſhing, in that caſe, half a buſhel of the rye graſs: and if it were ſpungy moſſy land, tending to damp, ſix or eight pounds of rib graſs may be ſubſtituted in place of ſo much of the yellow clover. The poa graſſes, and ſome others, are good; but there is a difficulty in procuring the ſeeds, which I fear will not be eaſily overcome.

My reaſon for omitting red clover, is, not that it would not proſper in ſuch ſoils: for in theſe circumſtances it would thrive very well; but becauſe it is a ſhort lived plant, and ſoon dies out; and as its broad leaves, where it does thrive, overſhadow the other graſſes, it is apt to choak them; ſo that when it wears out, it leaves the ſoil bare of plants, which encourages weeds and uſeleſs graſſes to come up in its ſtead: but as it is an excellent graſs for ſoiling horſes, if cut and uſed green during the ſummer, as much ground may be ſown with red clover as ſhall be ſufficient for their uſe, if the undertaker ſo incline; but never omit a ſmall ſprinkling of rye-graſs among it, which will not only augment the quantity of produce, but alſo bring it ſome weeks more early in the ſpring than it would have been.

Rye-graſs recommended.—I am alſo aware of the averſion that ſome perſons have againſt rye-graſs: but as I am ſatisfied, from long experience and accurate obſervation, that there is no ſufficient foundation for this prejudice, I ſhould think I betrayed the truſt repoſed in me, did I allow it to influence me on the preſent occaſion. Beſides the recommendation of this graſs, from the facility of obtaining its ſeeds, it has ſo many other valuable qualities to recommend it, that I conſider every circumſtance which tends to circumſcribe its uſe as a national misfortune. It is a graſs that is liked by almoſt every domeſtic animal above all others. It ſprings up very early in the ſeaſon, furniſhes a vaſt abundance of herbage, and thrives on almoſt every ſoil. On very poor lands, indeed, it produces a much more ſcanty crop than on ſuch as are richer; and on all ſuch occaſions, if it be not eaten down very cloſe in the beginning of the ſeaſon, it is apt to run up to ſeed; after which the ſtalks, like the ſeed ſtalks of every other kind of *gramen* I know, are diſreliſhed by cattle. Under the management of a ſloven, then it may be allowed to run to waſte; as the beſt paſtures even in Romney marſh may alſo be, to the great detriment of the owner, if not adverted

to in time; But if it be hard enough ſtocked, eſpecially *in the ſpring*, which is not a matter of great difficulty, it will continue to afford ſweet and ſucculent herbage throughout the whole remaining part of the ſeaſon: ſo that he who ſuffers by this neglect has only himſelf to blame, and not the plant he has injudiciouſly cultivated.

Some perſons will perhaps think the quantity of ſeeds above recommended, more than neceſſary. Certainly leſs might do; but experience has taught me that, on an average, more profit will be derived from this abundant ſeeding, than the reverſe.

The practice of ſowing all kinds of rubbiſh promiſcuouſly, under the name of *hay ſeeds*, is now ſo univerſally exploded, by all ſenſible men who have had opportunities of being fully informed, as renders it unneceſſary for me to ſay any thing particular on that head.

Burnbeaking, caſes in which it may be ſucceſsfully adopted.—Where the ſurface of waſte grounds to be improved is covered with a thick coat of the *nardus ſtricta*, and other dry benty kinds of graſs, it will often prove beneficial to pare and burn that ſurface; and, therefore, in theſe circumſtances, a good economiſt ought not

to overlook this mean of forwarding his operations. I am no ſtranger to the prejudice that prevails among many writers of the preſent day againſt this practice; but this, I conceive, in a great meaſure, owes its origin to haſty obſervation, which does not admit of diſcriminating fairly between the proper uſe and the abuſe of this practice. It is an undoubted fact, confirmed by the experience of many practical farmers, that on many poor ſoils, a crop may be thus obtained much more abundant than could be obtained without it. This fact, and it is an important one, is admitted even by thoſe who oppoſe the practice. It is well known by every practical farmer, that an abundant crop of any kind, under judicious management, is one of the moſt certain means of laying the foundation for future crops; and in cultivating waſte grounds, it is a great point gained to obtain a good crop at the commencement of theſe operations.

Burning does not conſume the mold, nor change the ſoil of waſte grounds for the worſe.—As to the idea, which ſeems to influence the opinion of many of theſe writers, that this practice tends to deſtroy the ſoil itſelf, and thus to render it thinner than it would be, it plainly originates from miſconcep-

tion; and is directly contradicted by experience. No kind of earth, properly ſo called, [I exclude peat earth, commonly called moſs, from the claſs of earths properly ſo denominated; ſo that it is to be here conſidered as an exception.] is capable of being conſumed by fire. All that the fire does, in the proceſs of *denſiring*, or *burn-beaking*, as it is indiſcriminately called, is to conſume the dried vegetable fibres which were intermixed among the ſoil; during which proceſs a ſmall proportion of alkaline ſalt is generated, which is known to act very powerfully as a manure; and the earth that was entangled among theſe roots, in conſequence of the incineration, is dried, and reduced to a powdery ſtate, but neitheris deſtroyed nor reduced in quantity. The qualities of this earth may, indeed, by this proceſs, be ſometimes a little altered; but, in the circumſtances here ſtated that alteration, it ſhould ſeem, could ſeldom be for the worſe. The kind of earth that is the moſt altered by the action of fire, is clay. Inſtead of remaining ſuſceptible of being very much ſoftened by water, clay, by this proceſs, is rendered incapable of being thus acted upon. A ſmall proportion of powdery brick earth thus obtained, mixed with the retentive mold, has apparently a beneficial tendency to divide it, and render the

ſoil more mellow. Theſe and other conſiderations, make me lean to the ſide of experience, in this caſe, with leſs difficulty than I otherwiſe might have done; and I ſhould have no heſitation in recommending the practice as beneficial, in the circumſtances above ſpecified.

The ſurface only may be burned, though the ſoil be deep ploughed.—The greateſt objection to it, in this caſe, is the difficulty of ſtirring the mold to a ſufficient depth before the incineration is effected; for experience univerſally confirms the propriety of giving only a very ſlight plowing after that proceſs, before the ſeeds are ſown. To effect both theſe purpoſes at once, a ſkim plough might be eaſily contrived, which ſhould pare off the ſurface where the ground was free of ſtones, to a moderate thickneſs, and, by having a horizontal ledge projecting beyond the bottom of a part of the mold-board, thus carry the thin ſwardy ſurface over the *open* furrow to the right hand ſide, and lay it on the top of the earth that had been turned over beyond it, as ſhall juſt now be deſcribed. After the ſurface has been thus pared off and diſpoſed of, another plough ſhould follow in the ſame tract, and turn the bottom earth over into the open furrow, on the right-

hand ſide, as in common plowing; and this may be deepened by the ſpade, or otherwiſe, to any degree thought neceſſary, without burying the ſward in the ſmalleſt degree. By this mode of management, the ſward may be dried and burnt perfectly well, and the earth be properly looſened at the ſame time. If that ſward be properly burned and ſpread in due time, and if lime be mixed with it, and ſlightly plowed in for turnips, an abundant crop will thus be obtained the firſt year, without any dung. This good crop of turnips will afford a great quantity of dung, while the ſoil will, in the mean time, be more mellowed than if it had been left under a bare ſummer-fallow. If the ſame field be next year dunged and ſown with turnips, it will afford a ſtill more abundant crop; and the ſoil will by this time be reduced into the moſt excellent tilth for being laid into graſs with the ſucceeding corn-crop; after which it muſt be the farmer's fault, if ever in future it can be put out of order. It is not, however, my province here to proceed farther in the mode of management of ſuch land.

Burning old corn land may prove hurtful.—But although I conſider the practice of burning the ſurface of barren *waſte* ſoils, which are not of

a moſſy nature, wherever the plants on the ſurface are abundant, as exceedingly beneficial, I confeſs I have my doubts about the propriety of extending this practice to ſuch ſoils as have been already fertilized by manures, and brought into proper tilth. All kinds of earth, though they be in their original ſtate, when dug from a great depth, infertile, become more fertile by degrees, on being expoſed to the air on the ſurface, when impregnated by manures, and the gradual rotting of the roots of plants that grow upon them, along with the intermixture of the remains of animals which die there. They are thus in time converted into that kind of ſubſtance which we call *vegetable mold*. This vegetable mold, then, is neither a ſimple earth, nor a mixture of any number of ſimple earths together. But it is ſuch a mixture, impregnated with the remains of animal and vegetable matters united with them. Theſe remains of organized bodies communicate ſomething to the ſoil of an apparently oily or mucilaginous nature. Along with the fertility which it is ſeen to acquire, theſe give it a more friable texture, and a greater facility than it originally poſſeſſed, of abſorbing water in a proper manner, and retaining it to a certain degree. Now, there ſeems to be little reaſon to doubt that fire tends to alter, deſtroy, or

diſſipate this mucilaginous quality which the mold derives from the ſpontaneous corruption of organiſed bodies. So that wherever the ſoil has been gradually fertilized by this proceſs, there ſeems reaſon to fear that the burning of its ſward will rather prove hurtful than beneficial.

But while I thus develope, as clearly as I can, the reaſons that would make me doubt of the propriety of the practice of burning, in theſe circumſtances, it is proper the reader ſhould be at the ſame time warned that theſe are only reaſons for doubting, but by no means rules for practice. Practical rules ſhould on all occaſions be deduced from well authenticated facts alone; and I have had no opportunity of meeting with any facts I could rely upon, that either tend to confirm or to refute this mode of reaſoning. I give it, therefore, as merely hypothetical, and as ſerving to direct the attention to a proper object of experimental enquiry, and nothing more. Human reaſon is by far too fallacious a guide to be relied upon in matters of this kind, as a *practical director*; though it is an excellent aſſiſtant for leading the mind into a proper train of inveſtigation.

Burning moſſy ſoils, a dangerous practice.—I do not ſpeak with the ſame reſerve in regard

to the impropriety of burning *moſſy* ſoils; of the very hurtful tendency of which I have had innumerable practical proofs. In this caſe, it is not the plants which grow upon it, but the very ſubſtance itſelf that ſerved as a ſoil on which the plants grew, that is totally deſtroyed by incineration. This ſubſtance is, by burn-beaking, amazingly diminiſhed in quantity; and the little that remains, inſtead of ſoil, after this deſtructive proceſs, is an inert earth, which is more unfit for the purpoſes of vegetation than any other that has ever fallen under my obſervation. I therefore conſider the burning of this kind of ſoil, as in all caſes pernicious; but particularly ſo, where there is no certain means of eaſily ſtopping the combuſtion, after a thin paring of the ſurface-ſward has been conſumed; and to ſtop it juſt there is, I know, a thing that is next to impracticable. For the proper means of meliorating peat, and converting it into fertile ſoil, I beg leave to refer the reader to a practical treatiſe on peat moſs lately publiſhed by me; as it would take up too much room to recapitulate the whole proceſs in this place. It is only neceſſary here to obſerve, that of all the kinds of barren waſtes, the improvement of this variety, under a judicious ſyſtem of

management, can be effected with perhaps leſs difficulty than that of any other.

Stiff clayey ſoils difficult to be brought into cultivation.—The moſt hopeleſs ſoil for an unlucky adventurer to begin to work upon, while it is yet in a rude and unproductive ſtate, is that of a ſtiff, coherent, obdurate clay. This kind of ſoil, though it be phyſically capable of being rendered perhaps the moſt productive of any that can be found; requires, when in a poor ſtate, ſuch nicety of management, ſuch repeated additions of manures in vaſt quantities, and ſuch an enormous expence in the cultivation of it, as to make any man of ſound ſenſe heſitate about engaging in attempting to improve it at all, unleſs under very particular circumſtances. When circumſtances, however, are favourable, it may be ſometimes done under the care of a very ſkilful operator, with great advantage.

The expence of cultivating ſuch ſoils often proves ruinous.—In every poſſible combination of circumſtances, where a *whole farm* conſiſts of this kind of ſoil, it muſt be managed at a vaſt expence. On account of the ſtiffneſs of the ſoil, the implements of agriculture muſt be ſtrong and

weighty, and, of courſe, the ſtrength required to draw them muſt be great. But this is not the worſt evil. On account of the neceſſity of catching the moſt favourable *tid* (*m*) for labouring the ſoil, or of loſing the whole crop, the time of plowing is limited to a very few weeks only; ſo that to perform the ſame quantity of work upon this kind of ſoil *in a proper manner*, will require more than *ten* times the number of ſervants and beaſts of labour, that would be wanted on a farm of equal extent, conſiſting of light friable mold: ſo that if the operator has not ſome other way of employing his force in the intervals, they muſt be idle; which will ſoon eat up the profits that can be derived from the moſt abundant crops. To diminiſh this expence, the unfortunate operator ſometimes finds himſelf tempted to try to labour his ground when it is *not* in the moſt proper circumſtances as to *tid*, which infallibly diminiſhes his crop to an aſtoniſhing degree. In this way, I have known ſeveral unlucky perſons reduced to bankruptcy, in farming ſoils, that undiſtinguiſhing obſervers would call ſoils of the beſt quality; becauſe they would ſometimes ſee upon them the moſt weighty crops they had ever obſerved. Theſe people do not advert, that though a guinea be a very good thing, the man who is obliged to

pay two and twenty ſhillings for every one of them that he obtains, will very ſoon be reduced to the neceſſity of purchaſing no more of them.

If a little of that kind of ſtiff land can be joined as an appendage to a farm of conſiderable extent of light friable mold, it may become a valuable addition to it; becauſe the operator will thus have employment for his ſervants and beaſts at all times, and when the proper *tid* arrives for labouring his ſtiff lands, he can turn his whole force upon it, ſo as to labour it juſt in the nick of time that is neceſſary to inſure a ſuperabundant crop. Under theſe circumſtances, ſuch land, in the hands of a ſkilful farmer, becomes a treaſure of great value: but it is only under circumſtances ſimilar to this, that the full benefit can ever be derived from ſuch a ſoil. More need not here be ſaid on the ſubject of improving lands of this deſcription by means of tillage.

§ II.

PART SECOND.

On the cultivation of waſte lands, as not *connected with a farm.*

ALL that has been ſaid above reſpects the improvement of waſte lands when they are connected with an adjoining farm, or in other circumſtances where animal dung can be brought upon them from without. If no recourſe can be had but to the waſte land itſelf for animal manures, its improvement becomes much more difficult; and other meaſures for accompliſhing it muſt be adopted.

Temporary meaſures neceſſary to be adopted at the beginning of ſuch operations.—If a man were to form a deliberate plan of ſetting himſelf down upon an extenſive unproductive waſte, with a view to cultivate it, he would find himſelf under very uncomfortable circumſtances for ſome time at the firſt, whatever were the amount of his

funds. Houſes muſt be, in the firſt place, erected, and ſome of the land muſt be cultivated; but where is he to find food for ſuſtaining the beaſts that are neceſſary for theſe operations, before his crops come in to furniſh that food? This is a very ſerious conſideration to which he muſt advert, and which muſt be obviated before he begins his operations, otherwiſe he will be ſubjected to great difficulties, beſides accumulated expences and loſſes, that may prove ruinous. In general, he will find it ſafeſt for him, and cheapeſt, to prevail upon ſome of the neareſt farmers to perform ſome of theſe neceſſary initiatory operations for hire, on ſuch terms as he can engage them; and keep as few beaſts of labour of his own as poſſible, until he get ſome crop to ſuſtain them. In this caſe he muſt content himſelf at firſt with doing not what he could wiſh, but what he can do; ſo that he may be obliged to take a crop or two, perhaps, without dunging, after liming only: but from this mode of procedure he ſhould deſiſt the moment he can find abundant ſubſiſtence for his working beaſts; and begin as ſoon as poſſible to put his fields into ſubſtantial good order, by dunging thoſe fields that have been limed, and laying them into graſs. Whenever he has got abundance of food for his working beaſts, his greateſt

difficulty is overcome; and provided his purſe holds out, he may then go on without much difficulty, by adhering to the following plan of procedure.

The natural produce of waſte lands conſumed by ſheep.—There are very few ſoils ſo barren but they afford ſome herbage upon which animals of one ſort or other may be ſuſtained. Sheep are the ſtock that are beſt fitted for the moſt barren ſoils; and the rearing of ſheep in general, is the uſe to which ſuch ſoils are applied in their natural ſtate. A farm of ſuch bare paſture to be capable of ſuſtaining a flock of ſheep ſo large as to pay for the expence of a ſkilful ſhepherd to attend them, without which no ſheep can ever thrive, muſt be of very conſiderable extent. But whatever be its extent, if the dung of theſe creatures be properly collected, and judiciouſly applied, along with lime, aided by a ſkilful culture and good management, it will furniſh the means of gradually meliorating the ſoil, and rendering it more productive of graſs as well as corn, than it ever could have been under the ſlovenly ſyſtem of management, which the bars to improvement already enumerated have rendered almoſt univerſal.

A ſlovenly practice being once introduced, it is found that inaccurate ideas come to be ſpontaneouſly engrafted upon it. All mankind know that if animal dung be laid upon any ſoil in ſufficient quantities, and properly worked into it, the ſoil will be rendered much more productive than it would have been without it: and if, when it is once brought into that productive ſtate, it be then laid into graſs, that patch will continue for an indifinite number of years, much more fertile than the adjacent ground of the very ſame quality, that has not been dunged.

From this fact, which every perſon in the country has had an opportunity of obſerving, [The little gardens made by induſtrious cottagers, which are to be ſeen in many places, on very unproductive waſtes, afford the moſt ſatisfactory examples of the fact here ſtated.] a neceſſary conſequence is, that every ſoil on which animals of any kind are ſuſtained, muſt either be in a continual ſtate of progreſſive melioration, or the effects of the dung of the animals muſt be loſt through ſome unobſerved kind of miſmanagement.

The dung of theſe ſheep a ſource of improvement.—To render this propoſition palpable, ſuppoſe a ſheep-farm that is capable of ſupporting

one thouſand ſheep. It has been aſcertained by repeated experience, that if the dung of that thouſand ſheep be carefully collected into one maſs, it will be ſufficient to manure one acre each day in a very proper manner (*n*): nor do I ſuppoſe any farmer will not be ready to admit, that, if the dung thus produced were properly mixed with the ſoil, and the field then immediately laid down into graſs, without being exhauſted by corn crops, the graſs upon ſuch dunged fields would be ſo much augmented in quantity, as to be on an average, upon ſuch poor ſoils, capable of ſuſtaining one ſheep at leaſt per acre, more than it could have done without that dunging.

If this be admitted, it will follow, that as the thouſand ſheep would afford dung for 365 acres in a year, the melioration of the ſoil in the courſe of one year, ſhould be equal to the feed of 365 ſheep. So that in the ſecond year, it ſhould, inſtead of 1000 ſheep, be capable of ſupporting 1365; and, in the third year, an addition of more than 365 might be made to that; and ſo on, in a progreſſion approaching to a geometrical *ratio*.

That no ſuch melioration as this takes place in practice, is very obvious: on the contrary, it is well known that many waſtes can ſuſtain no

more beaſts at preſent, than they could have done perhaps a thouſand years ago. Hence it follows, that the dung which has been dropped from theſe animals during the whole of that period, has been diſſipated and loſt; which, if it had been judiciouſly managed, might have been the means of a great amelioration during that time.

I do not pretend to ſay that it is practicable for any man to collect *all* the dung of the ſheep paſtured under any circumſtances, ſo as to apply it in the manner above deſcribed, to the immediate amelioration of the ſoil in the direct manner above ſpecified; and, therefore, am not ſo chimerical as to inſinuate, that an amelioration to the above degree, though phyſically poſſible, is morally practicable in any caſe. Under every ſyſtem of management, ſome waſte muſt be unavoidably incurred, becauſe ſome part of the dung muſt be caſually dropped. All I wiſh to inculcate is, that wherever dung is allowed to be dropped at random on the fields, under the circumſtances ſpecified, it either tends not at all to meliorate the ſoil, or to do it in ſuch a ſlight degree as not to be in the leaſt perceptible: [See the following Eſſay on the œconomical conſumption of the products of a farm.] Of courſe it fol-

lows, that the leſs dung that is ſuffered to be waſted in this way, the better it muſt be for the general improvement of the country, and the welfare of the community at large; and that, of courſe the neglect of this neceſſary attention is highly uneconomical; though it has been ſo little adverted to, that I make no doubt but nine out of ten who ſhall read this, will feel themſelves diſpoſed to deny the concluſion I draw, though they can neither produce a fact, nor a ſolid argument to invalidate it. I write, however, for the information of thoſe who ſhall have the patience to lend an unprejudiced and attentive ear, and not with a view to obtain the approbation of the inattentive.

The folding of ſheep has been practiſed for many ages, and ſtill is practiſed in many parts of Britain with much benefit to the owners of flocks, though it has not been any where that I know of attended to, with a view to the ſteady and progreſſive amelioration of waſte grounds, for the affecting of which the following directions may be found of ſome utility.

Lime ſhould be conjoined with it.—I ſcruple not again to repeat it, for it cannot be too ſtrongly inculcated, that lime, or other calcareous mat-

ter, applied in large quantities, muſt form the baſis of all radical improvements on waſte lands. Lime tends to ſweeten the graſſes produced on every ſoil to which it has been applied, ſo as to render them more palatable to all animals; it augments the quantum of the produce conſiderably; it thus renders the ground capable of ſuſtaining a greater number of beaſts. Theſe, of courſe, produce more dung; and that dung, if applied in conjunction with the lime, will produce greater and more laſting effects than it could have done without it. It would ſeem that Heaven, with a view to reward the induſtry of man, and to ſet no limits to the poſſible melioration of the ſoil, had diſperſed this univerſal fertilizer ſo generally over our globe, as to bring it within our reach, by the exertions of human induſtry, almoſt every where. Whatever, therefore, tends to facilitate the acquiſition of this manure to any particular place; whether by means of roads, canals, or any other device, muſt be conſidered as amongſt the moſt uſeful of human exertions. Suppoſing it to be thus attainable, our buſineſs here is to ſhow in what manner it can be the moſt economically applied for the purpoſe of improving waſte grounds.

Folding of ſheep, mode of conducting it.— Where it is propoſed to apply the dung of the animals which paſture upon waſte lands for the purpoſe of gradual amelioration, recourſe muſt be had to the fold; and lime ſhould in every poſſible caſe be adopted in aid of it. Dung, as well as lime, will always produce the beſt and quickeſt returns, when it is connected with tillage; therefore, as much of the ground ſhould be fallowed as circumſtances will admit, and limed as deſcribed in the preceding part of this chapter. Upon theſe fallows the ſheep ſhould be folded, by means of hurdles, during dry weather; and theſe hurdles ſhould be ſo moved, as to admit of the ground being plowed over as ſoon after the folding as poſſible. The mold having been previouſly deepened by the means before deſcribed, and the lime applied, it ſhould be turned over by a very ebb [ſhallow] furrow *(o)*. If the ſoil be proper for turnips, as much of it as has been dunged before the middle of May, ſhould be again plowed over, and inſtantly ſown with turnips the very day it is plowed, as ſhortly after plowing as poſſible: for no ſtate of the ſoil is, in any caſe, ſo favourable for the germination of ſeeds in this country, as that kindly moiſture which is always found in new plowed grounds, when in good

tilth. This mode of ſowing ſhould be univerſal; as it will more effectually inſure a crop from miſſing, than waiting for rain, which frequently burſts the ſeeds, and conſequently loſes the crop.

From the middle of May till the middle of Auguſt, the turnips ſhould be ſown progreſſively as the ground is dunged, always plowing and ſowing it as ſoon after dunging as poſſible.—After the middle of Auguſt, it will be unneceſſary to ſow any more turnips that ſeaſon. But if the ſoil be good, and the dunging abundant, rye, or cole-ſeed for ſpring food, or winter tares to ſucceed them, may be ſown till the month of October; after which time, it will ſeldom be practicable to fold on the fallows.

The turnips, if fed off with ſheep, will afford the ground another dunging; and it will then, in general, be ſo rich as to admit of its being laid down with graſs ſeeds, as above directed, along with the firſt crop; from which, if it be wanted, one crop of hay may be cut, and then it may be cut and conſumed green in the houſe, or paſtured. Thus will a conſiderable addition be made to the food of animals upon the farm, and with it an encreaſe of dung, which, if managed in the ſame economical manner, will augment the quantity of land that can be annually

improved, and thus accelerate the progreſs of the improvement, till in time the whole muſt be compleatly gone over in this manner, and rendered in every part much more productive than before. After this, by beginning the ſame proceſs afreſh, in which the addition of lime is not ſo neceſſary, the land will be endowed with a yet higher degree of fertility. And thus it may be gone over ſucceſſively, a ſecond, a third, or a twentieth time, ſtill advancing in its degree of fertility, till it has become as rich as can be deſired.

I make no attempt to eſtimate the quantity of ground that may be thus improved in a given time, or the rapidity with which the progreſs may be accelerated; becauſe, in a caſe of this kind, it is obvious that the facts on which theſe calculations would be grounded, muſt be aſſumed at the pleaſure of the writer. It is thus the eaſieſt thing imaginable to make the reſult be preciſely ſuch as he would wiſh it ſhould be: ſo that, without his intending it, every ſuch calculation may prove fallacious, and tend greatly to miſlead the incautious reader. Beſides, it is obvious that no calculation could be made, the reſult of which, as to the *quantum*, could be relied upon; becauſe no two caſes could be found, un-

der which, by the ſame mode of management, the reſult would be the ſame as to the *quantum*; for this muſt depend upon the nature of the ſoil, and many other indefinite circumſtances. All I aim at, by this illuſtration, is to ſhow that, under the ſyſtem of management here recommended, there muſt be a continued progreſſive amelioration in *every caſe*; though the rapidity of that progreſſion, and the proportional expence at which it can be effected, will greatly vary, according to the circumſtances of the caſe.

Neither do I enter into a minute detail of the particulars that would be neceſſary to be adverted to under this ſyſtem of management, as my object here is only to illuſtrate the general principle. Every intelligent farmer, who attends to it, will ſee that many economical precautions muſt be adopted, to enable him to derive the full benefit from the dung of his ſheep, without hurting the animals themſelves. He will ſee, that if his grounds be of large extent, it will be convenient for him to have at leaſt two folds under the fallow ſyſtem; one towards one end of his grounds, and the other towards the other. Perhaps it may be neceſſary to have more folds than two; as his ſheep ſhould never be obliged to travel farther to the fold than it would be neceſſary

for them to travel at any rate to fill their bellies; and when they have filled their bellies, he knows they muſt lie down to reſt themſelves, and chew the cud: and this they will do with leſs diſturbance in a fold, at regular periods, than in any other circumſtance. He will alſo perceive the neceſſity of having folds provided for them in convenient places, upon dry graſs ground, into which they can be put in rainy weather, when it would hurt his ſheep to go upon the fallows.—All theſe, and many other economical conſiderations, the attentive farmer would neceſſarily diſcover of himſelf, and advert to.

I may however obſerve, that under this ſyſtem of management, ſheep would be much leſs haraſſed than they are according to the practice adopted in almoſt every folding county.—Becauſe, when they are folded on the fallows of arable farms, they are always carried off their paſtures; and ſometimes they muſt be driven to a conſiderable diſtance through narrow lanes, and bad roads, which muſt tend to haraſs and exhauſt them conſiderably. None of theſe evils could be experienced under the ſyſtem above recommended; for the folds would gradually advance from the edges towards the middle of the fields, the paſtures of which would ſurround them on every

ſide. In theſe circumſtances, under the direction of a careful ſhepherd, ſheep could perhaps be made to thrive as well, perhaps better, than under any other ſyſtem of management.

Permanent incloſures not here neceſſary.—The reader will alſo pleaſe to advert, that, under the ſyſtem of management recommended, no permanent incloſures are neceſſary; and therefore the total expence of that ſuppoſed improvement will be ſaved to the undertaker. Incloſures, where large flocks of ſheep are to be kept, are well known to be not only not neceſſary, but highly pernicious. Sheep delight in a free open expoſure, and a wide range of paſture. Whatever circumſcribes them in theſe reſpects is hurtful to the animal. All that could be wanted on ſuch lands, would be a ring of moveable hurdles round the fields that are under crop, which could be ſhifted annually as the improvements went forwards; leaving the grounds, both behind and before, open as at firſt. Indeed, incloſures are, in many other caſes, rather hurtful than the reverſe: and ſuch fences as we often ſee around fields can have no beneficial tendency whatever. They ſeem only calculated for the purpoſe of waſting ground, and ſacrificing mo-

ney at the ſhrine of vanity. I queſtion not, but the money that has been expended on uſeleſs incloſures in England, in the original making them and their future ſupport, might, if fairly accumulated, be more than ſufficient to pay off the national debt: and it would be no difficult matter to find many fields, where that expence, if it were all fairly to be counted, would be more than the fee-ſimple of the fields incloſed would amount to.

Divided commons often come under this claſs of waſtes.—The reader will pleaſe alſo to advert, that many of thoſe commons which have been of late divided, are preciſely in the circumſtances that admit of being improved, with economy, by no other mode except that which has been above deſcribed; but in conſequence of each of the proprietors being obliged to *incloſe* his own ſhare, it has become totally impracticable *thus* to do it; and as the expence of incloſing comes to be a conſiderable item, many of the undertakers become tired of the outlay as ſoon as that has been effected, and then leave the fields totally neglected; or, if they attempt to plough them up, having no reſource for obtaining animal manure, they are forced to lay them out to graſs

in that ſhabby ſtate of poverty, which is the cauſe of loſs to the undertaker, and no advantage to the public.

On the whole, the cultivation of waſte lands, where the original ſoil is of a tolerable quality, though it be at all times a nice operation, and in general attended with conſiderable difficulties, eſpecially at the beginning, may, for the moſt part, be accompliſhed with profit to the undertaker, and much benefit to the community, wherever the operator is allowed to reap the *full* profits to be derived from his induſtry; but where he is certain that he *can* not, or ſuſpects that he *will* not, be allowed to do this, the very thoughts of attempting it are repreſſed in his boſom; and an indolence in this reſpect, which at firſt ſight appears to be culpable, but which upon a thorough examination will be found highly rational, is the conſequence of it. If the effect is expected to ceaſe, the cauſe muſt be removed. In all that I have written above, I have endeavoured to inculcate the utility of that kind of cheriſhing agriculture which aims at nothing ſhort of the higheſt degree of productiveneſs; being conſcious, from a long and extenſive experience, that where phyſical obſtructions are the only things that are to be ſurmounted, it is by this practice

alone, that profit in agriculture is to be expected. In theſe circumſtances, a judicious man will never heſitate at incurring any expence that he knows will add ſo much to the productiveneſs of his fields as barely to repay that expence; but where another perſon is permitted to come and ſnatch away his profits, the caſe is much altered: he then heſitates to lay out one ſhilling to augment his produce; and not his waſte grounds alone are ſuffered to continue in the ſtate of waſtes, but even his cultivated lands, and other incloſures, are ſuffered to remain for ages in a ſtate of unproductiveneſs that might be eaſily removed; and which is therefore highly diſguſting to the ſpirited cultivator to ſee, and diſgraceful to thoſe who, having it in their power, do not exert themſelves to remove.

Lime applied to the ſurface, how to be managed.—I have not given any directions for meliorating ground by means of lime applied to the ſurface only, without being mixed with the ſoil; becauſe, although I know that lime, or other calcareous matters, applied to the ſurface of the ſoil, in *very large quantities*, will have a ſenſible effect in ſweetening the pile, and augmenting the quantity of produce alſo; yet, I likewiſe

know, that the effect of that manure would be ſo much greater, if mixed with the ſoil, that it is in very particular ſituations alone, that it can ever be an economical practice to apply lime on the ſurface only; and never, I apprehend, where the ſoil is of a retentive nature. Where I wiſhed to improve fields that were too ſteep for admitting the plough, I ſhould adviſe that the ground, in all caſes, where it was in the leaſt of a retentive nature, ſhould be trenched by the ſpade, before the lime was applied, and then to blend it with the ſurface-mold. As this operation has to be performed only once, and will not only have a tendency to make the lime produce a more immediate and ſtronger effect upon the ſoil, but will alſo render it, in all future periods, drier in wet weather, and conſequently ſweeter in the pile; and moiſter in dry weather, and conſequently leſs variable in its produce than it otherwiſe would have been, there can be no doubt but the expence of trenching will, in a ſhort time, be abundantly repaid.

But where the ſoil is not retentive, and ſtones are very abundant, there is not an equal neceſſity for digging it up; and in theſe circumſtances lime may be ſometimes applied on graſs with profit. But, in this caſe, it will always be ad-

viſeable, firſt to mix the lime with ſome good mold, if it can be got, in the proportions of nearly two parts of earth for one of lime, and incorporate them well together by frequent turnings, during the courſe of ſeveral months: for, in this way, it is found that lime, applied on the ſward, operates much more powerfully thus than it ever does when applied by itſelf.

Irrigations ſlightly noticed.—Neither have I ſaid any thing about the practice of irrigation; becauſe it is only in few ſituations that water in abundance for that purpoſe can be commanded. But wherever that can be obtained, it is the ſureſt, and the eaſieſt of all modes of improving waſte grounds. The greateſt difficulty that will occur in the management of this manure, (for ſo I will call it,) on ſuch ſoils, is the frequent inequalities that are found upon their ſurface, ſo as to prevent the water from being ſpread evenly over them, or the over-retentiveneſs of the ſoil. Where theſe two obſtructions are not very great, water, if thrown over the ſurface in a proper manner, and managed with judgment and diſcretion, will ſoon bring the moſt barren waſte into a ſtate of great productiveneſs, either for graſs or corn; and nothing can be better adapted for

an alternation of management from the one to the other: nor is there any ſituation in which water may not be made to operate as a great improvement, from the flatteſt mead to the ſteepeſt hill, if the land can be ſo laid out as to admit of carrying the water thoroughly off from the ground, as ſoon as circumſtances indicate the neceſſity of ſo doing. But this circumſtance is ſo very neceſſary, that in regard to this manure, as well as many others, the full benefit, in many caſes, eſpecially on retentive ſoils, cannot be obtained till after the mold ſhall have been looſened to a ſufficient depth. After that has been done, and the ſurface ſmoothed, and a good ſward of graſs obtained upon it, the benefits to be derived from the proper uſe of water will be inconceivably great.

Incloſures, circumſtances that render them unneceſſary.—Neither have I taken incloſures under conſideration; as I do not conſider theſe to be a *neceſſary* part of the expence of improving waſte grounds; but rather I conceive that the predilection in favour of this ſuppoſed improvement is, on many occaſions, the cauſe of a great and uneconomical expenditure of valuable funds, which might be more beneficially applied. If

ground be to be kept under tillage, incloſures are, perhaps, in all caſes, (farther than a ring-fence, eſpecially along way ſides, or where they operate as drains,) pernicious rather than beneficial. It farther appears, from what has been ſaid above, that while land is under graſſes, if the produce be ſcanty, incloſures are always pernicious; and it will be ſhown, in the following eſſay on the economical conſumption of the produce of a farm, that they are never beneficial where the produce is abundant: ſo that they become of apparent utility only when land is left in graſs, while in a middling ſtate of productiveneſs only. And this is preciſely the ſtate in which graſs land is the leaſt beneficial to the ſtate: ſo that every effort ſhould be made to induce farmers to avoid leaving their ground in graſs, while it is in this ſhabby condition.

PART SECOND.

On the improvement of waſte and barren lands, by planting trees.

THOUGH there are few fields which might not admit of being brought into culture, under particular circumſtances, there are innumerable tracts of vaſt extent in this kingdom, which it will be much more profitable to the owner to plant with trees, than to attempt any other mode of improvement. Wherever the ſoil is dry and infertile; or where its chief or only produce is heath; or where it is full of rocks and ſtones riſing to the ſurface; or, if it be a ſtiff obdurate clay, having little ſurface-produce; and, in general, in moſt caſes where the ſoil is poor, if not in the very near vicinity of a town, it may be converted into plantations, if it can be freed from hurtful water, with greater profit than any other improvement it could admit of, unleſs in very particular circumſtances; even where it may admit of being brought, *in time*, into cultivable ground. Where the ſurface-produce is naturally ſmall, perhaps

nothing could be ſo economical as, *in the mean while*, to fill it with trees; becauſe theſe, if judiciouſly choſen, not only yield a greater profit than could be drawn from any other kind of produce, and afford conveniences for houſes, and other accomodations for inhabitants and for manufactures; but the ground itſelf, while the trees continue to grow upon it, undergoes, for the moſt part, a gradual amelioration, which it would not have done in its natural ſtate; and admits of being more eaſily improved when the proprietor can find leiſure to overtake it, than it otherwiſe would have been.

§ I.

General remarks on the different kinds of trees that may be planted on waſtes.

THE kinds of trees that chiefly require our notice on the preſent occaſion, are the oak, aſh, elm, beech, birch, cheſnut, ſcotch fir, ſpruce ditto, ſtone-pine, larch, and bermudian cedar. There are many others of leſſer note, that may claim our attention on particular occaſions.

Of theſe trees, the oak is beſt calculated to thrive on the ſtrongeſt and deepeſt clays. The aſh loves a rich and mellow loam; and where that is the caſe, it proſpers beſt on rocky banks. The wych-elm prefers alſo a mellow ſoil, and ſituations moderately damp, to ſuch as are drier and more arid. The beech thrives remarkably well on dry gravels, and can bear a pretty expoſed ſituation. The birch loves dry mellow ſoils, and will proſper well on land that is very ſterile. The cheſnut delights in deep loam, on a ſtone ſhivery bottom, where the roots run no riſk of reaching a retentive clay, or other ſtratum that detains the water. ſcotch fir, and ſpruce, will grow well on a light moory earth, if dry, though ever ſo poor, if cold clay does not riſe near to the ſurface, or gravel, or ſand. Of the ſtone-pine, and bermudian cedar, I have had no experience, and therefore can ſay nothing. But of all the trees that have been named, the larch proſpers on the greateſt variety of ſoils. I have ſcarcely ſeen it fail on any ſoil where water was not permitted to ſtagnate upon it; but it ſeems to prefer a mellow loam to either of the extremes of clay or ſand. And as this tree is undoubtedly the moſt uſeful of the coniferous tribe, as well as the quickeſt grower, and the moſt ornamental of that claſs,

it deſerves, above all others, the particular attention of the rural improver.

Moſt of the trees above enumerated, though they will thrive in plantations when properly made, upon ſoils of the nature indicated above, require ſo much care and attention while young, and ſuch a perfect kind of culture until they are fully eſtabliſhed, as but little ſuits the circumſtances of owners of waſte lands in general. Hence ariſes the univerſal complaint of the rapid decreaſe of live oak in this kingdom; a circumſtance which, though it has been noticed and complained of for a century paſt, has not admitted of any alleviation; nor ſeems likely to do ſo in the preſent ſtate of things in this country. Much might be ſaid on this ſubject, under the idea of patriotic exertions; ſeeing it is admitted on all hands, that when the britiſh oak ſhall fail, our navy muſt ſuſtain an irreparable diminution in point of ſtrength and durability: but as nothing that I could ſay could prove of any avail to incite to enterpriſes which ſo many other circumſtances tend to counteract, I think it unneceſſary to enter upon that ſubject; more eſpecially when I conſider that it does not ſo properly fall under notice on the preſent occaſion, as the planting of ſuch trees as can, with great economy, be reared in

large plantations at a ſmall expence, upon heathy moors and other barren waſtes, ſo as to return an abundant profit to the undertaker in the courſe of a very moderate period of years.

§ II.

Of fir plantations in particular.

THE improvements that have been made in the northern parts of Scotland, by means of large plantations of ſcotch fir, upon the bareſt moors, and in the bleakeſt and moſt inhoſpitable ſituations, are now well known; and afford the cleareſt demonſtration of the utility of ſuch enterpriſes, when judiciouſly conducted: and though it is admitted that the ſcotch fir is among the moſt periſhable, and the leaſt valuable kinds of wood that can be reared, and therefore ſells every where at a very moderate price; yet as the expence of rearing that tree is very trifling, the returns have been in all caſes ſo abundant, as fully to ſatisfy the perſons who have made theſe plantations; even when no other circumſtances, but the direct income that has ariſen from theſe plantations themſelves, has been taken into the account.

But when the collateral advantages are likewiſe adverted to, the improvement occaſioned by theſe appears to be infinitely great. In the neighbourhood of ſuch plantations, houſes can be reared at ſo little expence, and the roofs are ſo much ſtraighter and better than ordinary, as to induce ſettlers to make their houſes much neater and more commodious than in other places; rails, and other kinds of dead fences, can be ſo eaſily obtained, that poor people are firſt enabled to have good well fenced gardens, and then commodious incloſures of larger extent; the branches afford fuel to the ſettlers, which greatly adds to the comforts of their ſituation; cutting and manufacturing the wood into various kinds of utenſils, furniſhes employment to many perſons; population is thereby augmented; and, with an increaſe of population, its neceſſary conſequence follows, a deſire for land to produce the neceſſaries of life, and a conſequent encreaſe of rent to the proprietor. Like the ſettlers in America, theſe new ſettlers, in the deſart waſtes of Scotland, cultivate and improve the ſoil, as the trees are gradually cleared from it. In this way, Mr. George Dempſter, who will long be reſpected in Britain, at this moment ſees fields rapidly converting into cultivated ground on his eſtate, and

yielding to him ten or twelve ſhillings *per* acre rent, not only without any expence to him, but after having derived a conſiderable profit from the ſale of woods of his own planting, which grew upon land that five and twenty years ago was not worth, to him, above two pence *per* acre, and which might have remained in that ſtate perhaps for ages yet to come, had it not been planted at all. It is by a judicious management of this kind that men of landed eſtates, by a little foreſight, and with much profit, find themſelves enabled to furniſh both employment and ſubſiſtence to a numerous people, who muſt otherwiſe have either remained in a deſtitute ſituation, or have abandoned a country which did not properly provide for their accomodation. This is the kind of charity I wiſh to promote. It is an inexhauſtible fund, which enriches the giver, and ennobles and adds energy of body and mind to the receiver, inſtead of debaſing it, as the receiving of *alms* in any ſituation neceſſarily muſt do. One would think, that the proſpect of being thus extenſively uſeful to mankind, while the intereſt of one's own family would be ſo eſſentially promoted, would prove an irreſiſtible ſtimulus to every perſon to enter upon ſimilar enterpriſes with ſpirit and alacrity. In Scotland, this ſpirit is pretty gene-

rally excited; and the benefits that reſult from it are every day becoming more and more apparent. In England, the hands of induſtry are, *in this reſpect alſo*, tied up. Injudicious fiſcal regulations continually oppoſe every attempt at agricultural improvement; and while our rulers, with the inconſiſtency of children, talk of giving premiums with one hand for the encouragement of agriculture, they with the other reſtrain, by an irreſiſtible curb, all attempts at expoſing to the eyes of the public thoſe impolitic bars, which have hitherto diminiſhed the productiveneſs of this iſland to an aſtoniſhing degree; and muſt continue to diminiſh it ſo long as theſe bars ſhall be allowed to remain, were premiums to the amount of the whole revenue of Britain to be given for encouraging them. To deſcribe the improvements that *might* be made, is, in theſe circumſtances, a very ungracious taſk; for no one takes pleaſure in repreſenting things as *practicable*, which he knows are not likely to be carried into practice. While a ſenſe of duty induces me to ſtate, with unbiaſſed candour, the eaſe with which improvements *might* be made, where *phyſical* obſtructions alone are to be ſurmounted, I find it neceſſary, at the ſame time, not to diſguiſe the leſs obvious, though more powerful obſtructions, ariſing from

moral cauſes, that *muſt* be overcome, before extenſive improvements of the nature I have already mentioned, or thoſe I am now about to recommend, can ever be carried into effect.

Price at which a plantation of firs can be made in Scotland.—A plantation of ſcotch fir can be made at much leſs expence than any other kind of tree in the northern parts of Scotland; becauſe the young plants can be afforded at a ſmaller price than any others. In Aberdeenſhire, where planting is ſo general as to have become a ſort of occupation, fir plants of two years old, (and above that age no experienced planter will ever buy them,) ſometimes ſell at the very low rate of four-pence *per* 1000, conſiſting of 12 hundred; and they ſeldom exceed eight-pence; on an average, ſix-pence, or one half-penny *per* hundred: and there are men who make a buſineſs of making plantations, who will undertake to compleat the whole incloſing and planting, at the diſtance of one yard from each other, and uphold them for five years, (that is, ſupply any deficiencies that may be obſerved,) at the rate of from ten to thirty ſhillings *per* ſcotch acre, [four ſcotch are equal to five engliſh acres nearly,] according to the ſize of the incloſure, and the nature of the fence. In

all cafes of this kind, it is fuppofed the plantations are of 30 or 40 acres, or upwards: for where the inclofures are fmaller, the expence of inclofing is proportionally augmented. The charge is thus not only made moderate, but the total expence a man is to incur can be afcertained before he begins, which prevents him from being involved in unforefeen difficulties.

On bleak expofures, which kinds thrive beft.— It is found by experience, that there is fcarcely any foil fo bad, or any expofure fo bleak, where the fir tree will not live, if the plantation be of fufficient extent, and not upon the very fummit of high peaked hills. They do not, indeed, bear the fea-air very well, where they are much expofed to the feverity of its blafts; nor is the wood ever of a good quality, or the tree long lived, upon clayey foils. Several perfons in the fouth of England have found that the pine-after bears the fea blaft much better than any others of the fir tribe; which is a difcovery of great importance, and will no doubt be attended to by improvers. The fpruce-fir, however, will bear a ftill more expofed fituation than the fcotch fir; and, after a few years from the time of planting, it fhoots up with ftill greater luxuriance. But the cones

not being to be had in equal abundance, and the plants being more difficult to rear, they are ſold at a much higher price, uſually about ſix ſhillings *per* thouſand, fit for planting out. Silver fir, in a good ſoil, proſpers well, and is a beautiful tree, on account of the depth of its ſhade; but the price of the plants is too great to admit of large plantations of them being made.

Firs ought to be planted out while very young. —Wherever the ſituation is bleak, and much expoſed to ſtrong blaſts of wind, the plantation muſt not only be of conſiderable extent, if you expect the trees to thrive, but the trees muſt be planted very cloſe together, ſo that each plant ſtands at the diſtance of from two to three feet at moſt from each other; the more expoſed the ſituation the cloſer they muſt be; for it is obſerved, that until the branches intermingle, and thus ſerve to give a mutual ſupport to each other, the trees never begin to advance with vigour. Where the plantations are thus thick, there is a neceſſity for beginning to thin theſe out at a pretty early period; ſo that after the tenth to the fifteenth year from the time of planting, men muſt be conſtantly employed in thinning theſe plantations; and there are very few ſituations indeed, in which theſe

thinnings will not ſell for ſuch a price as to do much more than pay for the expence of cutting them out: but where the plantations are extenſive, theſe thinnings ſell at a ſmall price; which affords the conveniencies to ſettlers in that neighbourhood I formerly remarked, and gives employment to a multitude of perſons to dreſs and carry them to more diſtant markets.

The leaves and branches of the fir-tree a wholeſome food for cattle and ſheep.—One advantage attending the culture of the fir-tree, is, that it has been found by ſome well-authenticated experiments, that the leaves and young branches of the ſcotch fir afford a very wholeſome nouriſhment to cattle and to ſheep; ſo that they may be applied, in caſes of neceſſity, to the ſuſtaining of thoſe uſeful animals. In hilly countries, that are ſtocked with either ſheep or cattle, the benefits that may be derived occaſionally from them in this northern climate, where ſnow ſometimes lies for many weeks together, ſo as to prevent the beaſts from having acceſs to other food, will be very great; and therefore no perſon ſhould be without a plantation of firs on every farm for this very purpoſe, were it to be of no other uſe whatever. It may happen that, for many years toge-

ther, there may be no neceſſity of having recourſe to this aid; in which caſe the trees may be permitted to grow without moleſtation. When this ſupply muſt be reſorted to, it is only neceſſary to cut down ſome of the branches with leaves upon them every day, and give them to the beaſts, freſh and freſh as they are wanted; on which food the creatures may be preſerved in perfect health for months together, ſhould it be neceſſary. The larger branches left by them being piled up in a heap to dry, become excellent firewood; and the trees proſper as well as they could do in any other circumſtances, and afford an eaſy inſurance to the farmer againſt the heavy loſſes he is ſo often, without this aid, obliged to experience. I do not know an improvement in agriculture that is greater than this one, or that can be afforded with ſo little trouble or expence. Nothing can ſtand in the way of its being univerſally adopted, unleſs it be the difficulty of reconciling the intereſt of the tenant and the proprietor. As the law at preſent ſtands, the expence of making the plantation muſt fall upon the proprietor, ſeeing he is the ſole owner of the wood; and the tenant ought to have permiſſion to lop the branches occaſionally, and be bound to preſerve the plantation. It ſeems to be by no

means impoſſible to reconcile theſe intereſts; but this would require an exertion on both ſides, which, in the preſent ſtate of our knowledge, in regard to things of this ſort, can ſcarcely, I am afraid, be expected.

§ III.

Of the larch tree, its value and uſes.

But the larch is ſo much more valuable than the ſcotch fir, on all other accounts, that it is now univerſally preferred to it for plantations of large extent, in almoſt every ſituation. The quatities of this tree are, indeed, ſo numerous and ſo excellent, that theſe require only to be known in order to make it be propogated to a greater extent than any other tree whatever, that can be reared in this climate. I dare hardly even venture to mention theſe qualities, on the preſent occaſion, leſt I ſhall be accuſed of exaggeration; though the proofs that aſcertain them are ſo ſtrong as to be irreſiſtible. As this tree has only been of late introduced into Britain, the qualities of its wood are not here as yet ſufficiently under-

ſtood; and it has been hitherto cultivated chiefly rather as an ornamental tree, than with a view to profit: for, wherever it has been introduced, it grows ſo freely, on almoſt every ſoil or ſituation; it is ſo healthy, and ſo beautiful when in leaf; is ſo highly ornamental, when covered with its abundant pink bloſſoms in the ſpring; and is ſo elegant in its form, that it becomes inſtantly a favourite with every one who has begun to plant it.

The value of its wood remarked by Vitruvius. —The larch (Pinus Larix Lin:) is a native of the ſouthern parts of Europe, and eaſtern parts of Aſia, and there the valuable qualities of its timber have been long known. Among the Romans it was employed, in preference to every other kind of wood in building, for all purpoſes where ſtrength and durability were required; and Vitruvius attributes the ſudden decay of buildings erected in his time, when compared with the ſuperior durability of more ancient ſtructures, in a great meaſure to the want of larix-wood in the neighbourhood of Rome; that kind of wood having been there exhauſted before his time, and the expence of bringing it from a diſtance had become ſo high, as greatly to circum-

ſcribe the uſe of it. This tree is found in great abundance every where along the whole extent of that vaſt range of mountains called the Alps, and on thoſe leſſer hills that branch off from theſe. In all places there, where the ſituation prevents the young plants from being choaked by graſs, or cropped by animals while young, it ſprings up from ſelf-ſown ſeeds; and as it grows naturally ſtraight, it preſented itſelf to the diſtreſſed inhabitants round the borders of the Adriatic gulf, as the fitteſt material for piles to be driven into the mud, on which their houſes might be reared, when they were forced to ſeek for refuge from the barbarous tribes who over-ran Italy in the middle ages, in the inacceſſible marſhes where Venice now ſtands. Immenſe numbers of theſe trees have been then felled and applied to this purpoſe; and thus has been afforded an opportunity for proving by a fair experiment, the incomparable durability of that timber. For it has been found by experience, when theſe buildings have occaſion to be renewed, that after having ſtood many hundreds of years, theſe piles are not only uncorrupted, but have by time acquired, in this ſituation, a degree of hardneſs they did not originally poſſeſs: ſo that there is every appear-

ance that, in this particular ſituation, the wood may be deemed incorruptible.

Its extreme durability remarked by Doctor Pallas.—In other ſituations, it has been found to poſſeſs a durability nearly equal with the above. When Doctor Pallas, under the auſpices of the Empreſs of all the Ruſſias, was employed, a good many years ago, to make a ſurvey of the eaſtern parts of her Aſiatic dominions, he obſerved, in the peninſula of Kamtſkatka, ſeveral *tumuli* that were evidently artificial; but theſe had been reared up at period ſo remote, that none of the preſent inhabitants of that country had any tradition even reſpecting their origin, or the uſes for which they had been originally conſtructed. To obtain a knowledge of this he cauſed one of them to be opened up. In the centre of the mound, and on a level with the ſurface of the plain on which it ſtood, he found an oblong platform, protected by beams of wood joining each other at the top, and ſpreading wide below, like the roof of a houſe, and placed cloſe together ſo as to prevent the earth from falling on the area; where had been depoſited ſome human bodies ſtretched at full length, as appeared by the remains of ſkeletons there found. This kind of roof had

been covered over with earth to a great height; and thus had been formed the *tumuli* in queſtion. The wood was larch: and here alſo it was found to be uncorrupted. How long it had remained there it is impoſſible to ſay; but from concomitant circumſtances, it is probable it could not be leſs than ſeveral thouſand years.

In both theſe inſtances, however, the wood was preſerved from the air, and afford no fair proof of its durability in other ſituations. But there are not wanting proofs ſufficient of its extreme durability for the purpoſes of common life, even in modern times, independent of facts that are on record concerning that circumſtance in antient authors.

By Mr. Harte, and Admiral Greig.—The Reverend Mr. Harte, in his Eſſays on Agriculture, a moſt valuable performance, that is but too little known, enlarges on the economical uſes of larch wood with great ſatisfaction. Among other particulars, he deſcribes the manner in which the huts of the peaſants in Carniola are conſtructed of it, with a kind of exultation that was natural to a good mind when it developes a beneficent contrivance, that tended ſo much to render the lot of the lower claſſes of mankind much more

comfortable than could be effected by any other means that had hitherto occurred to him.

Theſe cottages are conſtructed entirely of larch wood: [I here quote from recollection only, not having the book at hand.] A ſquared beam is firſt laid flat on the ground where the wall is intended to be reared; into that, by means of tenons, cut out for that purpoſe, are fixed uprights, conſiſting of ſquared logs of the ſame, cut to the height of the intended wall, ſo cloſe as to touch each other. A beam running parallel to the firſt receives their tops, and keeps them firm in their upright poſition. Theſe are connected with the croſs walls, which riſe upwards in the proper form of a gabel. A roof is erected on theſe beams, in which, over the couples, are laid cingles of larch wood; and the hut is then finiſhed to continue for ages. In erecting the walls, openings are left for doors and windows: and in the roof, places are made for the emiſſion of ſmoke. When newly erected, the roof and all parts of the ſtructure are white; but after a ſhort time, there oozes out from the pores of the wood a kind of juice, that fills up every crannie, ſo as to cement the whole into one connected maſs, without chinks of any kind, ſo as to become quite impervious either to wind or rain. This juice gradually har-

dens, and being of a darkiſh colour, the building is covered all over as if with a varniſh, that is not affected by any viciſſitudes of weather. As ſoon as this varniſh appears, the peaſant's care reſpecting his little habitation is at an end for ever. How long ſuch a ſtructure may laſt, without ſtanding in need of any repairs, has not been aſcertained; but if the work has been properly executed, and duly ſecured againſt the effects of wind and external injuries, it is much beyond the extent of the utmoſt period of human life. Were poor people, who in this country are ſecured from oppreſſion in every reſpect, to have it in their power to have their cabins rendered thus ſecure againſt the injuries of weather, and the ravages of fire (for this wood ſo powerfully reſiſts fire, that a flaming brand laid upon the roof, and ſuffered to burn till it were conſumed, would not affect it) what a valuable addition it would make to the ſum-total of human happineſs! The late Admiral Greig, who had ſeen many ſuch huts in Siberia, was earneſt with the gentlemen in Scotland, when he made his laſt viſit to his native country, to induce them to make extenſive plantations of larch wood, inſiſting chiefly on this circumſtance, and aſſerting that he had ſeen many huts, which had been thus conſtructed, and which

he was aſſured had ſtood more than *an hundred* years, without ſtanding in need of the ſmalleſt repairs.

By M. le Preſident de la Tour d'Aigues.—Of the durability of this wood the following facts are additional proofs: "I have in my garden, "(ſays M. le Preſident de la Tour *d'Aigues*,) in "the year 1787, ſome rails, part of which are "oak, and part of them *larch wood*. The rails "were made in the year 1743, and only once "painted. *The oak has yielded to time, but the "larch is ſtill ſound.* They employ this wood "at preſent in *Provence* for making caſks. The "cheſnut of the Cevennes had ſupplied the "place of the oak, and the larch now ſucceſs-"fully ſupplies that of the cheſnut. The fine-"neſs of the grain retains perfectly the ſpirit of "the liquor, and does not alter its qualities. "It has been employed for that uſe for time "immemorial in the higher Dauphinè, from "*Siſteron* even to *Briançon*. I have in my "caſtle of Tour *d'Aigues* beams of twenty inches "ſquare, which are ſound, though upwards of "*two hundred years old*; but trees of this ſize "are only now to be found in places whence "they cannot be tranſported. There are in

" ſome places of Dauphinè, and in the foreſts of " Baye in Provence, larch trees, which two " men could not graſp, and more than twelve " toines (about 72 feet) in height."

By a gentleman from Switzerland.—This wood has been remarked for the ſame indeſtructible quality wherever it has been employed in work. I myſelf happened to fall into company with a native of Switzerland, in the month of October laſt, [1794] in the houſe of the ingenious Doctor Percival of Mancheſter The converſation happening to turn upon this ſubject, the Doctor aſked that gentleman, if larch wood was much uſed in Switzerland? His anſwer was, " Very " much." ' For what purpoſes is it chiefly em- ' ployed?' " For every uſe where ſtrength and " durability are required." He added, that a ſhort while before he came to Britain, he had been on a viſit to an acquaintance in the country, who lived in a *chateau* that was known to be above two hundred years old, the very ſtones of which it was built being now mouldering to decay; and he remarked that the windows, which, by their faſhion and workmanſhip, were judged to be the original windows that had been put into the houſe, did not diſcover the ſmalleſt

marks of decay. Theſe windows were made of larch wood. He added, that the conſumption of this wood in Switzerland, on account of its many valuable qualities, has been ſo great, as to exceed the quantity naturally produced: ſo that it has become ſcarce and dear; which has induced many gentlemen in that country to make large plantations of it of late, with a view to the profit that may be derived from it.

By Mr Ritchie, britiſh conſul at Venice.—Mr Ritchie, the britiſh *charge des affaires*, at Venice, writes thus to Mr Moore, ſecretary to the Society of Arts in the Strand, London, in anſwer to ſome queries reſpecting the uſes that are made of larch wood in Venice. "It reſiſts, (ſays he,) "the intemperature of the air more than any "other wood known in this country, and there- "fore it is much uſed in outer gates, pales, &c. "which are conſtantly expoſed to the open air. "It is no leſs durable within doors: and in ſome "of the old palaces here, there are are beams of "larix as ſound as when firſt placed there. In "a word, *Wherever ſtrength and durability are "required, this is reckoned here the moſt choice "and valuable wood*, and it may be applied to "a great number of uſes." Among theſe uſes,

he particularly ſpecifies *ſhip-building*, for which uſe they deem it the moſt valuable they have; but, on account of the ſuperior *levity* of fir wood, they in ſome caſes prefer it in thoſe ſeas, where the ſhallowneſs of the waters renders buoyancy a quality much prized. [Tranſact. of the Soc. of Arts, vol. XI.]

In Ruſſia, alſo, their ſhips of war are built of larch wood, which is brought for that purpoſe, at a great expence, from the interior parts of Siberia to Archangel, for the royal dock-yards only. And that it was employed in old times, ſeems to be proved by the following ſingular fact recorded by Mr. Evelyn in his Sylva, article Larix.

By Mr. Evelyn.—"Witſon, (ſays he) a Dutch "writer on ſhip-building, ſays, that a veſſel, "conſtructed of this wood and cypreſs, was "lately (when did Witſon write?) found in the "Numidian Sea, twelve fathoms under water. "It was reduced to ſuch a degree of hardneſs "as greatly to reſiſt the ſharpeſt tool. Nor did "it appear that any part of it had periſhed, al-"though it had continued under water above a "thouſand and four hundred years."

Mr. Evelyn farther remarks, that it ſeems to excel for beams, doors, windows, and maſts of ſhips, and *reſiſts the worm.* When driven into the ground, it becomes in time almoſt petrified, and is capable of ſupporting an incredible weight. It makes, he ſays, everlaſting ſpouts, pent houſes, and featheredge, which need neither pitch nor painting to preſerve them; alſo excellent pails, poſts, rails and props for vines. The texture of the wood is cloſe, and admits of a fine poliſh, ſo as to make beautiful finiſhing to rooms. It is neither liable to ſhrink nor warp, when put up into work; and, when cut into thin ſlices, it is the very beſt ſubſtance yet known for putting behind prints in framing. On account of theſe qualities, it is excellent for making pallets for painters to mix their colours upon. Before the uſe of canvas, it formed the tablets on which the great Raphael, and the famous artiſts of his time, eterniſed their art; and, on account of the fine poliſh it takes, has been ſuppoſed to give to their colours a peculiar grace and brilliancy. However that may be, it is certain that the modern Italians make uſe of this wood for picture-frames, becauſe no other wood gives gilding ſuch force, brightneſs, and as it were a ſort of natural burniſh; and this, he thinks, is the grand

ſecret why Italian gilding on wood is ſo much better than ours, which has often a tarniſhed ſpungy caſt, and looks like gilt gingerbread. Among other qualities of this wood, Mr. Evelyn remarks that it reſiſts the worm; and that it does reſiſt the worm in houſes, is perfectly proved by the ſingle fact that the paintings which have been done upon it for many hundred years, are ſtill entire; but I have met with no fact which proves that it will reſiſt the ſea worm; though there is no inſtance on record that I have met with, in which it has been penetrated by that deſtructive creature.

Mr. Evelyn, for theſe and other properties that he found recorded concerning this wood, warmly recommended the culture of the larch tree to his countrymen: But the minds of men were not yet prepared to adopt this improvement, and he preached to them in vain. More than a hundred years elapſed after his death, before, perhaps, one perſon in the iſland was daring enough even to try if it would live here: what he in vain recommended we have ſeen in ſome meaſure effected. It is now known to thrive every where; but our deſcendants only can ſee the wood in perfection of the produce of this iſland.

In all the foregoing inſtances, the experiments, we may ſuppoſe, reſpect that wood when it has attained full maturity, and is in the higheſt ſtate of perfection it can be made to attain. But it is well known that any kind of fir-wood that has grown very quickly, and is as yet young, though it ſhould have attained a conſiderable ſize, conſiſts chiefly of a kind of imperfect timber, of the nature of that imperfect kind of wood which is in general found in a ring of more or leſs thickneſs round the tree, immediately under the bark, which has been commonly called *blae*, becauſe of its pale and ſickly colour, to diſtinguiſh it from the harder and better ripened wood nearer the heart; which, eſpecially in old trees, is of a reder colour, and is therefore called *red wood*. It is now well known that the beſt fir timber which comes from Riga, and other places on the Baltic, is the produce of the ſame tree that is commonly cultivated here under the name of the *ſcotch fir*; but having grown, for the moſt part, more ſlowly in theſe countries than the *planted* trees do here, and having been allowed to attain a much greater age, that wood is beyond compariſon cloſer, and four times at leaſt more durable, in any kind of work, than the

young raw deals which are made from wood the uſual growth of this country. The ſame circumſtances attend the growth, and, we have reaſon to believe, the other qualities of larch timber: The larch is thus deſcribed by an acquaintance of mine who croſſed the Alps in October 1793: "I ſaw, ſaid he, larch, or larix, cut down a-"bout thirty miles ſouth of Bolzano, at an ele-"vation of more than two miles perpendicular "height above the valley and river Adige, ſome "of which were near three feet diameter, and "all *red wood*, the effect of age, except a ring "of leſs than an inch on the outſide. The tim-"ber remarkably fine, hard and ſtrong. The "larch is now generally planted all over Britain. "If it is left to grow to a ſufficient age, the "owners will not be diſappointed." We have not, however, yet had an opportunity of ſeeing any of that *aged* larch wood in Scotland; for its introduction into this country was at a period ſo late as not to admit of it. The two firſt trees of that wood which were planted in Britain, by the beſt account I can find, are at Dunkeld in Perthſhire, the ſeat of the Duke of Athole, in a moſt thriving condition, and are not likely to be permitted to be cut down ſoon. They are known to be now exactly 53 years of age. Two

years ago, they meaſured as under; as communicated to me by Mr. Scougal, then gardener to the Duke of Athole.

" The larch trees are fifty years old; they are " 120 feet high, three feet and a half diameter, " one yard above the ground; and are ſaid to con- " tain 110 (this is evidently a miſtake; from the " meaſurement given it ought to be 360) cubic " feet of wood each in the trunk, excluſive of " branches." A ſurpriſing growth! This is at the rate of $2\frac{1}{4}$ cubic feet nearly each year, which, valuing it only at one ſhilling *per* foot, would be 2s. 3d. excluſive of branches.

In order to aſcertain this fact with more preciſion, I applied to the Duke of Athole's preſent gardener; in anſwer to which I received the following letter.

" Sir, Dunkeld, *March*, 28, 1796.

The gardener here has delivered to me your letter of the 26th current; in conſequence of which, an exact meaſurement has been made of the largeſt larix tree on the Duke of Athole's lawn at Dunkeld. And the following are its dimenſions.

	F.	In.		F.	In.
At the height of	1	8	from the ground, circumference is	11	11
— — —	3	0	— — —	10	0½
— — —	6	0	— — —	9	0
— — —	9	0	— — —	8	6
— — —	12	0	— — —	8	2
— — —	18	0	— — —	7	11
— — —	24	0	— — —	7	7

" The above is from actual meaſurement: the following is computed.

	F.	In.		F.	In.
At the height of	48	0	from the ground, circumference may be	6	0
— — —	70	0	— — —	3	0

from whence it tapers to a top about 15 feet: ſo the whole height is 85 feet, planted in ſpring 1741. There are ſeveral larix upwards of 100 feet in height, which are 5 or 6 years younger, but none of ſo great girth.

" Of late years, the Duke of Athole has, to make trial of the wood, applied larch to a variety of purpoſes; ſuch as mill-axles, flooring in houſes, window-frames, and doors, poſt, and rail, and boat-building; for all of which it has hither-

to appeared to anſwer ſo well, that it is certainly the greateſt acquiſition of wood ever introduced into Great Britain; the more eſpecially, as it not only grows, but attains a conſiderable ſize in ſituations where, from the elevation of the ground, and bleak expoſure, ſcotch firs either die, or become ſtinted. Fiſhing boats made of larch under forty years old, laſt nearly three times as long as thoſe built of Norway fir. The Duke is ſo perſuaded of the excellence of the wood, that his plantations, on high grounds particularly, have of late years been almoſt entirely compoſed of that wood. Thoſe plantations though large, generally exceeding 100,000 every year, would have been more extenſive, if the trees were not obliged to be pitted in planting them, the trees having attained ſome ſize; viz. from 20 inches to 3 feet, by being two years and ſometimes longer tranſplanted from the ſeed-beds into others, before put out to ſtand, in order to prevent their being choaked by the undergrowth of broom and whins, which riſe very rapidly in the neighbourhood of Dunkeld: but where there are not theſe diſadvantages, it is imagined they might be planted with ſucceſs from the ſeed-bed, in the ſame way as ſcotch firs: an experiment which is to be tried. The only draw-back to that will be,

that both wild and tame animals, which may break into the plantations, would be apt to browze on the top-ſhoots of larch, a tree they are particularly fond of; but, if that is not very often repeated, the larch will ſtill puſh forward on a new leader, and riſe.

" The late violent winds blew over a larix, in the Duke's lawn, of 50 years age, 86 feet 6 inches in height, containing 82 feet of ſolid wood; for which 4l. ſterling was offered as it lay on the ground. I am, Sir, your obedient ſervant.

(Signed) GEORGE FARQUHAR."

I have found by experience, that pitting, as mentioned above, is not neceſſary, unleſs where graſs or other weeds grow with ſuch luxuriance as to endanger ſmothering the young plants.

Even young larch wood particularly durable.— The following facts, which reſpect raw grown wood in this country, tend to prove, in the moſt ſatisfactory manner, that, *even in that ſtate,* larch wood poſſeſſes qualities of the moſt valuable kind, that would be deemed fabulous, were they not well authenticated.

In January 1772, a violent wind, which committed great devaſtations in Scotland, overturn-

ed, among others, two or three larch trees that grew in the plantations of Mr. Campbell of Shawfield, at Woodhall, near Glaſgow. Theſe trees were ſo large as to admit of being cut up into planks, which were not particularly attended to by the late Mr. Campbell, who was then alive. About ten years afterwards, his brother, the preſent very reſpectable owner, ſucceeded to that eſtate; and finding, in his rounds, a low houſe made of boards which had been employed for feeding ſwine, in a waſte corner, under the drip of ſome large trees, that had been neglected for many years, which he thought a very unſightly object; ordered it to be taken down and carried away as rubbiſh. The carpenter, when he began to knock it to peices, was extremely ſurpriſed to find the wood quite freſh, and mentioned it to Mr. Campbell, as a very unuſual circumſtance; telling him, at the ſame time, that he now recogniſed that theſe ſheds had been made of the larch wood above named. Some time afterwards, being ordered to repair the top of ſome ſtalls in the ſtable, that had been gnawed by the horſes, on that occaſion the carpenter ſaid, he did not know how he could then do it, as he happened to have no ſeaſoned wood at the time, and could get none in that neighbour-

hood. Mr. Campbell, recollecting that he had ſaid the wood of the ſwine-houſe was quite freſh, deſired him to examine it, and ſee if that could be made to anſwer the purpoſe. It was tried, and found to be perfectly good; and having been put up, ſtood there, without any marks of decay, for ſeveral years, till, in conſequence of ſome conſiderable alterations that were making, the whole of theſe ſtalls were taken away, and theſe pieces of larch wood loſt ſight of.

The ſame gentleman having afterwards learnt, that on the coaſt of Lincolnſhire, where decoys for catching wild ducks are made, in doing which, it becomes neceſſary to drive many ſtakes into the mud overflowed by the ſea, for the purpoſe of ſtretching the nets, (which ſtakes are found to be very expenſive to uphold, as oak ſtakes, between low and high water-mark, very ſoon decay,)—one gentleman, wiſhing to try the durability of larch wood in theſe circumſtances, put alternate ſtakes of larch and oak. Two ſets of oak wood had been entirely worn out, as his informant aſſured him, and the larch continued firm. How long they may ſtill laſt, it is impoſſible to ſay.

Mr. Campbell, deſirous of making a comparative trial himſelf, made two gates, the ſupporters

of which were to be of timber; one of the poſts in each gate he cauſed to be made of larch wood; and the other, of the ſame ſize and ſhape, of the beſt foreign fir he could find. They were both painted, for the ſake of neatneſs and uniformity. One ſet of the fir ſtakes were worn out ſome time ago, and have been renewed.—The larch ſtands firm till this hour; and how-many ſets of fir poſts they may outlaſt, no one can tell.

Since the firſt edition of this work was printed, the following fact reſpecting larch wood has been ſtated to me.

About twenty years ago, my informant chanced to be upon a viſit to the late Lord Auchinleck, at his country ſeat in Ayrſhire; when the gardener, an old man, came one morning to inform his Lordſhip, that a wooden rail which had been put up as a fence many years ago, around his (the gardener's) little garden, having been often repaired, was now become ſo very frail, that it did not admit of being repaired any more with profit. His Lordſhip on hearing this, ordered the old rail to be taken down, and a new one to be put up in it's place. The gardener went out to execute this order; but in a ſhort time he returned, with a joyous expreſſion in his coun-

tenance. "What is the matter, John," ſaid his Lordſhip. 'Nothing, an't pleaſe your honour; only that I bring you news that will pleaſe you.' "What is that, John?" 'Why,' ſays John, 'your Lordſhip has always been very fond of the larix, and I have juſt diſcovered that it's wood is much more valuable than I ever before ſuſpected. On knocking down the fence round my garden, the poſts were all quite rotted, ſo as to fall down with the firſt ſtroke; except a few which are quite freſh and firm. I found that all theſe were of larch wood, a few ſpars of larix having been put up with the others when the fence was made; and all theſe are now as freſh as the day they were firſt put up, though all the others are quite rotten.' "Come," ſaid his Lordſhip to his friend, "let us go and ſee this wonder with our own eyes." They went immediately to the ſpot, and found it exactly as John had repreſented.—Orders were given to leave theſe poſts as they were, and to ſupply the place of thoſe that were decayed only. In this way, the fence was renewed; and my informant, who has been often at the place ſince that time, ſays he is perfectly convinced the larch poſts remain firm in that rail till the preſent moment.

This fact having awakened their curiosity, they went to examine some other pieces of larch wood that had been employed for other uses. Among these was a kind of bridge thrown across a rill of water, consisting of three or four spars of young larch wood, covered with sods. This bridge had been made a good many years before. On removing some of the sods, they found the wood perfectly firm : on which the sods were replaced, and the bridge, it is believed, remains till the present hour.

I myself happened to observe a spire of young larch wood, in the garden of Mr. Dempster, who has been so long distinguished for his conduct in the British Parliament, which had been stuck into the ground as a pole for a plant of hops, and allowed to stand there summer and winter, for the space, as he found, upon enquiry, of more than six years : on a careful examination of it, no symptom whatever of rotting could be discovered in it any where.

This, and other facts, having turned my attention to the subject of larch wood very strongly, I caused some spires to be cut out from a plantation I had made of larch in Aberdeenshire, and sent to this place (in the neighbourhood of Leith) for the sake of experiment. These spires were

of no more than eight years growth, at the time they were cut, and were upwards of twenty feet high. Of ſome of theſe I cauſed a rude ſeat to be made for a garden, the joinings being made merely by boring holes with an auger into the parts that were to receive the ends of other pieces, which were ſhaped ſo as to fit the holes. The bark was not taken off; and ſome of the ſmalleſt pieces in the top, not thicker than my finger, were thus placed as uprights in the back. It is five years ſince the wood was cut, and four years ſince the ſeat was made, which has ſtood ſince that time in a place where it is expoſed to the ſun and weather, with only the partial ſhelter of a few branches of a tree over head. No marks of rotting are as yet (March 1ſt, 1797,) diſcoverable on any part of it, nor of the other ſpires, which have lain without doors all that time, in various circumſtances. But what appears ſtill more extraordinary to me, is, that it has neither gelled (ſplit by the action of the ſun,) nor ſhrunk, ſo as to looſen the joints, which ſtill continue firm.

I beg leave, however, to obſerve, that though I cannot diſcover the ſmalleſt ſymptoms of rotting on any part of theſe ſpires; yet, upon a very accurate examination, *it appears to me* that the

wood is rather of leſs ſpecific gravity than it was at firſt, which I doubt not proceeds from an imperceptible kind of decay, which I ſuppoſe will in time render it, as we call it, *daezed*, that is, leſs ſtrong than it originally was, though not apparently rotten. Even this, however, is not a *certainty*; perhaps I may be miſtaken in thinking it lighter than the *dried* wood, while yet freſh cut down: for I could not compare them accurately together at the ſame time, and did not think of *weighing* the ſame pieces at different periods: but how long it may be before that period ſhall arrive, ſo as to render it brittle, I cannot tell. It doubtleſs is not yet arrived, even with regard to the ſmalleſt pieces of no more than one year's growth, which are ſtill firm and tough to an aſtoniſhing degree, conſidering the raw and unſubſtantial nature of the half-formed wood of theſe tender twigs.

In addition to theſe facts, and to ſhow that every twig of this tree may be employed for ſome uſeful purpoſe, I ſhall juſt add, that George Newnham, Eſq; of Summerhill, near Corke, informed me, *anno* 1793, that he employed ſome *branches* of larch wood as ſtakes for eſpalier trees in his garden, ſome years ago, intermixed with ſtakes of various other ſorts; all which larch ſtakes

remained firm after the others began to decay. In a ſubſequent letter, dated November 10th, 1794, he ſays, "The ſtakes of larch wood ſtill remain "in my garden perfectly ſound, both above and "below ground; the moiſture ſeems to harden "the wood in a ſurpriſing manner; the ſtakes of "the other timber are in general quite decayed."

Theſe facts eſtabliſh, beyond a poſſibility of doubt, the incomparable durability of this wood even in *the early* periods of its growth; a circumſtance which is of too much importance to the landed and agricultural intereſt of this country to require any apology in me for endeavouring to eſtabliſh, beyond a poſſibility of doubt, at the expence of a few additional pages of writing.

Larch wood neither ſhrinks nor warps, nor is eaten by worms.—Nor is *durability* alone it's only quality. When made into plank, there are proofs equally inconteſtible that it poſſeſſes the additional excellency of neither *ſhrinking* nor *warping* when made into work, nor of being liable to be attacked by the worm, during the courſe of ſeveral ages. The ſingle fact already quoted from Evelyn, that Raphael, Urbin, and other celebrated artiſts of that age, painted many of their beſt pictures on larch wood, which exiſt till this day

ſound and entire, eſtabliſhes theſe things beyond a doubt. Moſt of theſe pictures are now upwards of three hundred years old: it is obvious that the ſmalleſt warping, or ſhrinking in the wood, muſt have cracked and deſtroyed the paintings: nor are any worm holes diſcovered on examining the back of the boards.

Whether this wood is capable of reſiſting the ſea worm, I have not been able to aſcertain by actual experiment. The entire ſtate of the veſſel found in the Numidian ſea, and many other circumſtances, concur to render this probable. But a fact of this importance ought not to be left on the footing of *probability* only. I have been for four years paſt in diligent queſt of two things which I have not been able to find: the *firſt* is, a piece of larch wood actually in a ſtate of rottenneſs, no matter by what means it has been produced; but none of my correſpondents have been able to help me to it: the *ſecond* is, a piece of ſound, well ripened larch wood, in a ſtate of perfection, for the purpoſe of trying fairly whether it be capable of reſiſting the ſea worm or not. It is well known that at the bridge of Rocheſter near Chatham, every other kind of wood that is ſunk but for a very ſhort time into the waters of the river Medway, is very ſoon perforated by the

ſea-worm. My intention was, if I could have found the larch wood, to cauſe it to be faſtened, by means of croſs bars to a logg of ſound oak wood, of the ſame dimenſions, and both of them to be ſunk in the river at the ſame time. Let them be taken up, after lying ſome months, and examined: they may be then returned again into the water or not, as circumſtances ſeem to indicate. Thus would a fair comparative trial be made, the reſult of which, in all it's circumſtances, ought to be communicated to the public. I reject raw and imperfect wood from this experiment, for very obvious reaſons.

Larch wood nearly incombuſtible.—To all theſe valuable qualities, juſtice ſtill compels me to add, that larch wood may be ſaid to be in ſome meaſure *incombuſtible*. In conſequence of it's inaptitude to take fire, Mr. Harte obſerves, that there is perhaps no inſtance of the cabins of the Carnioleans being ſet on fire, though they are careleſs about throwing even flaming firebrands upon their roofs. The fact is, that though larch wood may be conſumed by fire, yet, where the maſſes are large, even if a fire were placed upon the bare wood, though it might be ſlowly corroded by it, and, in time, might thus have a hole eaten

into it; yet, unleſs in particular circumſtances, it could not be made to flame, ſo as to communicate it to other bodies. This quality of larch wood was known in the days of Julius Cæſar, who calls it *lignum igni impenetrabile*. So great is it's inaptitude to burn, that a philoſopher in Italy thought he had made a great diſcovery, during the laſt century, and actually publiſhed a book, for the expreſs purpoſe of convincing his countrymen, that it was *poſſible* to employ larch wood, on certain occaſions, for the purpoſe of incineration; but his experiments went no farther than to ſhow, that it was poſſible to make billets of that wood, when not of a very large ſize, actually flame: but to make it burn well, a blaſt furnace is abſolutely neceſſary. By this means, his treatiſe proves, in the cleareſt manner, the general propoſition announced above; viz. that larch wood, in ordinary circumſtances, may be ſaid to be uninflammable. That it may be conſumed in *a blaſt furnace* has, however, been long known: and the charcoal made of this wood, when thus employed, is deemed much more valuable than any other, for the purpoſe of ſmelting iron; probably it admits of being made to produce a more intenſe degree of heat. I ſhall have occaſion to ſhow below, that my countrymen have

discovered a way by which this quality of the tree renders it peculiarly valuable as a fire wood.

Larch, the shittim wood of Scripture.—On this head, it is worth while to remark, that an ingenious French critic contends, that the table of *shittim* wood, which was kept in the Jewish ark for sacrifices, must have been made of larch, as no other kind of wood is known to possess the same incombustible quality. The cedar of Lebanon, which was so much prised in antiquity for it's many valuable qualities, is well known to be very nearly allied to the larix in many of it's characteristics, both in botany and economics.

The larch is of very quick growth.—Having thus proved, beyond a doubt, that the larix, on account of the very valuable qualities of the wood, deserves to be cultivated in every part of this country; I shall next proceed to show, that, on account of it's quickness of growth, and the variety of soils and exposures on which it may be made to thrive, [it's beauty is universally admitted,] it deserves to be extensively cultivated in every part of this country, as one of the most *profitable*, as well as the most useful, productions that can be reared in these northern regions.

As to it's quickneſs of growth, the following facts will prove ſatisfactory.

Mr. Newnham, before quoted, ſends me the meaſurement of eight trees in a ſmall plantation of his, in the ſpring and autumn of the year 1794, which were as in the following table:

		Height.			*Height.*			*Increaſe.*	
No.		*F.*	*In.*		*F.*	*In.*		*F.*	*In.*
" 1	in Mar. laſt	6	0	in Nov.	10	0	—	4	0
2	— —	5	9	—	10	0	—	4	3
3	— —	5	2	—	9	0	—	3	10
4	— —	4	6	—	7	6	—	3	0
5	— —	5	7	—	9	10	—	4	3
6	— —	5	1	—	9	2	—	4	1
7	— —	4	3	—	7	10½	—	3	7½
8	— —	6	3	—	10	5	—	4	2
Average		5	4	nearly	9	2¼		3	9¼ nearly

" *N. B.* No. 1, encreaſed in circumference 3 inches, meaſured 2 feet from the ground.

" No. 6th, not quite two inches."

But as it may be ſuſpected that theſe are only a few of the beſt, I beg leave to add, that in the plantation from which my ſpires were cut, the trees, at *eight* years growth, meaſured, over the whole plantation, above 20 feet in height on an average; the trees were from ſix to nine inches

high when planted. They now, being 12 years old, meaſure on an average about from 34 to 36 feet in height. This plantation was made on a very good ſoil, and favourably ſituated. The particulars of the culture, to which I muſt attribute their quick growth in ſome degree, will be afterwards ſpecified.

Nor is it only while the tree is young that it makes theſe vigorous ſhoots; for it appears, by the meaſurement of the trees in Dunkeld, that this in a great meaſure continues even till a period of age beyond that which they have as yet attained in this iſland: for 120 feet, in 50 years, gives an average of nearly 2 feet and a half in height for each year of their growth. What a pleaſing thing it is for a man to have a certainty of ſeeing ſuch fine trees of his own planting, if he begins while in the vigour of life, and attains to only a moderate age! What a ſhort time to look back is twelve years;—Look at a plantation, of 35 feet in height, what a beautiful object it is! Such are the allurements in point of pleaſure only. Let us now turn our views to profit, which ought to be the chief object in every extenſive operation in rural affairs.

The greateſt obſtruction to the planting of trees is the proſpect that a long period muſt elapſe

before any emolument can be derived from theſe plantations. This operates as a ſtrong bar to exertions of this ſort: for a few years, to look forward, appears a long period: but when it is paſt, it ſeems but as yeſterday; and it is then we regret the advantages we might have enjoyed, had we not let ſlip the golden opportunity which we ſo careleſsly neglected to improve, while it was in our power. Let him who reads this not dwell upon the paſt: to him it is gone for ever, and cannot be recalled. But let him remember that time now is. Let the preſent moment then be improved: for, if he does not, he will have the ſame mortifying reflections to make a few years hence. There is ſcarcely one man alive who is ſo old as to need to deſpair of drawing profit, even in his own life-time, from the plantations he may now make; and he is certain that if death does not overtake him directly, his mind will be ſoothed with the pleaſing proſpect of being benefited by his labours, and the certainty of deriving pleaſure from their thriving condition in the mean while.

It is a ſingular felicity, in making a plantation of larches, that the wood can be applied to a variety of uſeful purpoſes *while it is yet of a very ſmall ſize*; and that, independent of the profit it

will thus immediately bring, an extenſive plantation of that wood will, in a very ſhort time, furniſh employment to a great number of perſons in manufacturing the various articles that can be made of it; who will thus contribute to his pleaſure and emolument in a thouſand ways that cannot be enumerated. For whatever calls forth the exertions of human induſtry, and furniſhes the means of ſubſiſtence to a numerous people, eſpecially when they are neceſſarily reſident in the country, adds to the proſperity of the ſtate, and contributes to the direct emolument of the perſon on whoſe property they are placed, in a more powerful manner than perhaps any other circumſtance whatever. Thus does a plantation of larches mediately operate as a ſort of creation of the human race. It calls beings into exiſtence who never would have participated of life; and diffuſes happineſs and joy where gloomy ſolitude alone muſt long have kept her dreary abode.

The larch grows on almoſt any ſoil.—To ſhow how theſe changes may naturally be effected, it is neceſſary here to recal what has been already ſaid, that the larix can be made to grow upon almoſt any ſoil, even from a ſtiff clay to a barren ſand, if not drowned in water; and in almoſt

every ſituation where trees of any ſort can be made to grow in this climate; ſo that no tree hitherto known is of ſuch extenſive influence. And though we ſhall ſoon ſee that it might be planted with profit, even upon good land, yet it does not refuſe to grow upon the worſt. Every proprietor of land, therefore, may, if he pleaſes, be benefited by this improvement. If his land be good, the profits will be the ſooner derived. If it be bad, they will be equally certain, though the returns will not be ſo quick, or the produce in an equal number of years, ſo abundant.

A plantation of larches will yield ſome return in 6 *or* 8 *years*—On good land, and under ſkilful management, one who makes a plantation of larches, may begin to draw a return from his land in half a dozen of years, from which period he may draw a continually encreaſing annual return for the whole remaining years of his life, and leave to his heir, at his death, a value in timber upon the land, worth perhaps ten times it's original purchaſe-price. This is the direct profit: but when the collateral advantages that may be derived from an encreaſed population of proſperous people, in a country that is but in part improved, is taken into the account, the benefits

are paſt computation, when plantations have been made upon lands that were originally of little value. And as to the objection, that if every one were to do this, the market would ſoon be overſtocked, it is true: but as every one will not do this, thoſe who firſt begin it, have the certainty of deriving the greateſt benefit from their exertions. What a ſtimulus ought this to be for immediate exertions! Before the firſt planted woods come to full ſale, the value of the timber will be known, and no quantity ſufficient will be brought to market to ſupply the demand.

Uſes to which young larch wood may be applied. —*Hay rakes.*—In ſix, eight, or ten years, according to ſoil and circumſtances, the trees will have attained a ſize ſufficient to be made into hay rakes, and ſeveral uſeful articles. This timber grows ſo ſtraight; it is, at the ſame time, ſo light, ſo ſtrong, and ſo durable, as to be peculiarly calculated for making hay rakes; and, from the peculiarity of it's ſhrinking leſs than any other wood, theſe rakes muſt remain longer firm than thoſe made of any other wood whatever. About two feet cut off from the root end, will form the rake-head; and five feet above that, with a very little taken off from the thickneſs of the under

part of it, will form the handle. No wood is more proper for the teeth of the rake, than ſome larch taken from the red wood of an older tree, ſplit up for that purpoſe; becauſe it is not only tough, but little liable either to ſplit or ſhrink, and will, of courſe, be leſs apt to looſen than any other. The bow may be made of aſh, or, what is ſtill better, becauſe both cheaper and lighter, though equally ſerviceable, of ſome of the wood of the laurel-leaved ſweet ſcented willow, *(Salix pentandria)* ſplit up for that purpoſe. The making of theſe rakes, and other articles, will furniſh employment throughout the year to many perſons.

Shafts for hoes, handles for brooms, ſcythes, &c. —Many other uſes may be made of the trees of this ſize. Among others, nothing is ſo fit for ſhafts to hoes: for it is nearly as ſtrong, and much more durable, than aſh, which alone has been hitherto employed for that purpoſe; and the hoe-heads keep much better upon it than on any kind of aſh wood. Handles for bruſhes, brooms, ſcythes, and innumerable articles of this ſort, would occaſion a vaſt conſumption of theſe ſmall ſpars.

Chairs.—Of the wood of this kind, alſo, might be made light, neat, and ſtrong chairs for ruſh bottoms. In compliance with my wiſhes, ſome chairs of this ſort were made of theſe ſmall ſpires for a trial. The joiner objected to it at firſt, becauſe it is found that when other kinds of wood are worked up with the heart in it, they are apt to ſplit; and if fixed by boring only, they ſhrink ſo much as ſoon to ſhake looſe, which it was expected would happen in like manner with the larch. The reſult of the experiment happily belied the prediction. The chairs keep firm.

Hop-poles, hurdles, gates.—In places where hop-poles are wanted, nothing in nature can be found that will anſwer this purpoſe ſo well as the larch: for one ſet of theſe would laſt againſt two or three ſets of aſh wood. Hurdles, ſpars, and gates, could be made of theſe, both lighter and more durable than any other woods whatever; and when the trees are of a ſize ſufficient for that purpoſe, they may be ſplit down for cart ſhafts; and in mining countries, they could be employed as poſts for ſupporting the roofs of coal-mines, and other uſes of that kind, with ſingular economy.

Neat and durable railing, hen-coops, &c.—The ſmall tops cut off in making theſe various works, would furniſh a neat, elegant, cheap and durable kind of railing, for being put upon the top of low walls, and other things of that kind, for ornament as well as uſe; eſpecially for preventing light ſheep from over-leaping wall fences. One end of them might be let into the coping, whether made of ſod, of clay, or of lime, as occaſion required; and the other end be received into a ſlip of ſawn larch wood, with holes bored through it to receive their points. From the ſtraightneſs of the wood, even without any work, this kind of rail would be made extremely neat, and at the moſt trifling expence. In the ſame manner might be made of theſe materials, hen-coops, crates for packing glaſs, and a variety of other articles, of which I have at preſent no knowledge.

Fences for fields.—But one of the moſt extenſive and beneficial uſes that would be made of this kind of ſmall wood, would be for the purpoſes of incloſing. Theſe ſpars, when the root cut was thick enough to admit of it, might be ſlit up the middle by a ſaw, and cut into lengths of five or ſix feet; or, where ſmaller, they may

be employed whole. As they are always ſtraight, and nearly of an uniform thickneſs, theſe, if driven into the ground for a few inches in a row, at a few inches diſtant from each other, with the ſplit ſides all in one ſide, and the round ſides on the other, would make one of the neateſt and moſt compleat fences that can be ſeen: The tops of theſe uprights being received into a piece of ſawed board, with bored holes in it for that purpoſe; and ſupported at due diſtances within ſide or without, by diagonal (ſloping) *rances*, reaching from the ground to the top. I have ſeen ſome fences of this ſort, made of common ſcotch fir, and nothing can be neater; but unfortunately theſe want durability, which would not be the caſe of thoſe made of larch wood.

Windows, joiſts, flooring, ſhip-building.—Theſe are a few of the uſes to which the ſmall ſpires, ariſing from the firſt thinnings of theſe plantations, might be applied. As they advanced to a larger ſize, the application of them to the various domeſtic uſes are ſo obvious and apparent, that it is quite unneceſſary to enumerate them. It may be only proper to mention, that for windows, joiſts, flooring, panelling,

couples, and every other purpoſe in building, theſe, if made of larch, would be much more perfect than any of the kinds of wood we have been hitherto obliged to employ for theſe purpoſes; and for ſhip-building, eſpecially plank, it would be evidently ſuperior to the oak itſelf: ſo that in a few years, this iſland would be able to ſupply within itſelf abundant materials for her own navy and numerous merchantmen; without being in danger of being obliged to depend upon foreign nations for theſe neceſſary articles; the proſpect of which, for many years paſt, has occaſioned ſo juſt an alarm among the people of Britain.

Barrel ſtaves.—To theſe I ſhall only add, that the neceſſary articles of barrel ſtaves and heading might be furniſhed by ourſelves without the aid of other nations. And this, if ever the fiſheries ſhall *be permitted* to be carried on along our coaſts, to the extent they neceſſarily will be, if ever a Legiſlature ſhall be found ſo enlightened as to perceive the benefits that would reſult from taking off thoſe ſhackles that have condemned ſo many thouſands of her beſt ſubjects to wretchedneſs and want, for centuries paſt, will be found to be a matter of much greater

conſequence than is at preſent imagined: for the unneceſſary expence of barrels, for theſe low priced articles, greatly enhances their price in foreign markets, and retards their ſale, in the preſent ſituation of things.

Hoops.—Of the larch alſo may be made *hoops* for barrels of all kinds that will be cheaper and more durable than any other that has ever yet been adopted. When the larch is new cut down it poſſeſſes a degree of flexibility equal to the willow. If it be immediately ſawed out into plank of a proper degree of thickneſs, it may be then bent into the form of a hoop of the ſmalleſt ſize with the utmoſt flexibility; and, if that plank be run down into ſlips of the proper breadth, it will make the neateſt hoops that can be imagined, being of an uniform ſtrength and thickneſs in every part. Theſe hoops, if made up into coils of a proper ſize, when freſh cut up, would eaſily take the ſet ſo as to keep it, and would only require to be ſteeped for a proper time in water when they were to be put upon the barrels, ſo as to admit of being brought to the true ſize as required.

Hoops of this kind would be uſeful for barrels of every ſort; but they would be peculiarly

valuable to the Weſt-India merchant, who is often ſubjected to heavy loſſes from the rotting of the hoops on his rum puncheons on their paſſage home, by which much leakage is incurred, and ſometimes even the whole liquor is ſuffered to run to waſte. From the extreme durability of larch wood, there is no room to apprehend that the ſmalleſt tendency to decay would be perceived on theſe hoops during this paſſage. It is ſcarcely neceſſary to add, that the beſt larch plank, and that alone which is free from knots, would be proper for making hoops, ſo that it will probably be many years before we can obtain much timber proper for hoops in this country, where no attention has hitherto been beſtowed on rearing larch wood free from knots.

Uſes of larch bruſh-wood.—Hitherto I have only ſpoken of the uſes that may be made of the *ſtems* of theſe trees; but there is not a branch, nor the twig of a bit of the bruſh, that may not be employed, with great economy, to ſome uſeful purpoſe. The larger branches might be employed for fencing of various kinds, and the ſmaller pieces of bruſh might be applied to the various uſes I ſhall now ſpecify.

For filling drains.—Wherever draining is wanted, which is the caſe in almoſt every diſtrict in this kingdom, nothing could facilitate this operation ſo much as abundance of larch bruſh. All other kinds of bruſh-wood are ſo periſhable, that however deſireable it may be, in other reſpects, to employ theſe materials, yet the drains are ſo ſoon choaked up by the rotting of the bruſh, that it has been found neceſſary to reſort to other materials, which coſt a much greater price, in place of them. Hence drains are now almoſt univerſally filled with ſtone or brick; but theſe articles, even where they can be obtained, are ſo expenſive, as to have greatly retarded the practice of under-draining, and, with that, diminiſhed the general produce of the nation to an aſtoniſhing degree. As larch bruſh is nearly indeſtructible by rotting, this inconvenience would be thereby removed.

For fuel.—In countries, too, where fuel is ſcarce, nothing could ſo well ſupply the want of it as the bruſh of larch wood; and here a peculiarity occurs, that greatly diſtinguiſhes this tree, in an economical ſenſe, from all others. In regard to all other trees, conſidered as fuel, it is the *wood*, and not the ſmall branches,

which forms the beſt fuel; but it is quite the reverſe with the larch, the *wood* of which cannot be applied to this uſe; but in return, the ſmall branches of this tree are found to make a fire nearly equally well with the larger billets of other trees. This is a diſcovery that was made, as moſt others have been, by accident, in the ſouth of Scotland, a few years ago, that deſerves to be generally known.

A gentleman, who owns a ſmall eſtate in Etrick foreſt, where coals are at a great diſtance, and fuel very ſcarce, thought he could not employ a conſiderable part of his land to a better uſe than that of planting trees upon it, chiefly with a view to ſell them for fire wood. At the beginning, he planted ſcarcely any other tree except the ſcotch fir; but obſerving, by degrees, the ſuperior luxuriance and rapidity of growth of the larix, he gradually began to plant ſome of theſe, encreaſing the number more and more, from year to year, as he came better to remark their ſuperiority over the others. When his plantations had advanced ſome years, he began to lop the under branches from the trees as they encroached on each other; and carrying theſe branches to a ſide, he arranged them into lots of a convenient ſize for ſale, and then ſold

them on a fixed day, by auction, to the higheſt bidder. As his larches came forward, he treated them exactly in the ſame manner; and arranging theſe in heaps ſimilar to thoſe of the fir, they were ſold at the ſame time with the others. Soon after he began thus to prune the larches, he was not a little ſurprized to find, that a heap of larch bruſh ſold readily at double the price at leaſt that the ſame perſons would give for one of fir of the ſame ſize. On aſking the reaſon of this ſtriking peculiarity, the purchaſers ingenuouſly told him, that when they put a faggot of fir-bruſh upon the fire, it got up into a blaze, and was almoſt inſtantly conſumed, ſo as to be of little ſervice, and occaſion much trouble and inconvenience; but when they put a faggot of larch upon the grate, it took fire more ſlowly, did not burn ſo fiercely, but continued, with a clear ſteady heat, nearly as long, and with as good effect, as billet-wood of fir would do. Thus did experience teach them a leſſon of the utmoſt conſequence in rural economy, and clearly eſtabliſhed the fact, that there is ſcarcely a ſituation in this iſland in which the ſmalleſt twig of this ineſtimable tree may not be applied to ſome very uſeful purpoſe in life.

I ſhall proceed to treat of the manner in which this tree may be reared with economy; after having mentioned one other valuable article that may be drawn from it, without either hurting the tree, or diminiſhing it's value in any reſpect.

Venice turpentine yielded by the larch tree.—In the Venetian territories, where this tree has abounded for many ages, the natives have been long in the practice of extracting from it a ſemi-fluid balſam, which, from the place where it is chiefly procured, has obtained the name of *Venice turpentine*. There are two kinds of Venice turpentine: one of them is extracted from the bark of the *ſilver* fir, by a peculiar proceſs; this is deemed the fineſt ſort. The other, which is ſomewhat inferior in quality is extracted from the larch tree. This reſin of the larix is not found in the bark, but in the body of the tree itſelf. It is not to be obtained in conſiderable quantities from very young trees; and when the wood begins to grow more ſlowly through age, the turpentine gradually dries up, till at laſt it affords none at all: It is only after the tree has attained the thickneſs of ten or twelve inches diameter that it is thought worth while to ga-

ther the turpentine; and from that time, for forty or fifty years, if it continue ſo long in vigorous growth, the tree will continue to yield an annual produce of from ſeven to eight pounds of turpentine from each tree. I do not know the exact price at which this ſubſtance ſells; but believe it is from three-pence to four-pence *per* pound: ſuppoſe it to be no more than two-pence, and that the annual produce is ſix pounds, that would be at the rate of one ſhilling each tree *per annum*. The gathering of which, though not expenſive, would add to the employment of the people.—The method practiſed is this:

A hole is bored by an auger into the tree near the root, ſlanting a little upward till it reaches near to the heart of the tree: into this is fitted a kind of cock, to conduct the balſam, which oozes out of it in a ſemi-fluid ſtate, into a veſſel ſuſpended at the cock for receiving it. This proceſs is continued from the end of May till the end of September; the operator uſually going over the wood once a day, to examine the receivers, and empty what is collected into a general receiver to be carried home. When the trees will yield no more for that ſeaſon, the whole balſam that has been obtained is preſſed through a

cloth to purify it, and is thus brought to market. It continues always in a ſemi-fluid ſtate.

An Engliſh acre will contain 682 trees, at the diſtance of eight feet from each other: at the rate above mentioned, the value of the produce in turpentine would be 34l. 2s. *per annum*, *per* acre, on the ſuppoſition that the trees ſhould yield as much of that ſubſtance in Britain, as on the borders of the Adriatic Gulf. Whether it will do ſo, remains to be aſcertained by experience. I have never heard of a ſingle trial that has been made in Britain, with a view to aſcertain this circumſtance. The produce above given, is mentioned upon the authority of M. du Hamel, whoſe general character for accuracy ſtands high in the republic of letters.

Manne de Briançon.—In the ſouth of France they alſo gather from this tree a ſubſtance which is celebrated by the authors of Dauphiné, under the name of Briançon Manna. *Manne de Briançon.* It is found in the form of a hoary powder, early in the morning. With the value and uſes of this manna I am a ſtranger, having never ſeen any of it. It is alſo ſaid, that at Venice, the bark of this tree is employed for the purpoſe of tanning; but as the virtues of it in this reſpect

are not known in Britain, I put no reliance upon it.

§ IV.

Directions for rearing plantations of larch trees for profit.

HITHERTO the larch tree has been cultivated in Britain chiefly for ornament, and it is only of late that the mode of rearing it with economy, *for profit*, has begun to be adverted to. It is in this laſt point of view, alone, I am at preſent to conſider it; ſo that ornamental plantations muſt be here put out of the queſtion.

It has been a very general practice in this country, to mix all kinds of trees together, in making a plantation, unleſs where theſe conſiſt entirely of the ſcotch fir. Fir plantations were very univerſally adopted till of late years, eſpecially in the northern parts of Scotland, where young plants of fir are reared at a very low price.

The larch ſhould be planted entirely by itſelf.— As larch plants began to become common, a

few of theſe were gradually interſperſed among firs or other trees; but it has been found, by experience, that when this is done, in almoſt every ſituation or circumſtances, the larch ſo much outgrows the fir, and every other tree, that it ſoon overtops them; in which ſituation, where the plants of larch are thinly ſcattered, at a diſtance from each other, they are expoſed to the violence of the wind, without ſufficient ſhelter, which bends and twiſts their tender top-ſhoots, ſo as greatly to retard its growth, and to disfigure the tree.

Having obſerved this to be invariably the caſe, it occurred to me, above a dozen of years ago, that no plant could be found ſo proper for affording ſhelter to the larch as the larix itſelf, which, if planted thick enough, would ſoon intermix branches, and thus give and receive mutual ſupport on all occaſions. With this view was made the plantation of larches ſo often mentioned above, in which the young trees were at firſt planted at the diſtance of no more than two feet aſunder. The conſequence has been, that they have ruſhed up with a rapidity unknown in any other ſituation; and the trees are ſo ſtraight, ſo clean, and ſo healthy, in all reſpects, as abundantly to prove that this is the proper mode of culture to be

adopted wherever this tree is intended to be reared with *profit*. On this, as a ſure foundation, the ſuperſtructure now to be deſcribed may be ſafely raiſed.

Difference between natural grown woods and plantations.—It has been often remarked, that no wood of the fir tribe, which has been reared in artificial plantations, has ever equalled in *quality* that which is produced ſpontaneouſly from ſeeds ſhaken by the hand of nature.

On comparing the natural with planted wood, the difference is found to conſiſt in two particulars only, where the ſoil has been of the ſame ſort. The natural wood is in general cloſer in the grain, and conſequently harder and deeper in colour; and it has alſo fewer knots in it.

The reed of wood.—What is called *the grain*, or reed of wood, is formed, for the moſt part, by a ſeries of circular rings running all round the heart of the tree, as is diſtinctly ſeen in a tranſverſe ſection of the tree; each of theſe rings contains a harder and ſofter part, plainly diſtinguiſhable from each other, for the moſt part, by their colour alſo, which are formed by a ſeries of tubes of different kinds, running parallel to each

other from the bottom towards the top of the tree, that are ſeparated from each other, at a leſſer or greater diſtance, by a ſofter parenchymatous matter. Theſe tubes, or fibres, are ſeen in every longitudinal ſection of the tree, running in parallel ſtripes, and conſtitute what is called the reed of the wood. And as one of theſe rings is added to the circumference of the tree each year of it's growth, and forms the whole increment of the tree for that year, it follows, that the leſs that increment is, or, in other words, the ſlower the trees grow, the leſs will be the breadth of theſe rings, and, of courſe, the cloſer the grain of the wood, and the harder alſo it will be: for it would ſeem that the number of tubes produced each year is nearly equal; but that the quantity of ſoft parenchymatous matter in which they are imbibed, is augmented in proportion to the quickneſs of the growth of the tree, which makes the reed both wider, and the general texture ſofter, than where it grows more ſlowly.

Knots in wood how produced.—Theſe parallel ſtripes or reed never are interrupted in coniferous trees, except where a branch ſprings out from the body of the tree. In that caſe, wherever a branch intervenes, it forms an interruption to the

direction of the parallel fibres, which, at that place are deflected into the position that the branch assumes, and forming a ring round the pith of that branch, the fibres run parallel with the pith of the branch in it's longitudinal direction.

As these branches spring out from the stem, for the most part in a direction nearly at right angles with the stem of the tree, it follows, that when the wood is sawed into plank longitudinally, the saw, when it crosses one of these branches, must make a transverse section of it, as in the direction of the line of A. B. Fig. 1*st*. This forms the blemish in deal, called *knots*, the appearance of which is seen in Fig. 2*d* [*see the plate at the end of this essay*.]

In regard to these knots, the following particulars are observable; viz. 1*st*, that the size of these varies in deals cut out of the same plank. If a deal were slit down in the direction of the line A. B. Fig: 1*st*, the knot in that deal would consist of no more than *four* concentric rings; but if it had been slit in the direction F. G. it would in that place have consisted of *six* rings, and so it would turn wider and wider, as you receded from the centre of the tree to the circumference, or as long as the branch continued to grow.

Hence, as a neceſſary corrolary, we muſt perceive that no *large* knots can ever be found near the heart of the tree, and that very large knots can only be found towards the circumference:

If, by deſign or accident, a branch be cut over ſmooth with the ſurface of the tree, the branch from that moment grows no more: but as the tree advances in growth, by the addition of a new ring each year, it gradually heals over the wound, and from that moment the ligneous fibres run over it parallel to each other, exactly as if no branch had ever been there, as in Fig. 3*d*; ſo that all the wood which is formed beyond that cut will be perfectly free from knots of any kind.

If the amputation has been made clear over at once, while the branch was ſtill growing, the fibres of the trunk will be joined in continuity with thoſe of the knot, and it thus forms a firm live knot, if the phraſe be admitted; but if the branch die, and be ſuffered to remain adherent to thetree, that branch receives no farther additions; and although the tree continues to advance in ſize, and ſurround the branch, yet it has no farther connection with it than contiguity only; and it then forms a *dead* knot. The dead wood, in this caſe, when the deal is ſawed acroſs it on both ſides, may be taken out of it as a cork, without

force, and thus leaves a *hole*, in place of a *knot*, in the deal, as is plain by inſpection of Fig. 4*th*, where the knot has continued alive till it reached the dotted line, till which time it received an annual increment, and had it's continuity with the fibres of the wood uninterrupted; but from that period, being dead, it encreaſed no more, and thus formed a hole in the deal through which it penetrated.

Some corollaries, to be drawn from the phyſical progreſs of a tree, might be here noticed, which will explain ſome very common phenomena in the ſtructure of fir wood. I ſhall only ſtate a few.

Though every branch, as well as the ſtem, receives a ring of increment each year, yet as the branches do not encreaſe in ſize ſo faſt as the ſtem, it follows that theſe rings are cloſer than thoſe of the ſtem. And as it is found to be a rule, I believe without exception, that the cloſer theſe rings, the harder is the wood, and the reder the colour of it. Hence it invariably happens, that the knots are of a cloſer grain, reder colour, firmer texture, and more durable quality, than that of the wood itſelf, though uſually more brittle alſo.

And as theſe qualities are augmented in proportion to the ſlowneſs of the growth of the one part, when compared with the other, it muſt happen that the ſmaller the knot is, if ſituated at the ſame diſtance from the heart of the tree, the firmer, and reder, and more durable it will be. Theſe, when the circumſtances are adverted to, are obvious corollaries.

The difference between natural and planted wood explained.—By keeping theſe particulars ſteadily in view, it will not only be eaſy to account for the ſuperiority of natural wood over that which has been planted; but, at the ſame time, we will be led to perceive in what manner artificial plantations of coniferous trees ought to be ſo managed as to approach as nearly as poſſible to perfection.

In woods of coniferous trees, the progreſs, when left to nature, is this. The ſeeds being ſtrewed very thick upon the ground, the plants, where the ſurface is favourable, ſpring up very cloſe upon each other. Being ſtraitened for room, their growth is ſtinted, and they hold a hard ſtruggle, for ſome years, which ſhall get the better of the other. By degrees, the weaker plants are overtopped by the ſtronger, and die;

but ſtill others ſtruggle for life, and maintain the conteſt: and ſo it goes on without interruption during the greateſt part of the period of their exiſtence, or at leaſt till they have attained a great height,—when the boughs of the moſt vigorous trees, ſpreading out above, overtop all thoſe that are near; and thus a ſufficient ſpace is allowed for theſe to remain unmoleſted till they attain their full ſize.

During this long ſtruggle for life, the progreſs is greatly retarded; ſo that their growth is ſlow, and the fibres of the wood of courſe very cloſe and hard. The ſide branches, too, having no room to ſpread abroad, are kept weak and puny, and are ſoon ſuffocated by thoſe above them, and die. In conſequence of the agitation by winds, and the conſtant rubbing of the trees around, theſe dead branches ſoon are broken off and fall to the ground, before the ſtem has advanced far around the dead ſtump. It is no ſooner rubbed off, than the bark begins to cloſe over it. The ſtem thus becomes clear of branches and ſmooth, and all the wood that afterwards grows over it, is fine and free from knots. Hence it is that deal, towards the heart of the tree, is always much fuller of knots than nearer the circumference, though theſe internal knots, for the rea-

ſons above given, will always be of a ſmaller ſize than thoſe that reach near to the outſide of the tree.

In artificial plantations we follow an oppoſite courſe. Anxious to admire the progreſs of our trees, no meaſures are adopted for retarding their progreſs, at an early period, but rather the reverſe: and were we even inclined to follow the progreſs of nature, the very expence of procuring and putting into the ground the plants, amounting to many millions on an acre, would prove a deciſive bar to ſuch enterprizes. The young trees are of courſe planted at a great diſtance from each other, and are encouraged to grow as quickly as poſſible, and thus to make the wood coarſe in the grain, and ſoft. The branches, too, having room to ſpread wide on every ſide, advance with great luxuriance, and continue to grow till they attain a large ſize, and of courſe render the deal full of large and unſightly knots throughout it's whole extent. Where utility and profit are aimed at, our attention ſhould be directed to remedy theſe evils as much as the circumſtances will admit.

To effect this, no method appears to me ſo eaſy to be reduced to practice as the following.

How to make planted wood reſemble natural grown trees.—Though we cannot afford to make our plantations as thick as nature does, we ought to approach as near it as prudence will admit; and, I am ſatisfied, that by planting larches at two feet diſtance, the benefits to be derived from the practice will do more than repay all expences attending it. Perhaps it might be ſtill better, if the plants were placed at no more than 18 inches apart; but not being *certain* of this fact, I ſhall, for the preſent, ſuppoſe, that two feet is admitted to be the moſt eligible diſtance *(p)*.

Plantations ſhould be made very thick.—At two feet apart, an Engliſh ſtatute acre will contain 10,890 plants. (A Scotch acre 12,960 plants, which is about 10,000, at the rate of 12 ſcore *per* hundred.) For the conveniency of thinning, and the other operations to be after mentioned, theſe ought all to be planted in rows, where the nature of the ground will admit of it. To do this, a ſmall line, meaſuring ſixty yards in length, ought to have knots tied upon it, at every length of two feet, and a feather, a coloured rag, or other diſtinguiſhable object, ſtuck into each knot. This will mark the place where the trees ſhould be put down. And if two men be employed,

after ſtretching the line, at a proper meaſured diſtance from the laſt, each of the men begins at the end of the line, and putting down a plant at each mark, work till they meet near the middle, when they ſhould turn back, ſhift the line, and begin anew; and ſo on they may advance till the whole field be planted.

The trees ſhould be planted out while very young.—It is unneceſſary to enter into minute details on this head. I would only beg leave to obſerve, that many advantages reſult from planting very ſmall and young plants, in preference to thoſe that are of a larger ſize. And this requires to be particularly adverted to, where they are to be planted ſo cloſe as is here recommended. If the ground has been in tillage, it will be a great advantage to have it neatly plowed over, and harrowed before winter. At any rate, it ought to be laid dry, ſo as that no ſtagnant water remains on the ſurface, at any time of the year, if poſſible. With this view, the water-furrows, if it be plowed, and the ſoil retentive, ſhould be neatly cleared out after harrowing. No weed is ſo deſtructive to young plantations as graſs: for where that abounds, if the trees be planted, while of a ſmall ſize, they will be infallibly over-

topped by it and choaked; and if they be planted large, they ſeldom ſucceed well; many of them die; and it is long before the ſurvivors take a full growth: ſo that, conſidering all theſe circumſtances, and the expence of putting in ſuch large plants, where the ſward is tough, it will be more adviſeable, in every ſuch caſe, to cauſe the ſurface to be pared by the ſpade before planting; and theſe parings be either carried wholly off the field where the thin ſurface paring is wanted; or where that is not the caſe, by turning it over flat upon it's back with the graſſy ſide undermoſt; and, in this caſe, if a little more than half the ſurface be turned over, it will cover the part upon which it is laid, ſo as to prevent the graſs from growing up for ſome years; but unleſs it wholly overlays the ſward, the graſs will advance with great luxuriancy round the edges, ſo as to render the paring of much leſs benefit than it would have been. Where the ſurface is ſmooth, and not too ſteep, or incommoded by ſtones, a plough might eaſily be contrived to perform this neceſſary operation.

Plantations muſt be compleatly incloſed and planted in ſquares.—We ſhall ſuppoſe the whole field to be thus prepared and *compleatly* incloſed,

(for unleſs this is to be done in the moſt perfect manner, ſo as to guard againſt all intruſions, it is wrong to attempt ever to plant trees,) the plants will ſtand in regular ſquares, two feet apart, as in Fig. *5th.*

In this ſtate they may remain ſix, eight, ten, or twelve years, according to the richneſs of the ſoil, or the purpoſes for which the thinnings are wanted, when they ſhould be thinned for the *firſt* time. The branches will in general intermingle with each other in the ſecond or third year after planting; after which period they will give and receive mutual ſupport, and advance for a time with vigour.

Firſt thinning, how to be made.—The firſt thinning ought not to be too long delayed, leſt the tops, by growing too cloſe, ſhould be ſo much ſmothered as to occaſion a hurtful gap when the thinnings are taken away.

At the firſt thinning, one row ſhould be taken clean out, ſo as to leave the plants there four feet apart; and allowing three rows to remain entire, take out the fourth, as in Fig. *6th*; and ſo on over the whole field. By this procedure, though the row on each ſide the open will loſe it's ſupport on *one* ſide, it's branches, being ſtill

intermixed with thoſe on the *three* other ſides, will give it ſufficient ſupport. It is neceſſary to cut out a row compleatly, to admit of trailing out the long ſpires together with their tops, which could not otherwiſe be done.

The ſecond thinning.—In conſequence of this open, the branches above will be permitted to grow more freely over the *open*; and in this ſtate they ſhould be ſuffered to remain till they there intermingle once more, when they ſhould receive the ſecond thinning, by taking out the middle row that was left at the former thinning, when the plants will ſtand as in Fig. 7*th*, in rows four feet apart, and two feet from each other in the rows. By this means, each tree is ſupported by thoſe on each ſide of it *in the row*, whoſe branches are cloſely intermingled, as well as by thoſe on one ſide, where firſt opened; ſo that ſtill they are open only upon *one* ſide, while they receive ſupport on *three* others.

The third thinning.—When the branches are cloſed in the laſt made open, the third thinning may be given by then cutting out every fourth row *croſſwiſe*, exactly as was done in the oppo-

ſite direction in the firſt thinning, when the plants will ſtand as in Fig. 8*th*.

The fourth thinning.—After a proper interval of time, the fourth thinning may be given, by taking out the croſs row that was left between the two contiguous to it. And now the whole trees in the plantation are once more reduced to ſquares, ſtanding at 4 feet apart, as at Fig. 9*th*.

There will now remain at the rate of 2722 trees *per* acre: ſo that 8168 plants have been taken out during theſe ſucceſſive thinnings.

Benefits to be derived from theſe thinnings.—This is the diſtance at which moſt people would have choſen to plant their trees at the beginning; but, in conſequence of the management recommended, many benefits will acrue, independent of the profit to be derived from the ſale of the thinnings, which, in moſt ſituations, will be an object worth the attending to.

In the *firſt* place, the plants, by ſooner cloſing upon each other, are for a ſhorter time after planting diſtreſſed by the wind, and therefore advance more kindly, and riſe cleaner and ſtraighter in the ſtem.

Secondly, The under branches, by being quickly ſuffocated, ſooner die and are rubbed off, and never attain to a ſize to make large knots, as they muſt infallibly do, if planted at firſt ſo far apart. The ſtems are thus rendered to approach in ſome meaſure to the ſtraight cleanneſs of natural woods. And if attention were beſtowed to prune off the under branches, as they gradually begin to decay, eſpecially of the few trees that are intended ultimately to remain for timber, the wood would be rendered even cleaner than the greateſt part of that which is got from natural woods: and,

Laſtly, By mutually checking the rank growth of each other, the wood will be rendered cloſer and finer in the grain than it otherwiſe could have been; and this not only without any loſs, but with great profit to the owner; as, inſtead of large dangling branches, which are of little uſe in any ſituation, he would obtain upright ſpires from the weedings, which, in every ſituation, may be converted to ſome uſeful purpoſe. And, in many caſes, might be a ſource of great emolument.

Farther thinnings, how to be conducted.—After a proper interval, the trees might be thinned, after the ſame manner as has been deſcribed, till

they were gradually reduced once more to ſtand in ſquares, at *eight* feet apart, which is perhaps the greateſt diſtance that ever ſhould be allowed to trees of this kind: for, by being thus circumſtanced, their ſmall tops would mix and ſupport each other: they would have ſufficient room to grow without ſtarving; and by ſtinting each other in reſpect to nouriſhment, though each individual tree would advance more ſlowly than it would do if allowed more room; yet there can be no doubt that a greater quantity of wood, *upon the whole*, might be obtained from the ſame extent of ground in an equal length of time, than if it had been thinner; and there is reaſon to believe the wood would be much finer in quality.

Yet here, as in regard to the proper degree of thinning, I have had no experience of the fact: I reaſon only upon probability, and therefore am far from ſpeaking deciſively. Should experience ſhow that a greater degree of thinning may be given to theſe plantations with ſafety, doubtleſs the effects of it, in an economical point of view, ſhould be tried; and that practice ultimately adhered to, which ſhall promiſe, on the whole, to be moſt beneficial. If thinning is to be at all adopted at this advanced age, it will require to be done with ſtill more precautions, in order to

inſure mutual ſupport, than when the plants are of a more humble growth; becauſe the wind will have much more hold upon their tops, and will act with a more powerful lever. When plantations of firs have been ſuffered to ſtand cloſe a long while, and then ſuddenly thinned, without due attention to theſe circumſtances, they are ſeen often to die, before they have attained an age at which their wood can be applied to any very uſeful purpoſe. In this point of view, theſe cautions and the gradual thinning, recommended above, to commence at a very early period, and never to be long interrupted, will be found to be highly beneficial, and ought not to be overlooked.

At eight feet apart, an acre will contain 680 trees: ſo that the trees cut out during the ſecond proceſs of thinning, have amounted to the number of 2042.

If the thinning be begun from the ſixth to the tenth year from the time of planting, as circumſtances ſhall indicate, the whole may be compleated thus far by the thirtieth or fortieth year of their growth, during which time there will have been ſold 10,210 ſpars from 15 to 50 feet in height, and proportional thickneſs, from each acre. If it be thought adviſeable to continue the thinning farther, after this period, no whole

rows ought ever to be cut out any where, but only a ſingle tree here and there, ſo as not to deprive thoſe around it of ſupport too much at once. In this way, perhaps, the thinning might admit of being ſafely continued for an indefinite number of years, where the ſituation is not very much expoſed.

Hints reſpecting the profit to be derived from theſe plantations.—I might now make a calculation with a view to ſhew what might be the amount of the profits to be derived from this practice; but I have a great averſion to calculations of this kind: for as all the data muſt be mere hypothetical aſſumptions, it is the eaſieſt matter imaginable for the calculator, in aſſuming a little more or leſs of theſe data, to bring out the reſult preciſely to his own wiſh, without any ſtriking obvious fallacy on his part. It is no part of my wiſh to miſlead the reader, but merely to inform him to the beſt of my power. From the facts already ſtated in different parts of this diſquiſition, every reader may, if he pleaſes, make out from theſe a calculation adapted to his own ſituation; for every perſon muſt be aware that more than four times as much money may be drawn for the ſame quantity of materials of this ſort, in

one part of the country, than in another. Doubtleſs, if I had not thought that, after making a ſufficient allowance for every unobſerved contingency, the proſpect of advantage to be derived from this practice, where adopted, was ſufficiently inviting to encourage proprietors boldly to venture upon it, on a pretty extenſive ſcale, in moſt ſituations, I ſhould, not have taken the trouble to enter ſo fully into the inveſtigation on this occaſion. Nor ſhall I add more on this head, except briefly to obſerve, that if we ſhall ſuppoſe that the ſale of 10,210 ſpars, on an average ſuppoſe of 30 feet in length, from one acre, would be ſufficient to defray all the expences incurred on making the plantation and upholding it, which will not, I ſuppoſe, be deemed an unreaſonable ſuppoſition in almoſt any ſituation:—and that each tree, at 50 years growth, inſtead of containing 360 feet of wood, as thoſe at Dunkeld are known to do, —theſe trees ſhould, at the ſame age, meaſure no more than 70 feet each, which is leſs than one fifth part of the others: in that caſe the 680 trees on an acre would at fifty years of age, contain 47,600 cubic feet of timber, which, at one ſhilling *per* foot, would amount to 2380l., from which, if you deduct the rent, which we ſhall for the preſent caſe ſuppoſe to be 5 ſhillings *per*

acre, which, for 50 years is 10l. and intereſt for payment withheld, ſay 15l. more, in all 25l., there will remain 2355l. free profit; without taking into the account any thing at all for the article balſam, or any other contingency. The concluſion we are forced to draw from theſe facts, which do not ſeem liable to any valid objection, are ſufficiently inviting, were more than three fourths of the ſum to be deducted for unforeſeen contingencies, as to be a ſufficient inducement, one would think, for any reaſonable perſon, whoſe ſituation admits of it, without throwing himſelf into embarraſſing circumſtances, to proceed without heſitation in this improvement. I ſurely can have no motive for inducing any perſon to attempt it, except the conviction that, ſhould ſuch plantations become general, the comforts of the lower ranks of people in this iſland would be much augmented; the general induſtry of the people greatly excited; and the wealth of individuals, as well as the general proſperity, receive by that means a very great addition. It is now about twenty-two years ſince I firſt endeavoured to turn the attention of my countrymen in Scotland towards this uſeful tree, by ſome obſervations in a popular work that had then a very general circulation through Scotland. [Afterwards pub-

liſhed by itſelf, in a volume, called, Letters on planting timber trees, by *Agricola*.] It then attracted notice, and has, I doubt not, had its effect, along with other cauſes, greatly to extend its culture. At that time I think it would have been then a high eſtimate, to ſuppoſe that 50 thouſand larch trees were annually reared in Scotland. At the preſent moment, the demand for that tree is ſo much encreaſed, that from the neareſt eſtimate I can make, one nurſeryman in Edinburgh alone has raiſed this ſeaſon above five millions of larch trees; and I do not ſuppoſe that, taking all Scotland together, there are not fewer than twenty extenſive public, beſides a great many private nurſeries, all of which are chiefly ſtocked with larches. [The Duke of Athole alone has been in the practice, for many pears paſt, of rearing himſelf, and planting out from his own nurſeries, at the rate of one hundred thouſand larches *per annum*, on an average of years. I myſelf have planted out above 200 thouſand larches on an average of the laſt three years, in Aberdeenſhire.] This affords a happy proſpect of the benefits that the northern parts of this iſland will in time derive from this article. I am ſorry to obſerve how comparatively few the plantations of larches are in England; and I alſo re-

gret to think that, among the numerous plantations hitherto made in Scotland, there is ſo little proſpect of obtaining much fine clean wood. Thick unmixed plantations of larches are but juſt beginning to come into uſe.

Sufficient fences neceſſary to protect plantations.—The neceſſity of protecting trees of all kinds from the intruſion of beaſts, eſpecially when young, is more generally admitted in theory than practice. I conſider it, myſelf, as a *ſine qua non* for rearing healthy trees of any kind; but in regard to the larch, it becomes ſo indiſpenſibly neceſſary, that I ſhould certainly diſſuade any perſon from planting trees of this ſort, unleſs he were determined, at all events, to have the ground ſo compleatly fenced at all times, as effectually to prevent any intruſion of domeſtic animals; for without this preliminary, he will reap neither pleaſure nor profit from the enterpriſe. The larch, though it will ſometimes recover its top, when the tender twigs of it are cut over, and admits of being cut in the ſide by ſciſſars better than any other coniferous tree known in this country, yet is extremely impatient of wounds in its *bark*; ſo that a touch there, which would ſcarcely be felt on any other tree, will make a

larix periſh entirely. For this reaſon it requires not only to be thoroughly fenced while young, but carefully protected even after it has attained a conſiderable magnitude. For this, among other reaſons, I ſhould prefer leaving the woods thick, even at an advanced age, to thinning them conſiderably: for thus graſs will be prevented from growing below, and no temptation be given for putting cattle or other animals among the trees, which might injure their bark.

Large incloſures recommended.—In order to diminiſh the expence of plantations, the incloſures ſhould be made as large as the circumſtances of the caſe will admit: for the larger theſe are, the ſmaller, proportionally, is the expence of the plantation. This is a propoſition ſo plain as to ſtand in need of no illuſtration.

Stone walls.—The nature of the fence muſt in many caſes be determined by circumſtances: where ſtones can be got very good, and at a ſmall expence, walls may be made a very good defence againſt *cattle* for a time; but light bodied *ſheep* will readily overleap them. Where larch ſpars are already to be had in the neighbourhood, a low rail of a foot, or 15 inches in height, form-

ed of the top twigs ſtuck into the coping, ſlanting outwards, will prove a perfect defence for many years. Where this is wanting, the wall can never be relied upon.

Ditch and bank fence.—In level ſituations, where the ground can be eaſily dug, a ditch and bank may be reared, as in Fig. 10, at a ſmall expence. B, C, is raiſed of ſod four feet high, C, E, D, is a ditch four feet wide at top, three feet deep, and about nine inches wide at bottom. The earth taken from the ditch forms the bank C, B, A, the ſod wall facing outward: A being the inner area for the plantation. This mound will not, in it's preſent ſtate, be an adequate fence againſt ſheep; nor even for any length of time againſt cattle; but by adopting the following precautions, it will become in two years' time a perfect defence againſt both.

Furze, it's uſe in fencing.—If there be ſward upon the ſurface of the ground D, take off a ſod from it, one foot at leaſt in breadth, which may be employed in raiſing the bank B; and in it's place lay ſome of the looſe earth that comes out of the ditch; lay alſo ſome of that looſe earth upon the leget C, which ought to be left from

6 to 9 inches broad for that purpoſe, ſo as to cover the ſward there. When the bank is finiſhed, draw a ſmall drill with a hoe all along at D, ſix inches back from the edge of the ditch, among the looſe earth, and another drill at C, cloſe by the bottom of the bank; ſprinkle ſeeds of the common whin or furze, *(Ulex Eurpæus,)* pretty thick in both theſe drills, and afterwards cover them carefully over with earth. Theſe ſeeds, if good, will come up readily the following ſpring; but as it is of much conſequence that no blanks ſhould be in either of theſe drills, they ought to be carefully examined along their whole length, as ſoon as the plants appear, and the wants ſupplied immediately with freſh ſeeds, ſo as to prevent gaps: another row of furze ſeeds ſhould be ſown upon the top of the bank B, and the work is compleated.

The whins at C, D, and B, will puſh out with vigour, ſo as in moſt caſes to attain the height of one foot each before autumn. In the year following, they will advance faſter, and will effectually prevent ſheep from jumping over; for they dare not come near the edge of the ditch to take their leap, and the buſhes on the top at B preſent a formidable ſcar in their face. And as to cattle, which, if allowed to go in the ditch, would

gradually pull down the bank with their horns, if they ſhould at any time get into the ditch, the two rows of furze nearly meeting upon their ſides would incommode and frighten them ſo much, as to induce them to get out of it as ſoon as poſſible, which they could only do by coming to the low ſide D. If they once got into that ſituation, they would feel it ſo diſagreeable, as to guard carefully againſt coming there again.

The larix itſelf, it's uſes in fencing.—To preſerve the furze from getting open at the bottom, one of the rows ought always to be cut over cloſe by the roots each year; 1*ſt*, the row C, leaving D, and B; 2*d*, the row D, leaving C, and B; and 3*d*, B, leaving C, and D; and ſo on alternately. In this way the fence may be kept up for the ſpace of ten or twelve years. After that period, the mound will in general crumble down of itſelf, and cannot be relied on as a ſufficient fence. To prepare for this evil, which may be expected, the row of trees next the bank ſhould be carefully preſerved all around, and if planted originally at no more than one foot aſunder, leaving an interval of three or four feet within, the trees will riſe up by way of hedge, as at F, fig. 11*th*, which, if made of larch, may be cut

in the ſides, if thought proper, by ſheers, ſo as to thicken it quite down to the bottom. This kind of hedge may be ſoon made an effectual defence againſt animals of any ſort, by the following contrivance. At the time the larches are planted, plant a ſweetbriar between each tree. This plant grows freely. To make it ſtill more luxuriant, let it be cut over by hedge ſheers *cloſe* by the ground, the firſt or ſecond autumn after planting, the twigs to be drawn out and laid to a ſide. It will ſend out very luxuriant ſhoots next ſeaſon, which, intermingling with the larches, now meeting each other, will puſh through the interval, and by it's prickles render them difficult to be approached. The intermingled twigs of the larch and eglantine may be next winter pruned in the ſides by the hedge ſheers, which will make them grow cloſer. Let the eglantine be cut over cloſe by the ground once more, but allow the ſhoots to retain their place; other ſhoots will ſpring up from their ſtems with vigour next ſeaſon, and intermingle with the live larch and dead branches of the eglantine. The hedge may be dreſſed in the ſame manner next winter. The dead prickly ſtems will thus be encreaſed, and cloſe all crannies. Through theſe will ſpring up freſh ſhoots of eglantine, and interlace the whole

together. By continuing this mode of dreſſing, and renewing it from time to time, as occaſion may require, it will become an impenetrable fence againſt any animal: ſo that when the bank fails, croſs rails, if neceſſary, being fixed to theſe living ſupports, will form a perfect fence, that may be kept up with little expence as long as it can be wanted.

This fence may be compleated at the price of two-pence *per* yard, in moſt ſituations. In ſome places, it may be leſs; in others, perhaps, a little more; but, in every caſe, where the nature of the ground admits of it, it is a very cheap fence for this purpoſe, and will prove effectual.

The bramble, it's uſes in fencing.—A fence of ſtill greater value, and which is equally applicable with the above in ſoft ſoils, and to thoſe that are harder in rocky and hilly countries may be thus conſtructed.

Let a bank be raiſed on the inner ſide of a ditch, where it can be dug ſimilar to the former, and faced with ſtones, where theſe can be eaſily had, of a good binding quality; or, where the ſtones are ſmall, or rounded, or fewer in number than wanted, they may be laid in alternate rows with ſods. This is a mode of fencing practiſed

much about Caermarthen in Wales, and is found to form a compact and durable facing. Or where no ſtones can be had, the facing may be entirely of ſod. The backing to be made of earth, dug either from the ditch, if on a level, or ſcraped from without in the beſt way it can be got, if upon a ſlope, or taken from behind where it can be eaſieſt had; ſo as to raiſe the wall with it's ditch from four to five feet high. Upon the top of this bank, and about one foot backwards from it's edge, plant a row of *bramble* plants, at about ſix inches apart all around. Theſe may ſometimes be picked up from the common; but, in this caſe, be ſure to take none but young plants newly grown and well rooted: all others ſhould be rejected: for it is of the utmoſt conſequence that the hedge ſhould come away equally in all it's parts, ſo as not to leave a ſingle gap in any place. To inſure this in the moſt effectual manner, I ſhould prefer in general plants reared from ſeeds, to all others. And where many fences of this kind are to be made, ſeedlings will be not only the beſt, but the cheapeſt plants. For obtaining theſe, the berries may be collected when ripe; the juice ſqueezed out; the mark, containing the ſeeds, dried and kept till the ſpring; if then ſown they will come up readily, as I ſhould

ſuppoſe, and will be of a proper ſize for planting out the winter after. Great care ſhould be taken to examine the plants the firſt ſeaſon after planting, and to ſupply every want that may be perceived; for if this be not done, the hedge will never afterwards be equal and uniform throughout it's whole extent. I am induced to take notice of this circumſtance ſo pointedly, from obſerving that culpable careleſſneſs, in regard to this eſſential circumſtance, is obſervable almoſt univerſally, which is the chief cauſe of that raggedneſs in hedges that every where prevails.

It is perhaps ſcarcely neceſſary to obſerve, that in places where the ground without riſes higher than that within the fence, it will be neceſſary to rear the bank to a greater height than elſewhere; and there alſo it will be proper to plant a dead fence of black thorns, or other bruſh wood, upon the top of the fence: if that be done at the time the brambles are planted, theſe live plants may be intermixed with the dead fence without detriment to them, but rather the reverſe: if the ground riſe conſiderably, and if ſheep abound in that neighbourhood, it will be proper alſo in theſe places to dig, or otherwiſe bare from graſs the ſurface of the ground, for three or four feet on the outſide of the ditch, and ſow whin ſeeds upon

it, which will quickly grow up, and effectually prevent the ſheep from getting there free footing to leap over the fence from the higher ground.

If the hedge has been planted with due care, it will come away with great luxuriance, and ſend forth annually a great profuſion of luxuriant ſhoots, which riſing upwards, and ſpreading out on both ſides, forms a cloſe matted coping of ſpiny plants all over, that will effectually prevent the intruſion either of men or other animals. To prevent the plants from eſtabliſhing themſelves at the bottom of the bank, it will be neceſſary to ſend a perſon each year, in the month of Auguſt, round the fence, with a ſharp light hedge-bill, merely to ſcutch off the tops of all ſuch dangling ſhoots as diſcover a tendency to reach near to the bottom of the bank; for if they be allowed to touch the ground with their points, theſe points, wherever they touch, will directly ſtrike root, and thus eſtabliſh a new plant at the bottom, or in the bank itſelf, if of ſod; from which others will ſpread around, to the great detriment of ſheep, if they be allowed to come there, and to the hurt of the paſtures, by whatever animals they are to be conſumed; by this very trifling attention, this evil will be effectually obviated, [If any plants

are obſerved to have ſtruck roots in the ſod wall, they ſhould be pulled out, as obſerved,] and the fences kept as neat as could be deſired, at an expence next to nothing: for a man could do all that is required, nearly as ſoon as he could barely walk round the incloſure.

The bramble reſembles the raſp-berry in the mode of it's growth, which differs from that of all other plants I know. Every year it ſends out a great number of ſhoots from the bottom, which puſh out to the whole length they ever attain during the firſt year. The ſhoots of this ſeaſon conſiſt of ſingle unbranching ſtems, unleſs where they have been accidentally cut over, when they become forked. The next ſeaſon, theſe ſtems ſet out a great many fruit-bearing branches, along their whole length, which flower and perfect their ſeeds, while a new ſet of ſtems are puſhing from the bottom to become ſeed-bearers next ſeaſon. After perfecting their ſeeds, the whole ſtem that bore them, with all it's branches, dies. This is the natural and unvarying progreſſion obſerved in the growth of this plant: ſo that a hedge of the kind I propoſe, will contain at all times three diſtinct kinds of ſhoots, intermixed with and croſſing each other in all directions: viz. *firſt*, the dead ſhoots; *ſecond*, thoſe that carry fruit;

and, *third*, thoſe that are puſhing forward in their longitudinal growth; and as all of theſe are covered with ſtrong ſpines, they form, upon the whole, an impenetrable matting, when confined within proper bounds.

I have never yet ſeen any care beſtowed to effect this laſt named purpoſe, and from this circumſtance alone, the great utility of the bramble as a fence-ſhrub, has never been properly adverted to. When neglected, it rambles to ſuch a degree, as to become a very unſightly plant, and a mere cumberer of the ground. To the qualities it poſſeſſes in common with the raſp-berry, muſt be added that ſingular peculiarity the bramble alone poſſeſſes, of a faculty to ſtrike roots at the point of the ſhoots of one year's growth; and this tendency is ſo ſtrong, that wherever theſe points are allowed to lie upon the ground, they will infallibly take root in a very ſhort time, after which time each of theſe becomes a new plant, totally unconnected with the former, unleſs by intermingling of branches; and thus they ramble wide, if neglected, and may quickly over-run a vaſt extent of ſurface. But what is not a little remarkable in this caſe, is, that no other part of the ſtem, except the point of the ſhoot alone, will ſtrike root, even if it were laid into the

ground: nor will any one of the fruit-bearing branches ever take root in any circumſtances. Hence, then, the only thing required of the huſbandman, in this caſe, is to take care that none of the dangling young ſhoots ſhall ever be allowed to reſt upon the ground, on the outſide of his fence; and he has nothing to fear. The ſlight dreſſing I have recommended, which, if never omitted for one year, will be the eaſieſt thing imaginable; (becauſe nothing but the tender ſhoots of that year require to be cut, which may be done by the ſlighteſt touch:) but ſhould it be omitted for one ſeaſon, not only would there be great riſk that many young plants would by that time have eſtabliſhed themſelves, but alſo the old ſhoots of the former year being become tough and hardened, would be with great difficulty cut through; ſo as to prove a very troubleſome operation. Never could the old adage, that "a ſtitch "in time ſaves nine," be better applied than in the preſent caſe.

A good fence of this kind may be reared, in moſt ſituations, for a price not exceeding from two pence to three pence *per* yard: for a facing is only required upon one ſide.

Sweet-briar may be ſubſtituted in place of the bramble in a fence of this kind, if thought proper,

as it will grow very freely in this ſituation; but this is by no means ſo elegible as the bramble: for unleſs the ſweet-briar be often cut over by the roots, it is apt to get naked below, ragged, and unſightly, if without ſupport from other plants; and if other plants be placed there, they grow poorly, from want of abundant nouriſhment. In expoſed ſituations, too, the wind gets hold of the tops of theſe ſhrubs, and by acting on theſe as a lever, is apt to pull down the whole bank, unleſs where it is made very ſtrong. The bramble is liable to none of theſe objections; and it ſeems to be the very plant fitted by nature for forming that cloſe netted prickly coping, which was wanted alike to prevent animals from tearing down this comparatively tender bank, and to preſerve it from the levelling power of the air, and other external injuries. It is the buſineſs of man to avail himſelf of the bleſſings that nature has bountifully put within his reach.

Other kinds of fences might be named, equally cheap and efficacious, for low and fertile fields, as thoſe are for upland barren ſoils; but theſe require not here to be ſpecified.

Concluſion.—I will not enlarge upon the advantages that might be derived by private indivi-

duals, or the benefits that would result to the community at large, were a large proportion of the waſte lands of the kingdom thus appropriated; as theſe are very obvious. Whether this ſhall take place, or not, I ſhall at leaſt have the ſatisfaction, for my part, to reflect that I have not been wanting in my duty in this reſpect.

The cedar of Bermuda is well known to be the moſt valuable wood for building light and durable veſſels, that have been yet built in any European ſettlement out of India. It grows quickly in Bermuda, and, by ſome experiments that were made by the late Duncan Stewart Eſq. of Ardſheil, who lived ſometime in theſe iſlands, the ſeeds were found to grow, and the tree to thrive in this country. What are the peculiarities of ſoil and expoſure that will beſt ſuit that tree, have not yet been aſcertained; far leſs is it known if it will grow properly in waſte and barren grounds. This ought to be fairly tried. With that view, it is my intention to order a conſiderable quantity of the ſeeds home; and I ſhall not fail to communicate to the public the reſult of theſe trials, ſhould life be ſpared till that ſhall be known.

THE END OF ESSAY SECOND.

ESSAY THIRD.

HINTS

ON

THE ECONOMICAL CONSUMPTION

OF THE

PRODUCE OF A FARM.

Multum adhuc reſtat operis, multumque reſtabit, nec ulli nato poſt mille ſecula precludetur occaſio aliquid adjiciendi.

LINNÆUS.

ESSAY THIRD.

HINTS ON THE ECONOMICAL CONSUMPTION OF THE PRODUCE OF A FARM.

No better proof can be adduced of the little progreſs that has been as yet made in the practice of agriculture in Britain, than that even the title of this chapter, nor any thing of a ſimilar tendency, has never found a place in any treatiſe that has yet been publiſhed on the ſubject of rural economics; though it will be found to be a ſubject of very primary importance.

It may be admitted as a maxim, that agriculture can never be ſaid to have been carried to it's ultimate degree of perfection, ſo long as there is to be found one inch of ground that could be made to yield a ſingle grain of greater or more valuable produce: ſo long as a ſingle ounce of vegetable matter is allowed to go to waſte, or that has not been applied towards the ſuſtenance of ſome uſeful animal, in the way in which it could produce it's moſt beneficial effect: and while a ſingle particle of dung or other ma-

nure is ſuffered to be miſapplied, or ſo employed as not to afford the greateſt poſſible reſource it is capable of yielding, for the reproduction of additional crops of the moſt valuable kinds. That the higheſt degree of poſſible perfection ſhould, in every caſe, be attained, is not to be expected in this imperfect ſtate: but the nearer we approximate to it the better; and the more ſteadily we keep theſe objects in view, and the more ſtrenuous our exertions are to attain them, we ſhall doubtleſs approach the nearer to theſe deſirable attainments.

So far are theſe objects, however, from being ſteadily held in view, in the preſent age, that one who attends to general practice in Britain, would be induced to believe they were ſcarcely ever adverted to, unleſs by a very few perſons, and in regard to a ſmall number of particulars only. Economy in the expenditure of the produce of a farm, like economy in the expenditure of capital in family affairs, ſeems indeed to be deſpiſed by many men, as indicating *poverty* of ſpirit, rather than wiſdom, and is therefore ſtudiouſly, as it ſhould ſeem, avoided. There are, however, a few individuals, who have ſhowed themſelves to be above theſe prejudices, and who have not been aſhamed to attempt to make

ſome progreſs in different departments referable to this head.

Economical arrangements, were the ſubject to be conſidered in it's utmoſt extent, as affecting the whole management of a farm, would take a much wider ſweep than that to which I mean to confine myſelf in the preſent diſquiſition; which is ſolely meant to relate to the conſumption of the crude produce of a farm by animals: nor can I pretend, in what follows in this eſſay, to give abſolute directions to the farmer what he ought to do, even on that part of the ſubject I ſhall now bring under view. At the mere outſet, in a buſineſs of ſuch magnitude and intricacy, the perſon who firſt attempts to open up the view, can do little more than act in the humble ſtation of a pioneer, who clears away a few obſtructions that may enable others, with leſs labour, to penetrate farther than he has done: ſo that what follows under this head can only be conſidered as an exploratory excurſion into an unknown region, from which only a very imperfect idea can be given of the ſubject. Craving, then, the indulgence of the reader, for unavoidable defects, and his friendly correction of thoſe involuntary errors that his ſituation may enable him to diſcover, I proceed to ſuggeſt ſuch hints

as have occurred to me on a ſlight view of this intereſting ſubject.

Much dung is waſted under the common practice of paſturage.—It is ſtated, in the agricultural ſurvey of Glouceſterſhire, that one acre of rye-graſs, which had been ſaved from Michaelmas to May, kept nine ewes and lambs *one month*. We may ſafely ſay that the produce of the ſame field, from May till Michaelmas, would have been double to that it yielded during the winter half year; conſequently it could have ſuſtained eighteen ewes and lambs one month. At this rate the acre of ground, taking the whole year round, would have afforded food for twenty-ſeven ewes and lambs for *one* month. Theſe are large ſheep, averaging about 25 pounds *per* quarter.

It is ſtated, in the ſurvey of Wiltſhire, that 500 ſuch ewes and lambs are ſufficient to dung an acre each day when folded upon it: at that rate, 27 of them ſhould dung an acre in a little leſs than nineteen days; conſequently, in thirty days, ſomewhat better than half an acre more. *(q)* Hence it follows, that if none of this dung were ſuffered to go to waſte, *an acre* of good land laid down to graſs, in high order, ſhould afford as much dung as would be ſuffi-

cient to dreſs *an acre and a half* of other land each year.

Again,—It is ſtated in the agricultural account of Suffolk, that the rich marſh lands there keep at the rate of ſix ſheep for ſeven ſummer months, and four for the five winter months, *per* acre; that is, a little more than five ſheep on an average *per* acre throughout the whole year. Theſe are very large ſheep, of which 800 would be equal to the 500 ewes and lambs above mentioned, and conſequently would be ſufficient to dung an acre in one day. But 5 times 365 makes 1825, the number of ſheep kept for *one* day. At this rate, one acre of theſe rich graſs lands would afford as much dung, in the courſe of one year, as ſhould be ſufficient to dung ſomewhat more than *two acres and a quarter* each year, if huſbanded with due economy.

As the ſheep in neither of theſe caſes are folded, the dung is ſuffered to drop in a ſcattered manner over the paſtures, throughout the whole year. In this manner, the influence of the dung muſt either be nothing, or it muſt produce *certain* effects upon the graſs. If the laſt, what will theſe effects be?

It is well known that when ſheep are folded upon graſs ground, ſo as to depoſit their dung

upon it in conſiderable quantities all *about one time*, as in folding, the effect is, that a fluſh of graſs is quickly produced over it's whole ſurface, which is much more luxuriant and abundant than it would have been, had it not received this dreſſing. But it is equally well known, that the animals, whoſe dung has occaſioned that fluſh of graſs, nauſeate it; nor can they be brought to taſte it, unleſs they be compelled through hunger to do ſo; although animals of another kind are ſeen to eat that kind of graſs, [called in ſome places *goſk*, in other places *toth*,] not only without reluctance, but even with avidity.

The extra fluſh of graſs raiſed on the two acres and a quarter, that might be thus manured by the ſheep fed on one acre, would be ſufficient, on a moderate computation, to keep at the rate of two ſheep *per* acre. By conſequence, the extra graſs produced by the dung of the ſheep kept on one acre of this rich graſs land, would be ſufficient to keep four ſheep and a half. But to keep within bounds, ſay *three* ſheep only could be kept by the graſs produced from the dung of the ſheep fed on one acre.

If the dung be ſuppoſed to have the ſame effect in producing extra graſs, when dropped

from the animals as they paſture on the field, as it has when laid upon ground cloſely, by means of folding, it muſt follow from theſe premiſes, that as much graſs will grow from that dung upon each acre as would feed three ſheep. But as the ſheep will not eat this kind of graſs without conſtraint, the ground muſt either be ſo hard ſtocked as to compel them, through hunger, to eat that naufeous food, or that portion of the graſs which is produced by the dung, will be ſuffered to run to waſte; ſo that, in either caſe, a conſiderable loſs muſt be ſuſtained by the owner.

This loſs may indeed be avoided, in as far as reſpects the conſuming of the graſs only, by mixing different kinds of ſtock on the ſame field, while in paſture. For if theſe animals can be made to aſſociate together, ſo as not to diſturb each other in the field, the one ſet of animals will eat up the rank graſs produced from the dung of the others, and thus the whole will be eaten up without waſte. This practice is indeed ſometimes adopted in Suffolk to a certain degree, where the farmers are in uſe to put among their ſheep a certain proportion of calves or horſes, which, in ſome meaſure, anſwer this end. But as the general practice there is to ſtock with ſheep only, the loſs to the ſtock itſelf, which muſt

ariſe from this cauſe, would be very great, were it not obviated by a circumſtance which indeed diminiſhes this evil, though this is in conſequence of it's producing another evil of nearly an equal magnitude.

If the dung, which is ſcattered about on the field, in ſmall quantities, as it drops from the animals when paſturing upon it, were ſuppoſed to be incapable, in that ſtate, of producing any ſenſible effect as a manure: or if that effect were very inconſiderable, in compariſon of what it would otherwiſe have been, if applied all at one time, as in folding; in either of theſe caſes, the nauſeating quality of the graſs would not be experienced by the animals; or in ſuch a degree only, as not to prove conſiderably hurtful to them: for, in this caſe, the dung proving inert, it would do little or no ſervice to the ground, and, in conſequence of that, would prove not in any ſenſible degree hurtful to the feeding of the ſheep.

That the above ſuppoſition is literally true, ſeems to be proved by the very fact which gave riſe to theſe obſervations. If the dung thus dropped produced a melioration in any degree proportionate to what it would have done if collected together, as in folding, it's effects muſt

have been extremely obvious in two reſpects; *firſt*, in augmenting the quantity of graſs produced on the field; and, *ſecond*, in encreaſing it's nauſeating quality; neither of which, at preſent, are very obviouſly perceptible.

In regard to the *firſt* particular. Every perſon knows that if a dunging, equal to more than double what is given by a good folding, were laid upon even ordinary graſs ground, it would at once make the produce nearly equal to that of the rich graſs lands in queſtion. And though it be true, that the effect of ſuch a dreſſing upon poor ground, would not be equally perceptible during the ſecond year as the firſt, yet it would ſtill be very conſiderable, inſomuch that, although no other dunging were given to it, and the crops were conſtantly cut and carried off from the field, it would not return to it's former ſtate, but would continue to afford much better crops than before it received the dreſſing, even for the third, and many ſucceeding crops. If the ſame dunging, then, were annually repeated, and if a ſimilar effect were to reſult from each repetition, the quantity of produce muſt go on continually augmenting in a very rapid degree from year to year. But as no ſuch rapid melioration is here perceived, we are forced to con-

clude, that the dung which is *thus* applied produces not the effect it might, under good management, be made to do; and that conſequently an unneceſſary waſte is thus ſuſtained.

If it ſhould be alledged, that when land is once brought to a certain degree of productiveneſs, it can be made to yield no more produce, were it to be dunged ever ſo often; and that it's richneſs could not be augmented even by folding itſelf, no more than it is obſerved to be by paſturing upon ſuch land;—the want of economy, in ſuffering the dung to be thus applied, would be even perhaps ſtill more obvious than in the caſe before ſtated. For if the dung produces *there* no good effect whatever, there can be no doubt that it would produce a very powerful effect, if properly applied to ground of a poorer quality: ſo long, then, as ſuch poor ground is to be found, thoſe who ſuffer their dung to be ſo applied, muſt be held guilty of very great miſmanagement, and of courſe ſhould make haſte to correct it.

The other circumſtance above noticed is a corroborative evidence, that the dung thus laid on the field is allowed to waſte itſelf in a great meaſure without effect: for had the nauſeating quality of the graſs been *nearly* as great as we know

it muſt have been, if ſuch a proportion of the graſs had been forced by the dung of the animal which is ſet to conſume it, this diſlike in theſe creatures muſt have been ſo great as to be at once perceptible to every perſon; and muſt have *compelled* the farmers *univerſally* to adopt ſtrong and deciſive meaſures to guard againſt it: but as no ſuch peculiarity is generally recogniſed, we are forced to conclude that, if it does exiſt at all, it is felt but in a very inconſiderable degree; and conſequently that the great quantity of dung which is dropped upon theſe fields, operates not upon them in any ſenſible degree as a manure.

If theſe obſervations be well founded, what an amazing waſte is ſuſtained, through the whole nation, by the loſs of the dung that is thus uſeleſsly ſcattered on the ſurface of paſture fields every where!

I am aware of the prejudice that is very generally entertained in favour of the benefits that graſs land derives from the dung which is dropped by the animals that paſture upon it. But although I have ſearched diligently for a fact, or an argument grounded upon facts, to ſupport this opinion, I am forced to declare that I have not been able to find one in ſupport of it; but,

on the contrary, many, beſides thoſe above ſtated, which militate againſt it. I am therefore compelled to rank this as one of that numerous claſs of opinions which have been at firſt caſually adopted, and afterwards cheriſhed, by a prejudice derived from habit rather than from reaſoning of any ſort. For ſuch opinions I entertain no undue reſpect, and ſincerely wiſh that the foundations of them were in all caſes diligently enquired into.

Had this opinion been well founded, it muſt neceſſarily have happened, that, in every caſe where graſs land has been long paſtured upon, without folding, the quantity of it's annual produce muſt have been ſenſibly augmented. That this has not been the caſe, we need only to open our eyes to be convinced of. It is only neceſſary to notice the immenſe numbers of poor graſs fields in every part of this kingdom, which have been paſtured from year to year without interruption, perhaps for ages paſt, and which diſcover not the ſmalleſt tendency to melioration of any ſort, whether the quantity of produce within the utmoſt ſtretch of the memory of man, or the rent that has been paid for them, [the alteration in the value of money being adverted to,] be conſidered as the ſtandard. I myſelf

know many fields which, under certain circumſtances, have grown evidently leſs productive than before, though perpetually paſtured upon. But as theſe caſes are not perhaps ſo common in England as in Scotland, I ſhall not farther inſiſt upon them here. The foreſt of Dartmoor in Devonſhire, and other ſuch extenſive moors of a barren nature, in many other parts of England, though every year ſtocked in ſummer with more beaſts than the produce can properly ſuſtain, do they diſcover the ſmalleſt tendency to melioration even till this hour? But there can be no doubt, that if all the dung which has been dropped upon theſe waſtes had been properly huſbanded, a great and ſenſible melioration on them muſt have been effected many ages ago, as I ſhall have occaſion to ſhow in the ſequel.

Again, taking the converſe of the propoſition above ſtated,—were it true, that the dung which is dropped upon paſtures tended ſenſibly to meliorate them, it muſt follow that thoſe paſtures from which the dung is conſtantly abſtracted by folding, as on Marlborough downs in Wiltſhire, and many other places, muſt either have grown worſe in the courſe of ages, even where it had not been touched by the plough; or at leaſt muſt have advanced much more ſlowly in their melioration,

than other grafs lands, equally untouched by the plough, from which no dung has been abftracted. Is this the cafe? I have not met with a fingle fact which tends to fhow that the prefent produce of the parts of thofe fields which have never been plowed, when compared with that of former times, differs in any refpect from that of other fields of a fimilar nature, from which no dung has ever been carried away by folding.

Thus am I forced to conclude, that in all cafes where animals are allowed to feed on paftures of any fort, the dung which is dropped from them is, in a great meafure, loft as a manure; and a rigid economy would require that meafures fhould be adopted for preventing this wafte, if it can be done without occafioning evils greater than that which it is intended to correct.

Folding economical.—The remedy which firft prefents itfelf in this cafe, is that of folding; and if properly managed, there are perhaps few cafes in which it might not be put in practice, not only without detriment to the ftock, but even perhaps in fome cafes to their advantage. This was hinted at in the foregoing eflay; but it is neceffary I fhould be here a little more particular on this head.

All animals, but eſpecially thoſe that ruminate, chooſe to feed and reſt by turns. Ruminating animals require much time for reſt, and the more quiet they are allowed to be during that period, the better they will thrive. If theſe, then, are withdrawn from their paſtures after they have properly filled their belly, and when they become neceſſarily diſpoſed to ruminate, they can ſuſtain no damage from being then put into a place where they can have no acceſs to food. And if they be only as long detained there as till they have rechewed the food they had ſwallowed, and begin to feel an inclination to eat more, they will be even benefited by this confinement, rather than otherwiſe. For, in theſe circumſtances, the creatures will thus be induced to feed and to reſt all at the ſame time, ſo that when they are at reſt, they are allowed to be wholly ſo, and can ſuffer no diſturbance from one another, nor from any other cauſe; whereas if they be left at liberty to range over the whole field at large, at all times, they are not determined, as men are from habit, all to enjoy their meal at the ſame time, and thus to feed and reſt as it were in concert; but each individual is left at random to feed or to ruminate as chance ſhall direct. Thus it happens that they ſeldom are ſeen all at reſt at the

ſame time. While ſome individuals are diſpoſed to ruminate, others are inclined to feed; and as they move about while feeding, the feeders diſturb thoſe who are at reſt: for being all of them gregarious animals, while one who ruminates lies ſtill, the others are moving forward; ſo that all ſuch ſeeing themſelves in danger of being left behind, are forced to riſe and follow the reſt, that they may regain thoſe which are feeding. Thus it is, that though apparently left at freedom to reſt when they pleaſe, they are actually put under a kind of conſtraint, and are forced to move about when they wiſh to lie ſtill; whereas by an attentive mode of penning, all this diſturbance will be entirely avoided, and they will be ſuffered to enjoy a repoſe as uninterrupted as their hearts could wiſh.

That penning, however, under injudicious management, may tend to retard the feeding of the animals ſubjected to it, cannot admit of a doubt. If the creatures be driven to a great diſtance from their paſtures to the pen, it muſt ſubject them to a hurtful degree of fatigue; and this will be encreaſed if they muſt be made to paſs through narrow lanes, where they may be crouded and incommoded by paſſengers; or where they cannot avoid being at times mired in

dirt, or drenched in wet: or if they be neglected too long in the pen, or put up at improper times, &c. In ſome caſes, owing to theſe circumſtances, it may admit of doubt whether the ſtock itſelf does not ſuffer more damage from penning, than the benefit that reſults from the collecting of the dung: but from the abuſe of a beneficial practice, we muſt not reaſon againſt the proper uſe of it.

To derive the full benefit from folding of which it is ſuſceptible, it would ſeem, that where the paſtures are of great extent, there ought to be two or more folds placed cloſe by the paſture, at convenient diſtances from each other; ſo that the flocks being gently conducted from one towards the other, feeding all the way, might find themſelves, when full, juſt at the place into which they might retire for reſt.—There they ſhould be ſuffered to remain juſt ſo long as is found by experience to be neceſſary to compleat their ruminating proceſs, and to prepare them for feeding afreſh: they ſhould then be ſuffered to riſe and ſtretch themſelves, when they naturally void their dung and urine on the ſpot. Thus will the dung be preſerved, and the paſtures be kept clean and ſweet. They ought then to be led gently to the freſh paſture which

they had not lately breathed upon, or trampled with their feet, and which of courſe will be to them ſweet and inviting: they ſhould thus be ſlowly conducted to their next reſting place, feeding all the way; and ſo on till they go over the whole in a regular progreſſion. If experience ſhall diſcover that diſeaſes are produced by ſuffering the animals to eat their food when covered with hoar froſt, or dew, or mildew, or at certain times of the day or night, when ſnails or other creatures are abroad, which they may ſwallow with their food: in all theſe caſes, when obſerved, the evil may, by an attentive economiſt, be avoided by means of a judicious uſe of the fold. He may, alſo, by the ſame contrivance, withdraw the creatures from the paſtures at thoſe times when they become reſtleſs and refuſe to feed. In ſhort, a judicious economiſt, by having folds properly ſituated, reſpecting the circumſtances of ſhelter, coolneſs, water, and other conveniencies, may avail himſelf of theſe for greatly promoting the health and enjoyment of the animals, and thus accelerating their feeding; ſo that, independent of the benefits he ſhall derive from their dung, he will in other reſpects derive conſiderable emolument. But where is the man who thinks of theſe things in the pre-

ſent day? They are deſpiſed, and therefore unknown.

In order to obtain ſome idea of the benefits that might be derived from penning, under a judicious ſyſtem of management, when compared with ſuffering the produce to be conſumed by animals which are allowed to paſture at large,—let us put the caſe, that two farms, each farm conſiſting of two fields of equal extent and alike in all reſpects; the one farm conſiſting of bare paſture, and the other of rich graſs land; each field of the ſame farm being ſtocked with the ſame number of ſheep,—were put, the one under the folding ſyſtem of management, and the other under that of the unlimited paſturage ſyſtem, and continued for a number of years,—and obſerve the reſult.

Say then, firſt, that the paſture was naturally ſo poor as, at the outſet, in both caſes, to be fit to ſuſtain no more than at the rate of half a ſheep *per* acre; and at that proportion was of extent ſufficient to nouriſh one thouſand head of ſheep, conſequently of 2000 acres extent.

We have already ſeen, that where the beaſts are allowed to range at large, ſuch a field will continue for ages without the ſmalleſt augmentation of it's produce; and that, of courſe, if it

began with a thouſand head of ſheep, however long the experiment were continued, that farm, the produce of which was ſo conſumed, would continue to the end to keep only the ſame thouſand head of ſheep.

In regard to the farm where folding is practiſed, let it be admitted that the extra fluſh of graſs produced on an acre, upon which one thouſand ſheep had been penned for one day, would be ſufficient to ſuſtain one ſheep more the firſt year after folding, than it could have done without it; half a ſheep the ſecond year, and a quarter of a ſheep the third year, beyond it's original proportion; and that, after the third year, the extra produce ſhould be counted at the rate of $\frac{1}{8}$ of a ſheep *per* acre for many years. Moſt perſons will ſuppoſe this an under-ſtatement: ſome may ſuppoſe it an over-ratio; but all will admit that the encreaſe muſt be ſomething. I ſtate it thus merely to ſhow the general reſult, not the preciſe amount of that reſult; ſo that every individual may alter the ratio till it ſuits his own fancy. The general concluſion will not be altered by that circumſtance.

On theſe data the thouſand head of ſheep ought to dung in one year 365 acres: but to make allowance for bad weather, and other con-

tingencies, let us deduct from that 165 days; and ſay that only 200 acres were dunged to a ſufficient degree by that number of ſheep in a year. By tracing the progreſs, the annual account will ſtand thus.

First year.

No. of Acres.		*No. of ſheep kept.*	*No. of Acres dunged.*
2000	at half a ſheep *per* acre	1000	200

Second year.

200	1*ſt* year after dung 1½ do. *per* acre	—	300
1800	do. original at ½ do. *per* do.		900
2000			
	Total this year	1200	240

Third year.

200	2*d* year at 1 ſheep *per* acre	200	
240	1*ſt* year at 1½ do *per* do.	360	
1560	original at ½ do. *per* do	780	
2000	Total this year	1340	258

It is unneceſſary to carry this calculation any farther. The gradual melioration is, in this caſe,

eſtabliſhed beyond a doubt, which, if continued for a great number of years, muſt produce a ſenſible improvement in every part of the country. I beg leave, however, once more to obſerve, that I do not contend to have attained any abſolute accuracy in the *quantum* of the melioration above ſtated: all I contend for is, that by a management ſimilar to the above, a progreſſive melioration would be unavoidable, the *ratio* of which might be in ſome caſes greater, and in others leſs than here ſtated; but that in every caſe it muſt be ſenſibly perceptible in the courſe of a great number of years. As no ſuch melioration, however, is perceptible in fields ſubjected to paſturage alone, that practice muſt be deemed highly uneconomical.

Neither let it be underſtood as if I recommended the mode of penning, above ſtated, as the beſt mode that could be deviſed of applying the dung. It was ſelected merely for the ſake of ſimplicity, for the purpoſe of illuſtration.—What is the moſt economical mode of applying dung for the purpoſe of agriculture at large, may come to be afterwards conſidered: at preſent it could tend only to embarraſs the ſubject in hand, which is the economical conſumption of the produce of graſs land: theſe few hints being

only a digreſſion, to ſhow in what manner the farmer may prevent his lands from being fouled without inconvenience, and even with profit to himſelf.

Let us now conſider the caſe of rich paſture fields: and, with a view to avoid the dilemma that might accrue from the ſuppoſition that very rich land derives little or no benefit from dung, we ſhall put the caſe, that the dung of the fold, in conjunction with lime, and ſuch culture as the nature of the ſoil may require, can be applied to ſome poor ground of little value in the neighbourhood, to be put under corn.

Suppoſe in this caſe, again, that the rich graſs field is capable of ſuſtaining alſo one thouſand head of ſheep; and let us for the preſent take it for granted, till we can overtake it, that the produce will not be diminiſhed by abſtracting the dung of theſe ſheep from it.

In this caſe, on the foregoing data, the dung of the ſheep would be ſufficient to manure 365 acres; which, as in the former caſe, we ſhall moderate to 200.

Let us ſuppoſe that the encreaſed crop, in conſequence of the dunging for the *firſt* year, is equal to two quarters of barley *per* acre. The

ſecond year, white and yellow clover with rye-graſs, equal to the feed of 3 ſheep *per* acre.—The *third* year, equal to 2½ ſheep; and every year after that it ſhould be equal to 2 ſheep *per* acre.

The firſt year would be

Sheep kept, heads.					*Acres dunged.*
1000	—	—	—	—	200

Second year.

1000 head on the original field as before	—		200
200 acres of barley at 2 quarters, 400 quarters at 24 ſhillings	—	L. 480	
	Total	L. 480	200

Third year.

1000 ſheep as above	—	—	200
600 more on the 200 acres dunged graſs land firſt year, at 3 head of ſheep *per* acre, which would dung	—	—	120
200 acres of barley as before		L. 480	
1600	Total	L. 480	320

Fourth year.

Sheep kept, heads.			*Acres dunged.*
1000	head of ſheep, as at the beginning — — — —		200
500	do. on 200 acres of graſs the ſecond year, at 2½ head *per* acre —		100
600	do. on 200 acres of graſs the firſt year at 3 *per* acre — —		120
	320 acres of barley, at 2 quarters *per* acre, 640 quarters as before — — —	L. 768	
2100	Total	L. 768	420

It is unneceſſary to proceed farther in this enquiry; for the progreſſive improvement here is great and obvious, let what deductions you pleaſe be made for errors or exaggeration.—Every one may reduce this to the ſtandard that pleaſes himſelf beſt; the ſame concluſion is unavoidable.

I conſider it then as a truth undeniably eſtabliſhed, that dung, dropped upon a field in paſture, either produces no effect whatever, or an effect far leſs conſiderable than it might be made to afford under a more judicious ſyſtem of management; and that, if it has any effect at all

upon the paſture, it muſt be that of rendering the food yielded by theſe paſtures leſs palatable, and leſs nouriſhing to the animals that feed upon it, than it otherwiſe might have been. To obviate this evil, which is every where felt by attentive farmers, eſpecially upon rich paſtures, different perſons have adopted different devices, all of which are liable to ſtrong objections in point of economy.

Hard or light ſtocking of paſture ground.— Some perſons contend, that the paſtures ought to be ſtocked very lightly; alledging, that although much of the produce is thus allowed to run to ſeed, which the beaſts will not eat, and which of courſe is trodden underfoot, and rotted by rain, and thus waſted; yet, experience, they ſay, proves, that a greater profit will be thus derived from it, upon the whole, than by any other practice, on account of the ſuperior thriving of the animals.

Others pretend, on the contrary, that light ſtocking of graſs land is a practice highly to be condemned; as it tends not only gradually to diminiſh it's produce, but alſo to encourage the growth of coarſe and unprofitable graſſes, which greatly deteriorate the paſtures; and that hard

ſtocking of graſs lands, eſpecially thoſe of a rich quality, is an indiſpenſible requiſite of good management.

Theſe two opinions, ſo diametrically oppoſite to each other, and which are equally maintained by ſenſible men, clearly proves the embarraſſment to which they are ſubjected, in conſequence of their not having adverted to the circumſtances ſtated above, and many other particulars that require ſtill to be developed, as affecting the economical conſumption of the produce of graſs lands.

A third party, who approach perhaps nearer to the truth than either of the above, adviſe that a mixed ſtock ſhould be always kept upon the ſame field: and were the conſumption of the foul graſs produced by the dung of the animals, the only article to be adverted to, it might be, doubtleſs, ſo managed as to correct this evil: but there are ſo many other circumſtances to be adverted to, that it is not eaſy, by this mean, to get them all remedied.

In every field, a variety of plants ſpontaneouſly ſpring up, ſome of which are diſreliſhed by one claſs of animals, while they are eaten by ſome others; and ſome of which plants, though eaten readily by ſome animals at a particular period

of their growth, are rejected by them entirely at another age. Thus it becomes neceſſary, not only to have a vaſt variety of animals in the ſame paſture; but alſo a very particular attention is required to augment or to diminiſh the proportion of ſome of theſe claſſes of animals, at particular ſeaſons of the year, otherwiſe ſome part of the produce will be allowed to run to waſte, unleſs it be hard ſtocked to ſuch a degree as to retard their thriving.

But if a great variety of animals be allowed to go at large in the ſame paſture, they are never ſuffered to feed with that tranquillity which is neceſſary to inſure thriving in the higheſt degree. One claſs of theſe wiſhes to feed, or to play, while the others would incline to reſt. They thus mutually diſturb and teaze each other: and this inconvenience is greatly augmented, if penning of any ſort be attempted. From theſe conſiderations, the practice of intermixing various kinds of ſtock very much together, is found to be productive of evils, in many caſes, greater than thoſe which reſult from the waſte of food this practice was intended to prevent. And though there can be no doubt that by hard ſtocking the graſs will be kept ſhorter, and conſequently will be more palatable in general to

the animals who eat it, than if it were allowed to run to a great length, and that thus even unpleaſing patches may be conſumed; yet as animals, which are to be fatted, muſt have not only ſweet food, but an abundant bite at all times, to bring them forward in a kindly manner, it ſeems to be nearly impoſſible to obtain both theſe advantages together in the practice of paſturage.

Cutting, and conſuming the produce in the houſe.—Might not theſe evils be greatly diminiſhed, if not entirely remedied, in many caſes, by having the produce cut by the ſcythe, and given to the animals freſh in the houſe; rather than to ſuffer them to go at large and eat the produce on the field, even under any ſyſtem of management whatever?

Many arguments tend to ſhow, that this practice would be, in general, highly economical. This ſubject may be conſidered under the following points of view:

Firſt.—The greater or leſs variety of plants that would thus be conſumed, and conſequently prevented from running to waſte.

Second.—Whether ſtall feeding or grazing tend moſt to promote the health and comfort of the animal.

Third.—The proportional quantity of manure obtained by the one or the other practice.

Fourth.—The quantity of herbage that will be afforded from the ſame field, under the cutting or grazing ſyſtem.

Under head the *firſt*. If *the conſumption of the plants* be the object principally attended to, it is plain the benefits will be great: for experience has clearly proved, that there are many plants which are greedily conſumed by beaſts, if cut and given to them in the houſe, which never would be touched by them when growing in the field. Of this nature is the dock, cow-parſley, *(Chærophyllum Sylveſtre)* thiſtles, nettles, and many other plants. Upon what principle it ſhould happen that theſe plants ſhould be ſo readily eat, when thus given, while they are totally rejected when in the field, I cannot ſay: but that they are thus eaten, without reluctance, even when the animal is not hurtfully hungry, is evident from this circumſtance, that the beaſts often fall greedily to theſe at the moment they are brought in from the field, even before they have had time to become hungry after they had come in. Thus fewer plants will be rejected or ſuffered to go to waſte.

In the *ſecond* place. It is well known that many of even the beſt kinds of graſſes, which, when young, form the moſt pallatable food for theſe creatures, if once ſuffered to get into ear, are diſreliſhed ſo much as never to be taſted by them, unleſs to prevent ſtarvation; and as, in moſt paſture fields, many of theſe graſſes get into ear from various cauſes, all the produce of theſe plants is inevitably loſt to the farmer. But, if cut down by the ſcythe, in proper time, not one of theſe is ever ſuffered to get into that nauſeating ſtate; and conſequently no waſte is ſuſtained from this cauſe.

Thirdly.—When animals are ſuffered to go upon the field, many of the plants are trodden under foot by the beaſts, and bruiſed or, in part, buried in the earth; in which ſtate they are greatly diſreliſhed by animals, and are ſuffered to run to waſte; which never could take place were the practice of cutting adopted. And,

Laſtly, on this head. Thoſe few plants which are totally diſreliſhed by one claſs of animals, ſo as to be rejected by them even in the houſe, will not, from this circumſtance, become leſs acceptable to others, but much the reverſe. Food that an animal has breathed upon, for any conſiderable time, becomes unpleaſant to other

animals of the ſame claſs; but not ſo to thoſe of another ſpecies: it ſeems indeed thus to acquire for them a higher reliſh. Even greater defilement by one animal, ſeems to render food more acceptable to others: for ſtraw, that in it's clean ſtate has been rejected by cattle, if employed as litter for horſes, acquires a reliſh for cattle that they ſearch for with avidity. Hence it happens, that the ſweeping of the ſtalls from one animal, furniſhes a dainty repaſt for thoſe of another kind; which can eaſily be ſhifted from one to the other, if the plants are conſumed in the houſe, but which muſt have been loſt in the field. We ſhall ſoon have occaſion to ſhow that this peculiarity may be employed to anſwer another uſeful purpoſe.

Under head the *ſecond*. If *the health and the comfort of the animal* be chiefly adverted to, the balance will be clearly in favour of the cutting ſyſtem, when compared with that of paſturing. It is well known that when animals are expoſed to the ſun, in the open air, they are not only greatly incommoded on many occaſions by the heat, but alſo are annoyed by ſwarms of flies, gnats, and hornets, as well as the terrible gad-fly, which drives them into a ſtate of perturbation little ſhort of furioſity, which muſt obviouſly

tend to retard their thriving. At other times they are hurt by chilling blaſts, or drenched by cheerleſs rain, which renders their ſituation very unpleaſing, and greatly retards their feeding, as is well known. Under proper management, in a well conſtructed ſtall, all theſe evils would be alike removed, and they would be kept perpetually in a proper ſtate of coolneſs, tranquillity, and eaſe, ſo as to make the ſame quantity of food go farther in nouriſhing them than it otherwiſe could have done. They would alſo be prevented from licking up ſnails, worms, and other noxious creatures, among their food, which by paſturing they are apt to do, when they feed at thoſe times of the day, or night, when theſe creatures crawl abroad. This would be entirely avoided by cutting the graſs at thoſe times of the day when none of theſe are to be found. Thus lingering diſeaſes might often be avoided, which always retard the thriving, and often prove totally the deſtruction of the animal. And, *laſtly*, by giving an opportunity of adminiſtering dry and nouriſhing food, along with the ſoft and ſucculent, where circumſtances require it, in any requiſite proportions, and by varying the taſtes, ſo as to provoke an appetite, not only the health, but the thriving of the creatures, would

be greatly augmented beyond what they other wiſe could have been.

Under the *third* head. If *manure is to be chiefly* attended to, there can be no compariſon between the two modes of conſumption. This is ſo greatly in favour of ſtall feeding, that it would be idle to ſpend time in ſearching for proofs of a propoſition that may be conſidered as ſelf-evident.

In the *laſt* place. If the *quantity* of herbage produced from the ſame field be adverted to, it will be found to be equally in favour of the cutting ſyſtem. It is well known, that all animals delight more to feed on the young freſh ſhoots of graſs, than thoſe that are older. Hence it invariably happens, that thoſe patches in a paſture field that happen to have been eaten once bare, in the beginning of the ſeaſon, are kept very ſhort ever afterwards throughout the whole of that ſeaſon, by the creatures delighting to feed upon them in preference to the parts of the field that have got up to a greater head; ſo that theſe laſt are ſuffered to remain, in a great meaſure, untouched, throughout the ſeaſon. It is not however, in general known that graſs, even the leafy parts of it when it has attained a certain length, becomes ſtationary; and, though it will retain its verdure

for ſome months in that ſtate, makes no ſort of progreſs whatever; whereas if it had been cropped down frequently, it would have continued in a conſtant ſtate of progreſs, advancing with a rapidity in a great meaſure proportioned to the frequency of it's being cropped. For experimental proofs of this fact, ſee eſſays on agriculture and rural affairs, vol. II. diſquiſition V. Nor has the diminution of produce that muſt thus be incurred, ever been adverted to by perſons who are intereſted in it; nor have theſe circumſtances entered in any reſpect into their eſtimation. From my own experiments and obſervations, however, I am ſatisfied that, in ſome caſes, the actual produce of the ſame field, by a judicious management *in this reſpect*, compared with bad management, may be augmented *fourfold* in the ſame ſeaſon. It is owing to this circumſtance, though the reaſon of the fact has not been underſtood, that hard ſtocking of paſture lands has been found to enable the ſame field to ſuſtain a much greater weight of ſtock than it could do when lightly ſtocked. But under no ſyſtem of management can the evil of unequal cropping of land under paſturage be avoided, unleſs it be by a deſtructive degree of hard ſtocking, which muſt be avoided where the animals are expected to thrive. By

cutting with the ſcythe frequently, ſo as to keep the graſs always ſhort, and therefore in a ſtate of continual vigorous vegetation, all theſe evils are avoided. The quantity of produce will be raiſed to the *maximum* that the land, in it's preſent ſtate, is capable of producing, while the ſtock to be fed by that produce needs not be in the ſmalleſt degree ſtinted in point of food.

Under every point of view, then, that this queſtion can be conſidered, we are forced to conclude that the practice of cutting of graſs, and conſuming it green, in all caſes where the ground is in a ſtate that can admit of it, when compared with that of paſturage, appears to be ſo greatly economical, that the particulars under which that mode of management can be practiſed, and the peculiarities affecting it, deſerve to be much more minutely inveſtigated than they ever yet have been.

In confirmation of the juſtneſs of this concluſion, it is now univerſally admitted as a fact, confirmed by innumerable experiments, that a crop of red clover, when cut, and conſumed in the houſe green, goes in all caſes much farther in feeding beaſts, than when it is conſumed by paſturage upon the field. The loweſt eſtimate that I have ever ſeen made on this head, from actual

experiment, is, that it will go at leaſt twice as far when cut, as when paſtured upon: ſome go as high as to ſay it will go *four times* as far. As every perſon, who has tried the experiment, agrees that the ſaving, by cutting this crop, is very great, that practice has of late years begun to prevail very much; though reaſon has not yet been able ſo effectually to ſtem the torrent of antient prejudice, as to render it entirely univerſal.

But the practice of cutting other graſs grounds, and conſuming their produce green, ſeems not yet to have been deemed even practicable, and has not of courſe been ever thought of being experimentally tried, although I have reaſon to be ſatisfied, from ſome experiments that I myſelf have made, and the conſiderations above ſtated, that the benefits to be derived from conſuming the produce of rich graſs lands *of any ſort*, in this way, will be even greater than that which takes place with regard to red clover.

The circumſtance that made me firſt advert to thoſe benefits that might be derived from conſuming graſs lands by cutting, in preference to paſturage, was merely accidental. I had a pretty long and broad graſs walk, leading from my dwelling houſe to a garden, which could be avoided, when inconvenient to walk upon it, by taking

another path: and as the pile upon this avenue was extremely close, I found it very pleasing to walk upon it, while free from wet, even when the grass was an inch or more in length. Instead, therefore, of having it close shaven like a lawn, every three or four days, and throwing the sweepings away, as usual, it occurred to me that by cutting it less frequently, I should be able to have all the use of my walk I wished for; while I would at the same time, lose no part of the produce. From these considerations, I resolved to have it cut so as to admit of being given with economy to my cows, while in the house. As much grass was, therefore, cut each day from it as served my beasts for the time; and so proceeding on regularly, first cutting one side of the walk from end to end, and then the other, the walk being frequently rolled when fresh cut, especially after rain, to keep the surface smooth, so as to allow the scythe to cut quite close. In this manner I not only effected the purpose originally intended, but, to my great surprise, I had soon occasion to perceive that I thus obtained food for beasts much greater in quantity, as well as sweeter in quality, than I had ever been able, under any other mode of management, to obtain from the same extent of ground. The grass was cut

ſix or ſeven times during the ſeaſon; and at each time the quantity, on account of the extreme cloſeneſs of the pile, was much greater than I could have ſuppoſed, and of a much ſweeter quality alſo. There was not in the whole, a ſingle blade of graſs that was either bruiſed or decayed in any way, ſo that the beaſts devoured it with inconceivable avidity; whereas if, upon ſuch rich land, it had been allowed to ſtand a little longer, the root-ends of the graſs would have begun to wither and turn muſty for want of air though the top continued green, ſome ſtalks alſo being choaked by others, would not only begin to rot, ſo as to become unpalatable to the animals, but their roots alſo, being ſuffocated, begin to die out, and the graſs becomes thinner, ſo as to be longer of ſpringing up after each cutting; and thus the *quantity* of the produce is diminiſhed, as well as it's *quality* much impaired. Some farmers, to whom I ſhowed this experiment in the courſe of it's progreſs, judged, when they looked at the graſs while growing, that it would be too ſhort to be worth while to cut it; but when I cauſed ſome of it to be cut before their eyes, the *quantity* laid down by each ſwathe was ſo much greater than they expected, as to excite a high degree of aſtoniſhment. Some of them even ad-

mitted, that the quantity of forage thus obtained at one cutting, though it did not, at the moſt, exceed two inches in length, was in their opinion equal to that obtained at one cutting of a field of red clover, when advanced to be in full flower; and my own opinion coincided with theirs. This experiment firſt ſuggeſted doubts in my mind, as to the propriety of conſuming *rich* graſs lands by paſturage; and every obſervation I have ſince made, has tended ſo ſtrongly to add to my conviction, that I have now not a doubt remaining upon this head; and I conceive that the loſs which is annually ſuſtained by the nation at large, from an inattention to this circumſtance, is ſo great as, in ſome meaſure, to call upon me to publiſh theſe remarks, with a view to direct the attention of others to inveſtigate the ſubject with greater care than it has hitherto obtained: for, however inattentive men may be for the preſent, to theſe hints, a time will come, if they are made public, when they will claim the inveſtigation of ſome conſiderate mind. When that time comes, my object will be attained.

Since the former edition of this work was printed, I have met with a publication by Dr. Thaer, phyſician of the Electoral court of Hanover, and publiſhed in the firſt volume of *Commu-*

nications to the Board of Agriculture, &c. p. 376, in which I am happy to find, that the concluſions I have drawn above, by reaſoning from the few facts that have fallen under my own obſervations, have been confirmed by experience of Baron de Bülow and others; which have proved, as Dr. Thaer ſays, that the following facts are incontrovertible.

" 1*ſt*, A ſpot of ground, which, when paſtured upon, will yield ſufficient food for only one head, will abundantly maintain four head of cattle in the ſtable, if the vegetables be mowed at a proper time, and given to the cattle in a proper order.

" 2*d*, The ſtall feeding yields, at leaſt, double the quantity of manure from the ſame number of cattle [hence *eight* times the quantity of manure from the produce of the ſame field]; for the beſt and moſt efficacious ſummer manure is produced in the ſtable, and carried to the fields at the moſt proper period of it's fermentation; whereas, when ſpread on the meadow, and exhauſted by the air and ſun, it's power is entirely waſted.

" 3*d*, The cattle uſed to ſtall feeding will yield a much greater quantity of milk, and encreaſe faſter in weight, when fattening, than when they go to the field.

"*4th*, They are leſs ſubject to accidents, do not ſuffer by the heat, by flies and inſects, are not affected by the baneful fogs that are frequent in Germany, and bring on inflammations; on the contrary, if every thing be properly managed, they remain in a conſtant ſtate of health and vigour."

Dr. Thaer believes that the ſtall ſyſtem of feeding on gréen herbage has never been adverted to by the fármers or agricultural writers of Great Britain. It appears that he, in this reſpect, labours under a miſtake; yet it cannot fail to prove very ſatisfactory to me, to find a practice I have ſo warmly recommended to the attention of my countrymen, ſo ſtrongly ſupported by the experience of practical men in Germany. It deſerves, however, to be noticed, that the obſervations of Dr. Thaer ſeem to reſpect broad clover alone, and not any culniferous graſſes, although I am ſatisfied from my own experience and obſervations, that the economy in the conſumption of theſe laſt kind of graſſes, green in the houſe, will be much greater than that which will reſult from the conſumption of broad clover in this way. Hence I cannot help warmly recommending the following experiment to the notice of the Britiſh farmer, in hopes that ſome perſon of enterprize and accuracy will ſee

it carefully performed. I regret that my preſent ſituation does not admit of it's being done by myſelf.

Experiment propoſed.—To aſſiſt ſuch well intentioned inveſtigators, it may perhaps be proper for me here to ſtate what I ſhould conceive to be the moſt economical mode of conſuming the produce of rich graſs lands, that it may be ſubjected to the fair teſt of accurate experiments, conducted more at large than the circumſtances of my farm permitted me to make.

If two fields of *rich* graſs land can be found of exactly the ſame extent and quality, the experiment can be fairly made, by ſtocking the one with cattle, allowing them to paſture upon it, and reſerving the other to be cut and given to cattle of the ſame kind, by hand, properly kept in the houſe; the difference of the profit drawn from each claſs of beaſts, will thus aſcertain the comparative value of the two modes of management

I need ſcarcely obſerve, that in order to make the experiment fairly, the two fields ſhould be as much alike in all reſpects as poſſible; and, in particular, that the ſurface of the land intended to be cut ſhould be ſmooth and even, ſo as to ad-

mit of being rolled frequently; for which purpoſe, the flatter the ground is in general the better.

Let the field that is to be cut be carefully ſhut up from cattle, eſpecially during wet weather; and let it be rolled with a weighty roller in the ſpring, as ſoon as it is firm enough to bear the tread of the beaſts without hurting the ſurface, firſt in one direction, and then in the direction acroſs it. If it be twice rolled in that manner, it will be an advantage rather than a detriment, for it is of the utmoſt conſequence, under the mode of management propoſed, that the ſcythe ſhould cut very cloſe, without taking up any earth; one quarter of an inch at the bottom is as much as a whole inch at the top; ſo that, on account of the quantity of graſs to be obtained, cloſe cutting is of the greateſt uſe. It tends, alſo, greatly to promote the quick ſpringing up of the ſucceeding crop, as I have often obſerved; and by this practice, no dead leaves are left, which is unavoidable in rough cutting. Frequent rolling, with a weighty roller, while the ground is a little ſoft, is abſolutely neceſſary for this purpoſe; and is alſo of uſe on other accounts, as will afterwards be noticed.

The field ſhould begin to be cut when the longeſt piles of graſs on it have attained the height of two inches at moſt, and proceed regularly, day by day, cutting as faſt as the beaſts conſume it, ſo as to go over the whole in three or four weeks, as the weather is warm or cold; when that which is was firſt cut will be ready to be cut a ſecond time, and ſo on; never omitting to roll it when the weather is moiſt, and not too wet. The graſs ſhould be carried off in a light ſparred or wicker cart, drawn by one ſmall horſe; this cart to move upon three broad low wheels, placed two on one axle, and one on another, below the body of the cart, ſo as to act as a roller when going over the ground: a cart, or rather barrow, of this conſtruction, I had made, and found it a moſt convenient implement. In this manner the work will proceed regularly, and without trouble throughout the whole ſeaſon: the beaſts ſhould be regularly fed; getting only a ſmall quantity at a time, but frequently, freſh and freſh; giving them ſweet water when neceſſary, and as much graſs as they will eat, allowing them proper time for reſt. Nothing ſhould be left in their ſtalls, at theſe times, to be breathed upon, and thus rendered diſguſtful to them; and if the houſe be ſo conſtructed as that the beaſts can be eaſily kept cool to a pro-

per degree, quiet and clean, they will thrive abundantly.

From the result of this experiment, when fairly made, and often enough repeated, so as to guard against the effects of accidental unobserved peculiarities, many corollaries may be drawn, that will be found of high importance, in regard to rural economics.

In making this experiment, however, the full result of it cannot be clearly perceived, unless it shall be continued for several years; for, in the course of time, many important changes may be expected to follow, both in regard to the quantum of the produce of the two fields kept under these two modes of management, as in regard to it qualities. The experiment of one year can do little more than ascertain what is the result while the produce is nearly of the same quantity and kind; but as changes in both these respects may be expected, the comparison between the real benefits to be derived from the one or the other mode of management might be very fallacious, were it not continued for several years; and to do justice to the experiment, the whole dung made by the beasts in the house, should be returned to the field which produced their food.

Graſs lands, if conſtantly cut, are not deteriorated.—What the changes would be, both in regard to the quantity and the nature of the produce from the ſame field, if annually cut, and the produce carried off, as above mentioned, or if conſumed by ſuffering beaſts to paſture upon it, cannot at preſent be told with certainty; but there are not wanting facts that may enable us to have ſome idea of the probable reſult.

It has been rendered probable, at leaſt, from facts already ſtated in this eſſay, that dung, when dropped upon land by cattle paſturing upon it, does not tend to enrich it perhaps at all; or if it does ſo, it is only to a very ſmall degree.

Whether *rich* graſs land, if conſtantly cut, and the produce carried off from it, without returning any of the dung, will thus, in time, come to produce crops leſs abundant than the ſame land would have done, if kept under paſturage, will not, with many perſons, ſeem to admit a doubt: yet there are conſiderations which ſo ſtrongly operate upon my mind for doubting if this be the caſe, that nothing ſhort of actual experiment can remove thoſe doubts. I have often ſeen lawns around gentlemen's houſes that have been kept under a courſe of continued ſhaving for time immorial, that diſcovered no ſymptoms of exhauſ-

tion, nor any ſenſible diminution of luxuriance or of verdure, though no manures of any ſort had ever been laid upon them. This fact ſtruck me as an important one; and that I might not be miſtaken with regard to it, I applied for information reſpecting this particular, to a gardener who had had charge of very extenſive lawns of this ſort, belonging to a gentleman of large property: he aſſured me, that for the ſpace of upwards of thirty years, that he had had the care of theſe lawns, ſome parts of them which had been laid down long before he knew them, and were originally, as he ſuppoſed, of a rich quality, had never received, during all that time, the ſmalleſt quantity of manure of any ſort; and that the lawn continued to be equally cloſe in the pile, equally verdant at all ſeaſons in the year, and required to be as often cut as ever; and that, in ſhort, he had no reaſon to apprehend that the quantity of it's produce had diminiſhed in the ſmalleſt degree. This ſeems to me a ſtrong preſumptive proof that graſs land, when once of a rich quality, may be continued for an indefinite length of time under the ſcythe, without being at all deteriorated, even where it gets no return of dung that is annually made for the produce of it. And as we have already ſeen that rich graſs land,

under paſturage, produces as much dung as ought to manure each year more than double it's own extent of ſurface; it follows, that if the ſame quantity of graſs land will only nouriſh as many beaſts in the houſe, as if it were paſtured upon, (and there are ſtrong reaſons for thinking it will do much more,) there can be annually obtained from each acre of land kept under the ſcythe, as much dung as might manure two acres more, which might be abſtracted from that graſs land without deteriorating it. Of courſe, if the land be ſuch as that it can admit of being made richer, a dreſſing of that dung, now and then returned upon itſelf, would give it the richneſs wanted, without any extraneous aid. In this point of view, then, it ſeems to be impoſſible to deny, that rich land, if kept under the ſcythe, can never become poorer, if none of the dung made by the beaſts fed upon it be abſtracted from it; but that, on the contrary, it can thus be made to afford a large annual ſupply of dung for the purpoſe of enriching poorer land, while it ſtill continues to be equally fertile itſelf.

In regard to the other effects of the practice recommended, there ſeems to be no doubt that the *quality* of the graſs muſt continue to improve while under the ſcythe, much more than while under

paſturage. Every perſon who has beſtowed the ſmalleſt attention to objects of this ſort, muſt have remarked that the worſt kinds of graſſes grow moſt freely upon thoſe parts of rich graſs lands that are the moſt open and ſpungy in their texture; and that they are in general much ſweetened in the pile, where they chance to be much trod upon. Hence the fineſt graſſes, on ſuch fields, are always found to abound moſt upon thoſe paths which are moderately trod upon; white clover and the ſweeteſt graſſes being ſeen there in abundance, while they are leſs frequent in the ſpungy parts of the field. But frequent rolling tends to produce this effect more univerſally and equally, than any kind of treading by beaſts (a practice frequently recommended by the beſt farmers,) ever can do.

Again.—It has been frequently remarked, by intelligent farmers, that the hard ſtocking of land tends much to improve the quality of the paſtures, as well as it's quantity. On this ſubject as well as many others, the obſervations of Mr. Davies, of Longleat, in his account of the agriculture of Wiltſhire, deſerve to be particularly adverted to. He obſerves, p. 18. that "the ſweetneſs of the "feed depends much more on it's being kept "cloſe, *and eaten as faſt as it ſhoots*, than on any

" peculiar good quality of the graſs itſelf: for " there are many downs that, when cloſe fed, " appear to be a very ſweet paſture, but which, " if ſuffered to run a year or two without a full " ſtock on them, will become ſo coarſe, that " ſheep *will almoſt as ſoon ſtarve as eat the graſs:* " and even in thoſe parts of the downs where " the finer and ſweeter graſſes abound, the ſoil " is frequently ſo looſe and porous, that nothing " but conſtant treading will prevent them from " dying out, or being choaked by the larger and " coarſer graſſes." And again, p. 23: " They " alſo ſay, that this new kind of ſheep being ſo " much nicer in their food, and rejecting the " feed of the downs, on which the chief depend- " ance for ſheep food is, have ſuffered the her- " bage to grow gradually coarſer and coarſer; " and that the farmers, in attempting to remedy " this evil, by ſhortening their ſtock of ſheep, " have made it worſe; it being a well known fact, " that *the cloſer the downs are fed, the more* " *ſtock they will keep.*" He farther remarks, that in conſequence of too light ſtocking, heath, in ſome caſes, comes in the place of the better graſſes. But it is very evident that all the purpoſes of hard ſtocking, that is, keeping the graſs ſhort, and in a continual ſtate of vegetation, and

conſequently ſweet, and preventing the coarſer graſſes from running up to ſtalk and overpowering the others, together with the conſolidating of the ground by treading, would be obtained with much greater certainty by the practice of mowing; while the animals that conſumed the produce could in no caſe be ſubjected to a ſtint of food, which they neceſſarily muſt ſometimes be, where reliance is had upon hard ſtocking alone for preventing this evil.

From theſe conſiderations, there ſeems to be good reaſon to believe, that not only would an equal quantity of produce go farther, if cut and given green to beaſts in the houſe, than if it were paſtured upon, but that, by a continuation of this practice for years, the ground kept under the ſcythe would gradually improve, ſo as to produce a greater quantity of food; and that alſo of a richer quality, than if it had been kept under a courſe of paſturage; while, at the ſame time, a great quantity of dung might thus be acquired for the purpoſe of fertilizing other ſoils of a poorer quality. The reader, however, will pleaſe never to forget, that though this reaſoning be very *probable*, it amounts not as yet to *a certainty*; nor can it ever do ſo, until ſome deciſive experiments ſhall be made to aſcertain with pre-

ciſion the facts that are as yet but imperfectly known.

Sweetneſs of paſtures, what.—The term, *ſweetneſs of paſtures*, uſed above, and ſweet kinds of graſs, frequently occur in agricultural writings: yet, it is doubtful if ever they have been properly defined, ſo as to convey a preciſe and accurate meaning to the reader, or been ſo much adverted to as their importance deſerves. I ſhall here attempt to ſupply theſe defects.

Thoſe paſtures which animals chooſe to feed upon, in preference to others, and which in general are eaten down cloſe to the ground, are ſaid to be *ſweet* paſtures, in contradiſtinction from thoſe where the graſs, being diſreliſhed, is ſuffered to grow to a greater length, and often to wither in part, without being touched, which are called *coarſe*, or, if tending to dampneſs, *ſour* paſtures.

Without entering here into a diſquiſition concerning the circumſtances that tend to produce this ſweetneſs of paſturage, which are various, I ſhall only obſerve, that from whatever cauſe it originates, it is, in as far as I know, an univerſal rule, that in every caſe the younger the graſs is, the ſweeter and more palatable it will

be to beaſts of every ſort; and that the ſame weight of food will go much farther in nouriſhing or fattening an animal, if it be very pleaſing to the palate of the animal to which it is given, than if it had been leſs toothſome. As this is a fact that has not been ſo much adverted to as it deſerves, it requires to be here particularly inveſtigated.

It is here neceſſary to advert, that a certain quantity of food is required for the mere ſuſtenance of every animal, and if that quantity be daily adminiſtered to it, and no more, the creature will barely ſubſiſt, and neither grow better nor worſe, if fattening alone is conſidered; and of courſe will never return, in the way of fattening, any profit to the farmer for that portion of it's food, however long it may be continued upon it. But if the beaſt ſhall get a greater quantity of food than this portion which is barely neceſſary for ſubſiſtence, that ſurplus food then goes to augment the ſize, and to *fatten* the animal, and of courſe yields a profit to the farmer, in proportion to it's quantity.

If this fact be admitted, it will neceſſarily follow, that the greater the proportion of this ſurplus food the creature can be induced to eat, in a given time, the more quickly it will be fat-

tened, and, of courſe, the greater will be the profit of the farmer. For example,—if it be ſuppoſed that ten pounds of forage be the exact quantity of food required each day for the *ſuſtenance* of the animal, there would be conſumed by it, in the courſe of one year, 3650 pounds of food, without any profit at all as a fatting beaſt.

If, again, it be ſuppoſed, that by the addition of one pound of food each day, the animal got ſo forward, as in the courſe of one year to be fattened and advanced in it's value to the amount of 50 per cent. of it's original price, the account would ſtand thus:

Caſe firſt.

	lbs.
For ſuſtenance for 365 days - - - -	3650
For fattening 365 days at 1 lb. - - -	365
In all	4015

Caſe ſecond.

But if the beaſt were allowed two pounds extra each day, it would conſume 365 pounds, (which, in this caſe, we are to ſuppoſe will *fatten* the beaſt as much as in the former

caſe,) in ſix months, or 182½ days, ſay 182. The account would, in this caſe, ſtand thus:

For ſuſtenance 182 days at 10 lb. - -	1820
For fattening - - - - - - - - - - -	365
In all	2185

Caſe third.

If the beaſt be allowed *four* pounds extra each day, it would conſume 365 lb. in three months, or 92 days. The account would in this caſe be

For ſuſtenance 92 days at 10 lb. - - -	920
For fattening - - - - - - - - - - -	365
In all	1235

Caſe fourth.

If the beaſt could be induced to eat eight pounds extra *per* day, it would conſume 365 lb. in ſix weeks, or 46 days, in which caſe the account would ſtand thus:

For ſuſtenance 46 days at 10 lb. - - -	460
For fattening - - - - - - - - - - -	365
In all	825

From hence it appears, that if the beaſt were fattened in the following periods, it would conſume

If fed for one year - - - - - - - - -	4015
If half a year - - - - - - - - - -	2185
So that the ſaving in this caſe will be	1830
If fed for three months, it would conſume only - - - - - - - - - -	1285
Which deducted from - - - - - - -	4015
Gives a ſaving of	2730
If fed for ſix weeks, it would conſume -	825
Which deducted from - - - - - - -	4015
Gives a ſaving of	3190

So that the ſame quantity of food, which would ſuſtain no more than *one* beaſt, if it were ſo ſparingly adminiſtered as to require a whole year to fatten it, would be more than ſufficient to fatten *four*, if they could be induced to take it in ſuch quantity as to fatten in ſix weeks only.

But as it is hunger alone that can induce any animal to eat ſuch kinds of food as are unpalatable to that creature, it is impoſſible to get the

animal to eat more of coarſe unpalatable kinds of graſs than what is neceſſary for bare ſubſiſtence only; ſo that ſuch fields muſt be appropriated to breeding only, becauſe, in the way of feeding, they can return no profit whatever to the farmer, by a kind of ſtock which diſreliſhes that food. If it be a little ſweeter, they may get on a little; but the profit, in this caſe, will be very ſmall. Render the graſs more ſweet and palatable, they will fatten the more quickly, and the farmer's profit be thus augmented: and ſo on almoſt in a geometrical *ratio*, in proportion to it's augmented ſweetneſs. Under this point of view, whatever tends to render the produce of fields more ſweet and palatable to the animals which feed upon it, is a very great national improvement; becauſe it anſwers the ſame purpoſe that a large augmentation in the quantity of the produce would do. But if the *quality* can be improved at the ſame time that the *quantity* can be augmented, it will be a two-fold gain, and the greateſt national benefit will thus be obtained. But as it has been already ſhown that every kind of graſs will be rendered as palatable as it is poſſible to be, by being cut and given to them in the houſe, while the quantity of it's produce will, at the ſame time, be there-

by augmented, it ſeems to be impoſſible to doubt that the practice muſt be highly economical.

Allow me here to point out one other obvious inference from the reaſoning above, that has been hitherto but too little adverted to. It is well known that very rich land in general produces the ſweeteſt pile of graſs, and that calcareous manures, in particular, have been remarked as being peculiarly calculated for producing this effect: it hence follows, that it is the beſt economy to lay lands down to graſs while they are in the moſt fertile ſtate, before they have been exhauſted by frequent corn crops, eſpecially after liming. Land may certainly be made too rich for corn crops; but I do not know if that can be the caſe with graſs land, under a proper management.

I cannot too often warn the reader to take notice that the foregoing, and every other *illuſtrative* calculation that occurs in theſe eſſays, is not to be conſidered as accurate in regard to the *quantum*, but merely in reſpect to the tendency: for I am by no means in poſſeſſion as yet of facts upon which *accurate* calculations, in regard to the preciſe degree of profit or loſs, in caſes of this kind, could be determined. I know of

no fact that has been yet brought forward, which clearly aſcertains whether the degree of melioration is exactly in proportion to the *ſurplus* food of any ſort that an animal can be brought to eat in a given time, though the probabilities are greatly on that ſide.

Neither do I know if it be an univerſal rule, when animals *of different kinds* are compared with each other, that thoſe kinds which can be made to eat, in a given time, the greateſt quantity of food, can be the ſooneſt fattened. The ſubject has never as yet, that I know of, been adverted to.

Under this head it deſerves to be remarked, that when horſes and cattle are fed upon the ſame kind of graſs, it is univerſally admitted that the horſe, if of the ſame weight, conſumes more graſs in a given time than the ox; and it is alſo a certain fact that the horſe will become fat in much leſs time than the ox. It is generally, I think, allowed that a horſe, living upon rich paſture, may be made as fat in one month, as a bullock upon the ſame paſture could be made in three. What is the exact proportion of food that would be conſumed by theſe creatures, in the ſame ſpace of time, has not, as yet, that I know of, been accurately aſ-

certained; but the general eſtimate that has been made, from the experience of former times, is, that two horſes conſume as much food as three cows or bullocks in the ſame time: and they are ſo paid for in paſture fields, where they are both taken in upon time. If both theſe facts are ſo, it would appear that a horſe could be fatted on leſs food than an ox. For,

Three oxen at 12 lb. would conſume 36 lb. each day; which, in 93 days, amounts to 3348 lb. that is, for each ox, 1116 lb.; and two horſes, conſuming alſo 36 lb. a-day, will eat in 31 days 1116 lb. which is at the rate of 558 lb. conſumed on the fattening of each horſe. So that, on theſe data, the horſe can be fatted with preciſely one half the quantity of food that the ox can. If this be ſo, the ſaving to the nation would be great indeed, were we at liberty to fatten horſes for food to man, inſtead of cattle: but prejudice ſays that this muſt not be done.

I have often thought that the refuſing to eat the fleſh of horſes in Europe, is an unreaſonable, prejudice that ought to be overcome. It is indeed forbidden by the law of Moſes, to which origin we can trace many of our vulgar prejudices what have been gradually overcome: the animal itſelf is a beautiful clean feed-

ing creature, ſo that no averſion can be excited on that account: it's fleſh, wherever it is eaten, in common with that of bullocks, is invariably accounted the greater delicacy of the two; and there are not wanting perſons in this country who have taſted it, and concur in the ſame opinion. The prejudice, then, muſt be accounted highly unreaſonable; and why ſhould it not be overcome? Many perſons among ourſelves have got over the much better founded prejudice they had once entertained againſt eating ſwine's fleſh, and now reliſh it perfectly well. The common people, at this moment, ſhudder at the idea of eating a frog; yet many perſons in the polite circle have overcome that prejudice, and admit it to their tables as one of the greateſt delicacies: and what is to hinder them from overcoming in like manner their prejudice againſt horſe fleſh? We have ſeen above, that it might prove a mean of reducing the price of meat, and augmenting the produce of the country: I ſhall only add, that humanity would ſtrongly plead in behalf of this exertion: for were the fleſh of horſes to be eaten, inſtead of being worked to death, as they now are, and ſubjected to a treatment that outrages the feelings of nature, they would be put up to be fed; kindly

treated and pampered with delicacies, ſo as to have the full enjoyment of life till the laſt moment they are ſuffered to exiſt.

That ſome particular kinds of food have a greater tendency to produce fat than others, there ſeems to be little doubt; and that others prove more nutritive for a given quantity, is undeniable. But the comparative value, in theſe reſpects, is in every caſe as yet unaſcertained; ſo that here a wide field of inveſtigation remains that is wholly unexplored, which muſt be done before we can pretend to have attained any thing like a proper ſyſtem of economy; but even a beginning, however feeble, is ſome faint advance in an unexplored region.

Condiments, their importance on domeſtic economy.—On adverting to what has been ſaid above, it will appear that too little attention has hitherto been beſtowed to the ſubject of condiments as affecting animals. Hitherto the greateſt part of mankind ſeem to forget that mere animals have the ſenſe of taſting in as great perfection as man; and are diſpoſed to indulge their appetite for ſenſual gratifications, without any reſtraint, wherever circumſtances put it in their power. The uſes that may be made by man,

for his own emolument, of this natural propenſity of animals, are very obvious when adverted to. Yet I know no caſe in which the general attention of men ſeems to have been ſtrongly turned to that point, unleſs it be in reſpect to the fattening of calves: for I have met with few perſons who have had an extenſive practice in this department, who are not ſenſible that the profit is in proportion to the quantity of milk that the creatures can be induced voluntarily to take in a given time. This ſolitary fact is known by thouſands, who never once think of extending it to any other caſe of animal exiſtence. But there are not wanting a few perſons, who, in conſequence of accurate obſervation, have diſcovered the vaſt importance of ſtudying with care the taſte of the creatures they feed, that they may not only furniſh them with the kinds of food they like beſt, but alſo to vary theſe from time to time, and to give them exactly in the quantities, and in the way that they find will induce the creatures to eat the moſt; having the full experience that the profit to be drawn from feeding beaſts is always proportioned to the encreaſed quantity of food they can get each individual *coaxed* to conſume in a given time. In this branch of rural economics, I have met with no

perſon who has made greater progreſs than a plain practical farmer at Hope, in the neighbourhood of Mancheſter, who ſpares no trouble nor expence in procuring ſuch kinds of food and condiments as he finds beſt calculated to induce his cows to conſume, in a given time, the greateſt quantity of food poſſible. The conſequence is, that this man makes much money, where his neighbours, who are not in the ſecret, and more niggard in their outlay than he is, ſuſtain a loſs. Among other condiments, this man has diſcovered that *pure* water ſtands pretty high in the ſcale; on which account his beaſts are never ſuffered, far leſs obliged, to taſte a drop of water that has ever been ſullied by any animal ſetting a foot into it. With this view, they are always ſerved with running water, which is, for their convenience, received into a long wooden trough, through which it paſſes while they are drinking. Such poor beaſts, as are compelled, through neceſſity, to drink out of thoſe muddy ſtagnant pools, in which other cattle have waded for days together to cool themſelves in hot weather, which are fully impregnated with their dung and piſs, feel the inconvenience of this nauſeating draught; and the farmer of courſe ſuffers an abatement of his profit to an aſtoniſhing degree. Aſtoniſhing

to him, it may be juſtly called: for though he feels the effect, he ſeems to be ignorant of the cauſe, and therefore ſuffers it to exiſt, without an attempt to remove it; as every attentive perſon muſt have obſerved in many thouſand caſes.

There can be little reaſon to doubt, that animals which can be induced voluntarily to take an extra quantity of food in a given time, will be quickly fattened by that practice; but we would ſcarcely be inclined to ſuſpect, that the ſame effect would be the reſult where the animals are compelled involuntarily to take a much greater quantity of food than they ever would do, if left entirely to themſelves, were we not in poſſeſſion of facts which undeniably prove that this is certainly the caſe. The practice of *cramming* fowls, as it is generally called, eſtabliſhes this point beyond a doubt.

The following method of fattening geeſe, in Languedoc in France, while it proves the poſition here ſtated, deſerves to be generally known, as it will give ſome hints that may be uſeful in fattening other animals.

After the bird has got into *full fleſh*, (*i. e.* by being well kept upon green food,) it is neceſſary not to delay the fattening of them too long,

leſt you loſe the ſeaſon entirely. About the end of December they enter into rut, *after which time they will not fatten at all.* As ſoon as the froſt has ſet in, (uſually towards the end of November,) they are ſhut up, to the number of *ten or twelve*, (never more) in a dark ſtill place, where they can never ſee light, nor hear the cries of thoſe which are kept for laying. They remain in that priſon till they have attained the greateſt degree of fatneſs, and are ready for killing: that moment muſt be ſeized, otherwiſe they would very ſoon turn lean, and at laſt die.

There are two ways of fattening of them.—The *firſt* is, by giving them a trough filled with grain, which they call *ſarde*, ſo that they may eat whenever they pleaſe. [I do not know what kind of grain is denoted by the word ſarde. Perhaps it may be buck-wheat. It does not ſeem from what follows, that the effect of the operation called malting on grain, intended to feed animals, is there known.] The geeſe fattened on this grain are very delicate. Others put into the trough grains of maize boiled in water.—They take care to give them *plenty* of that food, and *to keep the coop clean.* At the end of two or three weeks the geeſe are all fully

fattened. They are then taken out of the coop, and allowed to go at large into the water for twenty four hours. Without that precaution their fleſh would have a diſagreeable flavour.—

The above may be called the natural method of fattening, by *enticing* them to eat food enough of their own accord. The *ſecond* may be called the *artificial* method, and is as follows:

The geeſe are put up in the ſame manner as before, and are *crammed* twice a day, by putting into their craw, by means of a tinned tube, as much as it will hold, of maize boiled in water. The tube is uſed, becauſe the bill of the gooſe being furniſhed with teeth, the perſon who ſhould attempt to perform that operation by hand, would ſoon have it ſcratched and torn to pieces. By this means, the geeſe acquire *a prodigious fatneſs, ſo that a pair ſometimes weigh from fifty to ſixty pounds.* Their *liver* weighs from one pound to a pound and a half,—is white and delicate;—but has a ſlight bitterneſs to the taſte, which the liver of a duck has not. The *hearts* are large, like a ſmall apple, and when dreſſed on the gridiron, they are excellent eating. The feet are boiled, after which they are fried the ſame as the tongue.

Ducks are fattened in the ſame place as under.

When the ducks are pretty fat by the uſual modes of feeding, they are ſhut up eight by eight in a dark place. Every morning and evening, a ſervant puts their wings acroſs, and placing them between his knees, opens their bill with his left hand, and with his right fills the craw with boiled maize: they ſometimes die ſuffocated; but they are not a bit the worſe for it, provided care is taken to bleed them directly.—The unfortunate animals paſs there fifteen days in a ſtate of oppreſſion and ſuffocation, in conſequence of *their liver* growing large, which keeps them always panting, and almoſt without breathing. *When the tail of the duck ſpreads out like a fan*, they know that it is fat enough; they are then turned out to bathe in water, after which they are killed.

" I have opened two ducks, of which the one had not, and the other had been crammed. The firſt had a liver of the natural ſize, the ſkin equally thick in all places, and the lungs perfectly ſound. That which had been crammed, had *an enormous liver*, which, covering all the lower part of the belly, extended as far as the anus. (The ducks are generally ſuffocated when, by the preſſure of the liver, the anus is opened, and the liver appears at it's orifice.) The lungs were

ſmall, and loaded with blood. The ſkin of the belly, which covered the liver, was of the thickneſs of a ſhilling. When the ducks thus crammed, as well as the geeſe, have been plucked, they ſeem balls of fat, and none of their members are diſcernable."

There are ſome inferences, not a little curious, may be drawn from theſe facts, in regard to the fattening of other animals. Not only does it confirm the general poſition aſſumed above, that the more food an animal can be made to take, in a given time, the quicker it will be fattened: but this rule ſeems to hold, when it is given even in a *hurtful* quantity, beyond what the animal would naturally have taken; and farther, that by certain modes of feeding, when well underſtood, the ſize of particular parts of the body can be augmented at pleaſure, far beyond their natural proportions. Could the quantity of tallow in quadrupeds be augmented nearly in the ſame proportion to the liver, in this caſe, it is evident the profit to the owner would be greatly augmented. The following mode of fattening poultry, as practiſed by an experienced perſon in Britain, approaches nearer to that *natural* mode of feeding, and concurs in confirming the general doctrines.

Receipt for feeding poultry.

" Very ſhort time is neceſſary. If a chicken be not fat in a *week*, it is diſtempered.

" Poultry ſhould be fattened in coops kept *very clean.* They ſhould be furniſhed with gravel, *but with no water.* Their only food, barley meal, mixed ſo thin with water as to ſerve them for drink. Their thirſt makes them eat more than they would, in order to extract the water that is among their food. This ſhould not be put in troughs, but laid upon a board, *which ſhould be clean waſhed every time freſh food is put upon it.* It is foul and heated water which is the ſole cauſe of the pip. The preventative is obvious."

Common ſalt, value of, in feeding beaſts.— There is no ſubſtance yet known which is ſo much reliſhed by the whole order of *gramenivorous* animals, as common ſalt. The wild creatures of the deſart are ſo fond of it, that wherever they diſcover a bank of earth impregnated with a ſmall proportion of ſalt, they come to it ever after regularly to lick the ſaline earth, as they would to a pool of water for drink, were

there none other near; ſo that when a hunter in America diſcovers ſuch a *lick*, as ſuch places are there called, he reckons himſelf ſure of obtaining plenty of game, by lying in wait near it, and, ſhooting them as they approach it, until the whole beaſts that have diſcovered it are killed.

It is alſo admitted by all thoſe who have tried the experiment, that ſalt, given along with the food of domeſtic animals, [except fowls, to which ſalt is a certain poiſon,] tends very much to promote their health and accelerate their feeding; and although ſome perſons, who have been at a loſs to account for the manner in which this ſtimulent could act as a nutritious ſubſtance, have affected to diſregard this fact, yet no one has been able to bring the ſlighteſt ſhew of evidence, to invalidate the ſtrong proofs that have been adduced in ſupport of it; though, unfortunately for this country, few experiments of this kind have been tried in it. In fact, we have no reaſon to ſuppoſe that ſalt acts in the ſmalleſt degree, as a nutritious ſubſtance, or, *of itſelf*, tends to fatten any animal; but that merely, by acting as a condiment, it whets the appetite, and gives the creature to which it is properly adminiſtered a ſtrong reliſh for it's proper food, ſo as to induce it to eat *in a given time* a greater quantity than it would have done, and thus greatly to aug-

ment, as has been above explained, it's feeding quality beyond what it otherwiſe could have had. In this way, it is not perhaps an extravagant poſition to ſay, that by a proper uſe of common ſalt, the ſame quantity of forage might, on many occaſions, be made to go twice as far as it could have gone in feeding animals, had the ſalt been withheld from them. If ſo, (and let thoſe, who are inclined to withhold their aſſent to this poſition, prove, by a ſet of experiments fairly conducted, that it is erroneous; till then, the unvarying teſtimony of the few who have tried it, confirming the poſition, ought to be relied on. If ſo, then, I ſtill ſay,) we have here laid open to our view an eaſy mode of augmenting the produce of our fields to an amazing extent: for, if the ſame quantity of forage can be made to go, not twice as far, but *one twentieth* part only farther than it now does, it would be the ſame thing as adding one twentieth part to the aggregate produce of meat for beaſts, throughout the whole kingdom. But, according to the eſtimate of the preſident of the Board of Agriculture, there are upwards of fifty millions of acres of *cultivated* land in this iſland; the value of that forage produced by which cannot, on an average, be rated ſo low as twenty ſhillings *per* acre; but even at that low rate, the

the addition of one twentieth would amount to 2,550,000l. *per annum*; a ſum ſo great, that when viewed in the aggregate, it is difficult to bring the mind to believe that ſuch an improvement is actually practicable; yet, when the particulars are conſidered in detail, it ſeems to be impoſſible not to admit that the amount of the improvement muſt be greatly above what is here ſtated.

This improvement, however, *immenſe* as it muſt appear to be, in whatever way it can be viewed, is entirely prevented from taking place in this iſland, by reaſon of the ſalt laws: for while theſe ſhall be continued on the footing they now ſtand, it is vain to think ever to induce farmers even to try the experiments that are neceſſary for elucidating the facts here wanted: and other perſons are, for obvious reaſons, incapable of making the experiments; nor, if they could make them with the utmoſt accuracy, could they ever convince farmers in general, while the duties ſhall be allowed to continue as they now are, ſo far as to induce them to make a copious uſe of ſalt for their beaſts in their general practice. Conſidered under this point of view, as well as many others, the duty on ſalt muſt be accounted one of the moſt impolitic taxes that

ever was impoſed in any country; as it tends to retard the proſperity of the nation in a thouſand ways, to an amount that no perſon, who has not conſidered the ſubject with the ſame attention I have done, could ever believe to be poſſible.—Better were it for the inhabitants of this country to pay an hundred times the amount of the free produce of the duties on ſalt, if levied in any one of a variety of ways that might eaſily be ſuggeſted, which do not bind up the hands of induſtry as this does. But ſo long as party cabals ſhall occupy the minds of the leading men in the legiſlative and executive departments of government, to the excluſion of every object from their ſerious thoughts, that cannot be immedately connected with them, it is in vain to think that obſervations which tend to promote merely uſeful meaſures, which might perhaps affect the intereſt, and tend to diſguſt ſome powerful ſupporters of either party, or their adherents, will ever command the attention of any party. I write then, at preſent, as in times paſt, without hope, and merely from a ſenſe of duty. I am happy in being placed beyond the verge of the vortex of any party whatever, otherwiſe I alſo might perhaps have been induced, like others, to leave this ſubject untouched, as well as ſome others

that in a ſimilar manner retard the proſperity of the nation, and which are equally reſpected alike by thoſe who are in power, and thoſe who hope to be ſo *(r)*.

Hay, beſt mode of obtaining it of a fine quality.—Hitherto I have treated only of green forage; but as in this climate, where graſs does not continue to vegetate luxuriantly throughout the whole year, a proviſion muſt be made for winter food for beaſts; for this purpoſe, it becomes neceſſary, in all caſes, on graſs farms, to appropriate a proportion of the land for hay. It becomes, then, a conſideration of ſome importance, to enquire in what way hay of the beſt quality can be obtained in the greateſt quantity, and at the leaſt expence that the nature of the caſe will admit.

From the conſideration above ſtated, it is evident that it is a matter of much greater conſequence than has been generally imagined, to take care that the hay ſhall be of the very beſt *quality* poſſible; becauſe one ſtone of hay, of an exceeding fine quality, may probably go as far in *feeding* beaſts, as four of an inferior quality will do. Indeed no hay, but that which is of the very beſt quality, will *fatten* beaſts at all; and

there are very few places in this iſland, where the farmers are at ſo much pains in making their hay as to render it ſo good as to be fit for this purpoſe. So little attention is in general beſtowed upon this ſubject, that few farmers have even an idea of the circumſtances that chiefly tend either to improve the quality of their hay, or to make it worſe. For the moſt part, all that ſeems to be aimed at, is to get the graſs as quickly dryed as poſſible, ſo as that it may admit of being kept, when put up in a large maſs together.—And as graſs, that is already withered before it be cut, can be more eaſily dried than that which is very green and ſucculent, it is too general a practice to allow it to advance too far before it be cut; in conſequence of which, the hay is rendered of a quality much inferior to what it might have been. Some light will be thrown on this branch of our ſubject by the following facts ſtated by Mr. Davies, in his account of Wiltſhire.

"The dairy farmers," he obſerves, "in North "Wiltſhire, and in particular the graziers, are "much more attentive to the quality, than the "quantity of their hay. It has been already "remarked, that they make a point of haining "up their meadows as early as poſſible in au-

" tumn, and of courſe are able to mow early in " the ſummer.

" It is not uncommon to ſee graſs mown, " not only before it is in bloſſom, but even be- " fore it is *all in ear*; and to this it is owing " that it is more common to fatten cattle with " *hay alone*, in North Wilts, than perhaps in " any county in the kingdom.

" And by this the dairy men are able to keep " up the milk of thoſe cows that calve early, " and from which calves are fatted, which " would otherwiſe ſhrink before the ſpringing " of the graſs, and never recover. And the ad- " vantage they get by early after-graſs, and by " the duration of that after-graſs to a late period " in autumn, fully compenſates for the loſs of " quantity in their hay crop."

Theſe obſervations are judicious; but they do not go as far as could be wiſhed. Nothing is ſaid as to the mode adopted for *winning* the hay (*s*) on which it's quality muſt always greatly depend. It is in general underſtood, that if hay can be made ſo as to retain ſome tinge of it's green colour, it is better than if it were bleached white, or rotted: but precautions are ſeldom thought neceſſary to be adopted for guarding againſt the effects of ſcorching ſun-ſhine, which

by too quickly exhaling it's natural juices, renders it ſticky, brittle, and unpalatable to a certain degree; and, what is of ſtill more importance, the effects of rain, or even dew, if abundant, if they be ſuffered to fall upon the graſs after it is cut, and before it be made into hay, are ſeldom adverted to; ſo that if dry weather come ſoon to exhale that wet, while the graſs lies ſpread out upon the ground, the farmer feels little anxiety about the conſequences; though it is a certain fact that no hay, which has been in the leaſt wetted during the proceſs of hay-making, can ever be made to have that ſweet palatable taſte it would have had without it. Nor did I ever ſee it fail that beaſts, when allowed to chooſe between hay ſo made, and that which has been carefully guarded from moiſture, ever heſitated to make choice of the laſt, or committed a miſtake, even where I myſelf could not diſtinguiſh a perceptible difference. By precautions that I myſelf have adopted, and which are mentioned in the eſſay on hay-making, in the firſt volume of theſe eſſays, this evil may be in a great meaſure obviated; but even under that proceſs, the ſurface of the hay-cocks cannot be protected from dew or rain; ſo that if wet weather ſhall come on during the hay pro-

ceſs, a very large proportion of the hay muſt ſuſtain a damage that greatly diminiſhes it's value. To guard againſt this inconvenience, and to obtain hay, in all caſes, of the very beſt quality the circumſtances will admit of, the following proceſs may be ſafely conjoined with the practice of cutting and feeding beaſts with graſs in the houſe, above recommended.

If the produce of graſs land be to be cut, as above deſcribed, and uſed green, it will be proper, in general, to reſerve a part of it for hay: in this caſe the cutting for *graſs* and for *hay* ſhould be carried on together; but with the following variations, depending on the uſes it is to be applied to. That part of the graſs which is intended to be uſed green, as it will ſuffer no damage by being cut when wet, muſt continue to be cut regularly each day as it is wanted, without regard to the weather; whereas that part of it which is intended for hay, ought on no account to be cut while wet; and therefore that part of the operation muſt be diſcontinued unleſs when the weather is dry and fine; nor ſhould graſs that is intended for hay ever be cut either in the morning, or the evening, while dew is upon it. And as the hay, in the mode propoſed, ought to be made day by day for a conti-

nuance, as the graſs comes forward for the ſcythe, while the weather is in a proper ſtate for it; and not all at one time, as in the uſual mode of hay-making, the cutting both graſs and hay from the ſame field may be very economically combined together. For this purpoſe, the graſs which is cut in the morning, while the dew may perhaps be upon it, and in the afternoon, ought to be appropriated to the beaſts green; and that part of the graſs only, which is cut from about nine till two o'clock, while the weather is dry and fine, ſhould be made into hay. If the mower begins to cut down for hay about nine o'clock in the morning, and goes on in that operation till one or two o'clock in the afternoon, and if the perſons who are to put up the hay begin to that operation about one, the graſs will thus be allowed to lie between three and four hours in the ſwathe, expoſed to the ſun, which will exhale ſome part of it's moiſture, and deaden it enough for the purpoſes required, though it ſtill retains the whole of its nutritious juices without abatement.

After being allowed to lie thus long, it ſhould be raked clean up, and carried off the field in the ſame cart that is employed for taking in the graſs, and immediately put into the ſtack,

ſo as that the whole graſs that was cut that day ſhall be put up before evening; and thus regularly each good day throughout the ſeaſon.

But as graſs, while in this green and ſucculent ſtate, would not keep if put up by itſelf, care muſt be taken to provide ſome dry forage to mix with it. For this purpoſe nothing can be ſo proper as good dry hay; but for want of that, at the beginning, good ſtraw may be very ſafely employed. *(t)*

To perform this operation properly, it will be neceſſary to erect a permanent roof for the hay-ſtack, ſupported by upright poſts of a proper height. This practice will be highly economical in every ſenſe; not only becauſe it will ſave the waſte of thatch every year, and the labour of putting it on and ſecuring it upon the hay-ſtack, but alſo becauſe it will ſave from damage a great proportion of hay, which is unavoidably waſted in conſequence of the imperfection of that kind of temporary thatching. Nothing, I conceive, but inattention, or the averſion that landlords have to erect proper buildings, or the want of ſecurity to encourage farmers to do it, could ever have reconciled the nation to the idea of ſecuring hay by the imperfect protection of a temporary roof. Almoſt the only hay-ſtack, proper-

ly ſo called, I have ever yet ſeen with a *permanent* roof, is belonging to J. Bayley, Eſq. at Hope near Mancheſter, which is one of many judicious improvements adopted by that public-ſpirited gentleman.

Nor need this roof coſt the farmer almoſt any extra expence beyond what he muſt have laid out for his proper accommodation in other reſpects: for if the bottom of the hay-ſtack be made to reſt upon beams ſupported ſo far above the ground, as to admit of his domeſtic animals to ſtand under them, the ſame roof will anſwer both purpoſes at once, as is done at preſent with dwelling houſes of ſeveral ſtages.

When the hay-ſtack is to be made up, a wooden gangway of a few looſe deals ſhould be laid along from end to end of the whole ſtack, about ſix feet above the ſurface of the floor; a platform on the ſame level for receiving the hay, ſhould be connected with it. By means of this gangway, a thin ſtratum of dry hay ſhould be firſt ſtrewed lightly above the bottom floor; [It will be neceſſary, in all caſes where cattle are put below this hay-ſtack, not only to have a floor, but alſo to have the beams lathed below and plaiſtered, not only for the purpoſe of preventing fire, but alſo for preſerving the beams

from rotting by the breath of the beaſts.] and above that a ſtratum of graſs ſhould be ſtrewed in the ſame light manner without trampling upon it; and ſo on over the whole length of the hay-ſtack. If the extent of this ſtack be properly proportioned to the quantity of hay to be daily cut, it may be ſo contrived as that no more than one (or perhaps occaſionally two) very thin ſtrata ſhall have occaſion to be thus made in any one day. In which caſe the new cut graſs will be expoſed to the ſun and drying air, for the beſt part of one day more, before it be covered up, without danger of being damaged either by dew or rain. [To render this kind of hay-ſtack perfectly compleat, the ſides of it might be covered with open deals, ſet ſhelving like a tanner's dry houſe, which would admit the air without ſun-ſhine, and totally exclude rain even during windy weather.] Another ſtratum of hay and graſs being, in the ſame manner, laid upon this next day, will prevent it from being ever afterwards expoſed to the ſun, and will at the ſame time preſs it gently down, but ſtill ſo lightly as to allow the air to paſs through it, and gradually exhale its moiſture. Each ſucceſſive addition will preſs that below it a little more firmly, ſo as to make it ſlowly to conſoli-

date below in proportion as it dries. Thus will the whole of the native juices of the hay be retained in as great perfection as can be conceived poſſible, without danger of having it either muſty, in any caſe, (for muſty hay is always occaſioned by extraneous wet,) or over-heated: and I have not a doubt, that if hay were thus made by the intermixture of dried hay of the ſame ſort with the freſh graſs, it would prove as nutritious and fattening for beaſts, (perhaps more ſo, *(u)*,) as the freſh graſs would be; while the quantity obtained from the ſame extent of land, would be greater than can be got by any mode of management hitherto adopted.

To render it practicable to ſtrew the hay in this manner quite equally over the whole ſurface of the ſtack, the reader will eaſily perceive that the gangway muſt admit of being ſhifted more or leſs towards one or the other ſide, as occaſion may require; and alſo, that when the hay riſes ſo high as nearly to touch it, the platform ſhall admit of being raiſed a ſtage higher. This, he will eaſily perceive, can all be effected without inconvenience, by making the gangway of looſe deals, to be ſupported by light moveable bars, running acroſs the ſtack, the ends of which reſt upon bars fixed to the uprights that

ſupport the roof, horizontally along the ſide of the ſtack, at the height of ſix feet above each other. All this will be ſo plain, by one moment's reflection, as to require no farther illuſtration here.

When the hay riſes ſo high as to touch the eaves of the roof, it may be allowed to ſubſide for ſome weeks, during which time it will have ſunk a good deal, ſo as to admit of more being put upon it; after which, being allowed to ſettle once more, it may receive a freſh addition; and ſo on till it be filled choak-full up to the roof, the laſt additions being introduced by the end, the perſon treading on the hay in the middle, and ſqueezing it lightly before him, when he comes to the end to fill up the whole of the triangular cavity of the roof as full as may be. As there can be here no preſſure from above, there will be no danger of it's not drying ſufficiently: or, if it be a corn farm, the hay-ſtack may be allowed to ſettle till the corn harveſt; and at that time the vacuity at top may be filled up with corn inſtead of hay. This will be a great conveniency to the farmer in a tickliſh harveſt: for as he will be able to put up the corn without preſſing it cloſe, and as there will be little preſſure upon it in this ſituation, he will be

able to inn his corn long before it could admit of it in any other ſituation.

It may perhaps be deemed a digreſſion in this place, but I cannot omit the occaſion that here offers, to take notice of the benefits that the farmer might derive from the practice, were it univerſally adopted, of putting up all his corns, as well as hay, under permanent roofs, conſtructed on the general plan of that recommended for the hay-ſtack. The expence would be trifling at firſt, and the ſaving afterwards very great, as well as the accommodation it would afford. It would, in fact, be only heightening the roofs of the houſes he ought neceſſarily to have upon the farm, ſo as to admit of placing the corn above the beaſts, and ſhades for utenſils, &c. he muſt have at any rate, for no walls would be neceſſary to that part where the corn is to be kept.

If this plan were to be adopted, it might be effected in the following manner. Let a row of poſts be placed perpendicularly on each ſide of the building where the walls ſhould be, at the diſtance of ſix feet from each other; theſe poſts reſting below on the floor, and ſupporting at top the platform on which the couples for the roof are to ſtand, which will bind them firmly. Place then another row of perpendicular poſts at

ſix feet from each other, *acroſs* the building, directly from ſide to ſide, in a line between the two outſide pillars. The top of theſe inner poſts to be faſtened to the girder, (or, as it is called in Scotland, the *balk*) that joins the under part of the couples; and the roof being put on, and properly ſecured, the building is finiſhed.

This ſtructure being in readineſs, and the corn ſuppoſed to be ripe before it is reaped, and dry cut down, it may be carried home the ſame day, and built up with ſafety in the following manner:

For ever purpoſe, and in whatever way the corn has been reaped, I am ſatisfied it ought to be bound up into ſheaves before it is led, if economy be aimed at; and the neater theſe ſheaves are done up the better: for the expediting the loading and unloading, and the ſaving the waſte that would accrue by ſhaking, and while carryrying it about looſe in forking, will always do much more than pay for the expence of binding it up, even where the corn has been cut down by the ſcythe; (a ſlovenly practice, however, which cannot, I am ſatisfied, from actual experiment actually made, be in any caſe adviſeable, where all *items* are fairly taken into the account.) Suppoſing it then to be in ſheaves, begin to build it up in the corn ſhade, by laying a row of ſheaves

with the butt end outwards, right acroſs the ſhade in a line with one of the rows of poſts; and another row of ſheaves in the ſame manner in a line with the next row of poſts, laying the tops of the ſheaves towards each other. Theſe ought to be laid in by hand looſely, from a ſcaffold on each ſide, and not trod upon. The points of ſome of the ſheaves will reach to the butts of the others, and they will pack thus quite well. A row of ſheaves is then to be laid acroſs theſe, ſo as that the length of the ſheaf lies *acroſs* the building. The butts of the ſheaves of this row ſhould be placed firſt on the outſide, and then another row of ſheaves ſhould be placed, in the ſame direction, overlapping the points of the former, and ſo far from the ſide, as that the middle of theſe ſheaves ſhall be oppoſite to the firſt poſt; and on the other ſide of it another row reverſed, ſo as that the points of the one ſheaf lie towards and intermix with the points of the others; and ſo on acroſs the whole building, in rows, with the butt ends of one row of ſheaves to the butt ends of another, leaving a ſmall ſpace between them for the circulation of the air. Above theſe ſhould be laid another ſtratum of ſheaves acroſs theſe, in the ſame direction as the firſt; and ſo on, croſſing

each other in alternate layers, the whole way till it reaches the top.

One diviſion, of ſix feet in width, being thus finiſhed, another is to be begun, and finiſhed in the ſame manner, leaving one of the intervals of ſix feet between the poſts free, acroſs the whole ſtructure, and the other filled up alternately throughout the whole.

In this way, the work goes on from day to day, as the harveſt advances. The corn is thus ſecured immediately, as ſoon as it is cut, from the poſſibility of receiving damage from bad weather; and being placed high in the open air, in narrow diviſions, full of perforations, what ſap is in it will be gently evaporated, while the native juices of the plant will be preſerved, without danger of heating.

The ſheaves being put up looſely, the ſtack will gradually ſubſide a good deal, in conſequence of the preſſure from above: and as it will be fit, in moſt caſes, to be packed more cloſely after a few days, by the time that the whole range of ſhades are thus filled up, and room wanted for more corn to be put into it, the ſheaves that are upon the top of the firſt diviſion, and which are of courſe now the drieſt, ought to be thrown down into the firſt open diviſion, and regularly laid and

trampled upon, ſo as to make them firm; until by lowering the one diviſion, and raiſing the other, they come to be of an equal height; when the operators ſhould proceed to another, and ſo on gradually to others as they are wanted.

The under part of the ſhade will now be filled cloſe up, and the top be left quite open, as at firſt, ſo as to admit of a ſimilar operation with the former, the firſt led corn forming now the baſe, and ſo on. The latter cut corn may now be put upon the top of it, exactly after the ſame way with the firſt; and being high in the air, and not ſo much preſſed by the weight above, it will be more quickly dried. Thus ſhould you proceed, making two or three ſucceſſive rows, if neceſſary, until the harveſt is finiſhed, and all got in.

For wheat, which is much firmer in the ſtraw than other corn, and generally cleaner and well ripened, leſs precaution is neceſſary. The firſt diviſion may be put up as above deſcribed; but it will not be neceſſary to leave any open diviſions for this kind of corn: one diviſion after another can be filled up from the ſcaffold at one ſide. In moſt caſes no precautions will be wanted to prevent it from heating; but where it is greener cut than uſual, and it appears doubtful if it will keep well, in laying the ſheaves lengthwiſe

acroſs the ſhade, an opening of a few inches in width may be left in the middle, between two ſheaves, all along in the ſame line right acroſs the whole, which, being covered by the ſheaves laid lengthwiſe acroſs it, will admit a circulation of air: one of theſe pipes may be made in every ſecond, fourth, or ſixth layer, as circumſtances ſhall ſeem to require.

After this manner, the whole corn of a farm could be perfectly ſecured againſt ſuſtaining any damage from the weather in any ſeaſon; and thus an immenſe expence on ſome occaſions, and an amazing waſte in others, be entirely prevented; while the ſtraw, in every caſe, would be nearly as good as hay; and the quality of the grain much better than it ever can be, if ſubjected to rain after it has been reaped: for I have found by experiment, that if grain has ever been wetted from the time it is cut down, it never can be brought to the ſame ſtate of perfection as it would have had, if it had never been wetted: nor can any art ever make the ſame corn, if it has been once wetted, ſhrink into ſo ſmall a bulk, or become, of courſe, ſo weighty as the ſame corn would have been, if it had been thoroughly *winn*, without having been at all wetted. Nor does barley, that has been wetted and afterwards

dried, ever malt ſo kindly as it would have done if kept quite dry. This is a fact, I believe, that is not generally known. *(v)*

For the purpoſe of *fattening* beaſts, it may be neceſſary to mix the *hay* with the graſs, but for rearing young beaſts, or other purpoſes, it will be highly economical to make uſe of ſtraw for this purpoſe: for ſtraw of oats or barley, when thus mixed with graſs, will be equally good as ordinary hay. If economy were duly ſtudied by farmers, perhaps not one particle of theſe kinds of ſtraw ought ever to be employed in any other way: nor could the poſſeſſor of *corn* farms ever be at a loſs for making ſuch an intermixture, as he will find it profitable always to have as much ground under clover, as would be ſufficient thus to mix the whole of his ſtraw, if he inclined. If the proportion of wheat ſtraw were more than enough for litter, it may be cut, and profitably applied in the ſame manner. But men muſt accuſtom themſelves to regard economical conſiderations much more than they do at preſent, before they can bring their minds to bear with patience ſuch diſquiſitions as the preſent. Till that time ſhall come, agriculture muſt ſtop far ſhort of attainable perfection in Britain.

I wiſh to go on.—But the fear of becoming tireſome makes it neceſſary to curtail: yet I muſt add, that as ſo much ſaving may ariſe from the proper diſtribution of buildings; and as this would become an object of much greater importance than it now is, were the ſyſtem of ſtall-feeding in ſummer, as well as in winter, to become univerſal, a few words on that head may not be deemed ſuperfluous.

On the right conſtruction of farm-buildings.—Whatever diminiſhes the quantity of labour required of one man, produces a ſaving to the farmer that will be in proportion to that diminution of labour. In houſes ill arranged, and, of courſe inconvenient, it will require one man to feed and clean from ten to twenty ſtall-fed cattle, but in houſes properly conſtructed, I have known one man be able to feed and clean fifty head of beaſts with great eaſe. The arrangement which admitted of this economy, was as under. The houſe was divided by a foot-way of ſix feet wide, running along the middle from end to end. On each ſide of it was a range of ſtalls for cattle, placed with their heads towards each other, of ſuch a length as to admit of twenty-five to ſtand on a ſide, which, at three feet for each will give

ſeventy-five feet. At each end of this walk was a door, by one of which the hay or other dry food was introduced; and at the other turnips or other food recently brought home were laid down, ſo as not to mix with or foul the hay. Along each ſide of the walk was placed a wooden trough running the whole length, without interruption, a ſection of which was of this ſhape, ⋃ the bottom being about ſix inches wide. Between each beaſt there was a ſmall diviſion by means of a board, perforated below, and the whole trough was placed in an exact horizontal poſition, the bottom being raiſed about ſix inches from the ground. Behind the troughs were placed the ſtakes to which the beaſts were faſtened. The floor on which they ſtood was paved, ſloping a little backwards; and at a length juſt ſufficient to allow the beaſts to ſtand eaſily and no more, it was lowered at once about three inches, ſo that the dung which was dropped from the beaſts, when they ſtood right, fell into the lower diviſion. This part of it, and indeed the whole, was made very ſmooth, ſo as to admit of the dung being eaſily ſweeped off by a broad-mouthed flat ſhovel or rake occaſionally, and put into a wheel-barrow as often as was neceſſary, and thus carried off. The upper part of the ſtructure was ſupported by ſtrong poſts placed at

proper diſtances, and a paſſage of three feet left clear behind the cattle. This houſe had been originally intended to be left open without walls; but as it was found to be too cold for winter feeding, to which it was ſolely appropriated, the ſpaces between the pillars had been walled in. For a houſe to be uſed the whole year round, it would beſt anſwer the purpoſes of this climate to have theſe intervals cloſed in winter, by boards that join to each other quite cloſe, which could be removed during the ſummer ſo as to keep the cattle quite cool at that ſeaſon. At one end of the ſtalls, where the ſituation will admit of it, ſhould be a pipe of water, which could by means of a ſtop cock, be let into the troughs at pleaſure. In this way the whole troughs could be filled at pleaſure with pure water; and when the beaſts had drank as much as they inclined, the water that remained could be let off by opening a plug in the bottom, and carried clear away by a channel prepared for that purpoſe. In feeding, the attendant fills a barrow properly conſtructed for that purpoſe, and wheels it along the middle walk, giving to each beaſt as he goes along, a ſmall quantity only of that kind of food; and ſo on till he goes over the whole. As ſoon as that is eaten up, (or if any part of it remain in

the ſtall of a particular beaſt, he takes it firſt away:) he gives each beaſt in the ſame manner, another ſmall quantity of a different kind of food. In this way he goes over them three or four times ſucceſſively, varying the food at each time if he can; and always reſerving to the laſt the ſweeteſt and moſt palatable kind of food by way of deſert. Then ſweep their troughs clean; and if they have got much dry food, eſpecially if ſalt has been adminiſtered, the trough ought to be filled with water, at leaſt four times a-day, which will keep it always ſweet and clean, and induce them to eat much more than they otherwiſe would have done. But if they have abundance of turnips, or other equally ſucculant food, the water may be adminiſtered much more ſparingly.

It is not conſiſtent with the plan of this eſſay, to enter fully into the beſt mode of fattening beaſts; or to ſpecify the kinds of food which anſwer beſt to be conjoined with each other; or the way of varying them, ſo as to produce the moſt beneficial effects; or the mode of managing the beaſts themſelves, as to temperature, dreſſing, &c. or how to chooſe the food and apportion it to the different ages of the beaſts, and circumſtances of the caſe, &c. &c. This would form an ample ſubject for a ſeparate diſſertation. I may, how-

ever, here ſpecify one ſingular fact, that refers immediately to the ſubject of this eſſay, which, lays open a wide field of enquiry to the attentive farmer.

Noxious plants may be converted into nouriſhing food.—There are ſome of the products of our fields which are not only not uſeful, but highly noxious to the farmer; as, inſtead of nouriſhing his beaſts, they prove actually poiſonous to ſuch beaſts as accidentally taſte them. The following fact will ſhew, that had the enquiry above ſpecified been duly made, ſome of theſe might be rendered highly nutritious.

No plant common in Britain is a more certain poiſon to domeſtic gramenivorous quadrupeds than the common yew tree, *(Taxus Baccata;)* and many are the inſtances of cattle, horſes, and ſheep, being killed, which have accidentally taſted of it's leaves and young twigs. Yet it is a very ſurpriſing fact, that in the province of Heſſe in Germany, where hedges of this tree abound, the peaſants are in the cuſtom of feeding their cattle through the winter with the tender ſhoots of that tree, cut down from their hedges for that purpoſe, which they find a very excellent and nouriſhing food at a ſeaſon of the year when

other ſorts of ſucculent food cannot be eaſily obtained.

This ſingular fact having come to the knowledge of Profeſſor Wiborg, of Copenhagen, he at firſt was inclined to think that the common opinion, that the yew tree is a poiſon to animals, was unfounded: but experiments ſoon ſatisfied him, to his coſt, that it certainly was ſo. He then ſuſpected that the tree called by that name in Heſſe muſt be ſomething elſe than the common yew; and he determined to take a journey thither to aſcertain this fact. He found it was the common yew tree; and, by experiments he there made, he alſo found that it proved equally poiſonous to beaſts in Heſſe as it had been in Denmark.

He then ſuſpected that he had been miſinformed in regard to it's being there uſed as a food for beaſts in winter. But here alſo he was ſoon ſatisfied he had been told only the truth; as the peaſants readily allowed that they uſed it for that purpoſe every year, and that it made a valuable part of their winter provender.

Surpriſed at theſe facts, he then enquired what were the means they employed to deſtroy it's noxious quality; but to this they could give him no ſatisfactory anſwer. All they knew of the mat-

ter was, that they found it neceſſary, at the beginning of each ſeaſon, to uſe it ſparingly at firſt, and to give it to the beaſts along with their other food: that they gradually encreaſed the proportion of yew twigs, which at laſt came to be a principal part of their food; but that they never kept their beaſts entirely on that food alone, but always gave them ſomething elſe along with it.

At the firſt he ſuſpected, that, in this caſe, as is experienced by man in regard to opium, the animal frame gradually became habituated to this drug, ſo as to admit of it's being taken in much larger doſes, in time, with ſafety, than could have been practicable at the beginning: and willing to make ſome experiments to aſcertain this point, he tried to give it alone in ſmaller doſes than thoſe he had formerly adminiſtered, and found to be poiſonous; but the beaſts he tried refuſed to eat it by itſelf in any quantities; ſo that he began to ſuſpect that the reaſon of their mixing it with food, at the beginning, in very ſmall quantities, was merely to cover it's taſte, which proved diſagreeable, till the beaſts became habituated to it, when they eat it more readily.

If ſo, it ſeemed to him probable, that it's deleterious effects were counteracted merely by the operation upon the animal economy of the other

food that was adminiſtered along with it. Convinced of this, by the facts that had been ſtated to him, he ventured to give, at once, to a horſe eight ounces of green yew twigs, (which he had repeatedly found before was a doſe ſufficient to kill any horſe when given by itſelf,) chopped ſmall, and mixed among twenty ounces of oats. This mixture the horſe readily ate up at the firſt; nor did the ſmalleſt ſymptoms of any diſorder appear. This experiment he ſo often repeated, as fully to aſcertain the fact, that when adminiſtered in this manner, the yew tree was perfectly innoxious; and that it is ſolely to the circumſtances of it's being always adminiſttered along with ſome kind of dry food in Heſſe, and never by itſelf, that it proves there ſalutary inſtead of hurtful.

He has not aſcertained whether every kind of dry food for beaſts would anſwer the purpoſe, or whether it is confined to ſome particular kinds only: but as the peaſants have remarked no peculiarity in this reſpect, it is probable that any kind common in that country, anſwers the purpoſe equally well as others. Neither is it aſcertained as yet, what is the ſmalleſt proportion of ſuch dry food that will barely ſerve to render it innoxious; but here, as in every caſe where ac-

curacy is required, experiments are ſtill wanting.

From this fact we ought to infer, that perhaps there is no plant whatever produced in this country, which may not be employed as food for beaſts under a judicious management, though we are as yet ignorant of the way in which any other ſubſtances than thoſe we have long been accuſtomed to uſe, can be employed with advantage by the farmer.

Sheep may be ſtall-fed.—Hitherto I have ſuppoſed that ſtall-feeding can only be employed with regard to beaſts that have been uſually kept in the houſe; viz. cattle, horſes, and ſwine: but it will be preſumed, that ſheep muſt be thrown out of the liſt of domeſtic animals, if ever the mode of ſtall-feeding on green food above recommended, ſhould come into general practice. So far is this, however, from being the caſe, that I am inclined to believe that if ſheep ſhould be fed after this manner, the improvement will be greater on them than any other claſs of animals. It is true, we have never yet been accuſtomed to ſee ſheep faſtened to a ſtake, and thus fed by hand, like what has been done with cattle; but this only proves that we have not hi-

therto conſidered the ſubject with the attention it requires, and no more; for I know of no inſtance where it ever has been tried and proved abortive. It behoves us then to enquire what reaſons we have for believing that it would not ſucceed; and if we can find none which tend to that point, but rather the reverſe, we ought at leaſt to ſuſpend our ultimate deciſion on that point, until the fact ſhall be clearly aſcertained by fair experiment.

We know that the ſheep is an animal as gentle in it's nature, and as ſuſceptible of domeſtication and controul, as any creature whatever; and therefore we have no reaſon to believe that it would make any violent ſtruggle, or ſuch efforts as might tend to retard it's thriving, if tied up: but much the reverſe; for it delights in eaſe and quiet: ſo that in this ſtate it would meet with an indulgence, in this reſpect, entirely ſuitable to it's nature.

We farther know, that no domeſtic animal ſuffers ſo much from wet as the ſheep: for, on account of the thickneſs of it's fleece, it becomes ſo weighty, when wet, as to overload the poor creature, ſo as to oppreſs it. And as it is long before it can be dried, eſpecially in winter, the animal is chilled by the cold while thus drenched

in wet, ſo as greatly to retard its thriving. But if the ſheep were put into a ſtall *when dry*, and never ſuffered to go from under cover to be wetted, it muſt be totally freed from both of thoſe inconveniences; in conſequence of which it could not fail, as one would think, to thrive much better under this mode of management, than that to which it has hitherto been uſually ſubjected.

It may perhaps be alledged, in anſwer to this, that we do not obſerve that ſheep thrive in general better in thoſe diſtricts, where they are uſually put up under cover all night in cots, than in thoſe diſtricts where they are never houſed at all, but rather the reverſe. I believe, indeed, that they always thrive worſe where they are cotted, than where they are ſuffered always to lie without doors: but this ſeems not at all to militate againſt the practice recommended, becauſe the caſes differ from each other in an extreme degree. When put up into a cot, while the ſheep are yet wet, as muſt often, indeed uſually, be the caſe in winter, and there ſtowed very cloſe together, as they uſually are in theſe circumſtances, they muſt ſoon become extremely hot, and a copious ſteam ariſe from their wet ſkins, under which they muſt be ſtewed for the

greateſt part of the night: but it is well known that the ſheep delights rather in a cold than a hot climate; and, if it be dry, this animal never ſeems to enjoy ſuch perfect health as during the coldeſt weather we ever experience, provided it have at all times abundant food. This kind of ſtewing heat thus produced can ſcarcely fail to prove highly detrimental to the creature; and when it is conſidered that the vapour that riſes from it's own dung, on which, to a great depth, it is uſually obliged to lie in theſe cots, mixes plentifully with the warm aqueous vapour, it can ſcarcely fail but that diſeaſes of various ſorts will be the conſequence. Nor is this all: after being ſtewed all night in this cloſe place, and put into a ſtate of high perſpiration, the poor creature is turned out hungry in the morning, perhaps amidſt froſt and ſnow, which ſoon freezes the water in it's fleece, ſtops all the pores in the ſkin, ſuddenly checks all perſpiration, and chills the poor creature almoſt to death during the whole day. Under this kind of management it would be wonderful indeed if diſeaſes innumerable were not the conſequence. But where the creature is put up while dry, and is kept continually ſo, and at reſt ever afterwards, in a cool airy place, where it never can

be ſo much crouded as to ſuffer any extraordinary degree of variation in regard to heat or cold, and at the ſame time receives abundance of nouriſhing food, none of theſe evils can be experienced; and the diſeaſes which originate from that ſource can never be expected to appear.

From theſe conſiderations, to omit others that might be mentioned, there ſeems to be good grounds for believing that ſheep will admit of being ſtall-fed with perhaps greater benefit to the perſon who adopts that mode of management, than that which is to be drawn from any other animal whatever.

Thoſe, then, who would wiſh to fatten ſheep under the ſyſtem recommended, in preference to other kinds of domeſtic animals, have no reaſon to think that they will be under a neceſſity of laying aſide the ſcythe on that account. It will be eaſy to contrive low apartments under the hay-ricks, properly divided by ſtakes and alleys of a proper ſize, bounded by ſtakes, as for cattle, of a proportional ſize, to which the ſheep may be faſtened, and thus to be regularly fed by hand throughout the ſeaſon. Whenever the experiment ſhall be fairly made, it will ſoon be ſeen whether it will be attended with as much profit

as we at preſent have reaſon to expect; and when this fact is aſcertained, the practice may be either continued or abandoned. The perſon who ſhall try this experiment, can run no riſk of ſuſtaining much damage by it; and as the expence attending it can be but ſmall, it ſeems to be a very proper object of experimental trial.

On the conſumption of turnips by ſheep.—Though thoſe branches of the ſubject I meant to have treated in this eſſay be not nearly exhauſted, I find the volume has ſwelled to ſuch a ſize, that it becomes neceſſary to curtail a good deal. Turnips, however, are an article of ſuch vaſt importance to the farmer, and the economical modes of conſuming them have been ſo little adverted to, that I cannot omit offering a few ſhort hints, on that head, before I conclude.

There are three modes in which turnips have hitherto been chiefly applied; viz. 1*ſt*, conſuming them by ſheep on the field in which they grew; 2*d*, drawing them, and giving them to cattle *in the houſe*; or, 3*d*, drawing them, and giving them to beaſts in the field. To theſe practices I do not object; but there are ſome circumſtances

reſpecting the management of each, that do not ſeem as yet to have obtained all the attention they deſerve.

In conſuming turnips where they grew, by ſheep, much waſte is incurred over moſt parts in Britain, by letting them have acceſs to too great a quantity at once. It is not uncommon to hurdle off as much ground, at once, as is intended to keep the ſheep for a week at leaſt; and ſometimes as much as will ſerve them four weeks, without moving the hurdles. The ſheep have thus at one time too much food; in conſequence of which they range at once over the whole, and break, during the firſt day, almoſt every turnip in the field, all of which broken turnips begin inſtantly to rot, ſo that many of them become in a ſhort while ſo putrid and ſtinking, that no creature will taſte them, and a large proportion of wholeſome food is thus inevitably waſted. Nor is this the only waſte ſuſtained by this practice. As the pulp of the turnip is more palatable to the ſheep than the rind, they naturally ſcoop out the pulp from the whole, before they think of eating any more of the rind than is neceſſary to give them acceſs to the pulp. When the pulp is all conſumed, however, they muſt either eat the rind *alone*, or the whole of it will be loſt; ſo

that the farmer finds himſelf conſtrained either to keep his ſheep ſo long upon that part of the turnips, as to compel them through hunger to eat the turnip peel, (in which caſe the creature muſt ceaſe to thrive, if not to fall back into a worſe condition than before,) or he muſt reſolve to abandon the turnip ſkins to waſte alſo, although he knows that theſe, under proper management, are a very wholeſome kind of food. A good economiſt will think it neceſſary to adopt ſuch a mode of management, as to ſuſtain no ſort of waſte under this head.

With this view, he will not blindly adopt the notion which ſeems to be but too common, that turnips can only be beneficially employed for *fattening* of ſheep; but he will examine with attention, whether, under certain circumſtances, he might not be more benefitted by *rearing* ſheep by the aid of turnips than by *fattening* them. Every conſiderate man knows that the market for fatted ſheep is extremely limited, in many remote ſituations, which are peculiarly adapted for ſheep-rearing; but that if he can contrive to keep his breeding ſheep always in high condition, he will find abundance of markets for theſe at good prices, where ſheep in worſe order could not be ſold at all. When turnips were

firſt introduced into the remote parts of Britain, they were invariably conſidered as being in a manner excluſively adapted for the fattening of beaſts; and that was the uſe to which they were ſolely applied: but, by degrees, experience taught the farmers in ſome remote ſituations, that a much greater profit may be derived from applying them to the ſuſtaining of milk cows, and the rearing of young cattle, than to the feeding of them; and theſe are the uſes to which this valuable article is now chiefly applied. But the uſe of turnips for keeping on a breeding ſtock of ſheep, though it is known in ſome diſtricts in Britain, is far leſs generally underſtood than it deſerves to be. By this mode of employing turnips, however, it would ſeem to be a very eaſy matter for an attentive economiſt to avoid the waſte above pointed out, and to derive the full benefit from all his turnips with much improvement to his flock.

All that is required for keeping a young ſtock in a conſtant ſtate of growth through the whole year round, is to prevent them from ever being ſtinted for food, eſpecially of the tender and ſucculent ſort. It muſt happen, however, that during the winter, when the days are ſhort, and the weather ſevere, very little ſucculent food of any kind

can be found on the common paſtures of ſheep; ſo that they are pinched for hunger, and greatly decline during that ſeaſon, if they do not die entirely. What is wanted then, is a ſmall addition to their ordinary food, adminiſtered ſo equally throughout the whole winter ſeaſon, as to give them each day enough to prevent them from ſliding, though not ſo much as to fatten them for the butcher. This will be beſt done by giving them a ſnap of turnips each night, that ſhall in quantity be juſt ſufficient for that purpoſe, without being ſo much as to prevent them from ſeeking and reliſhing their ordinary food throughout the day. With this view, let us ſuppoſe that a row of hurdles is run along one ſide of a field of turnips, ſo far only as is juſt ſufficient to allow the whole flock to get acceſs to the turnips with their heads at one time. Let this row of hurdles be moved juſt ſo far back every day as to leave acceſs to as many turnips as ſhall be judged ſufficient for this purpoſe, and no more. The conſequence will be, that when the ſheep come in from their paſtures at night, after having picked up as much through the day as they could there find, they will eat their turnips by way of a deſert; and then lie down to repoſe during the night in a comfortable ſtate, with their bellies full. If the food through-

out the day has been ſcanty, the turnips will be all eaten up at night, ſkins and all. If the food has been more abundant, perhaps a few of the ſkins may be left till the morning, when they will be clean eaten up. In general, it will be adviſeable to ſet off rather fewer turnips at one time than the ſheep could eaſily eat up, in order that none may be waſted. By this practice the ſheep will be kept in perfect health and high condition, throughout the whole year, and will grow nearly as much during the winter as the ſummer months. The ewes in particular will be kept ſtrong and healthy, ſo as to produce ſtout lambs, and afford milk in much greater quantities when they yean, than they otherwiſe would have done; as is known to be invariably the caſe with cows that have been kept up by means of turnips during the winter; and being in high health in the ſpring, the whole flock will advance with the firſt ſpurt of early graſs, ſo as to be at all ſeaſons more forward for market, and conſequently bring much higher prices than otherwiſe could have been the caſe.

By moving the hurdles regularly forward, as propoſed, and leaving the field open behind them, the area in which the ſheep are confined will become larger every day as the ſeaſon ad-

vances, ſo as to give them better room to chooſe their bed where they find it moſt convenient. A neceſſary conſequence of this will be, that if the field be uneven in it's ſurface, the ſheep will naturally chooſe to lie moſt upon the high and dry patches, which are uſually the pooreſt parts of the field, ſo that theſe patches will thus get a more than ordinary ſhare of the dung, which is preciſely what they ſtand in need of to make the crop equal over the whole. To admit of this, it will be proper to begin in all caſes at the higher parts of the field, and advance downward to the loweſt extremity. But on this, and other particulars of management, equally obvious, it is unneceſſary to enlarge.

I ſhall juſt hint, becauſe it is not as yet univerſally known, that where the early graſs yielded by watered meadows cannot be obtained, ſucculent food for keeping ſheep on in the months of April or May, till other graſs gets up, may always be procured merely by ſowing or planting (this kind of turnip admits of being tranſplanted as eaſily as colworts,) a proportion of the turnip-field with the ſwediſh turnip, or *ruta baga*, which will keep perfectly ſucculent till June, if ſo long wanted; as I myſelf have often experienced. This kind of turnip does not indeed

grow to ſo large a ſize as the common ſorts; but it is much more ſolid, and goes much farther, bulk for bulk, than any of them do. It's flower-ſtems ſhoot out as early in the ſpring as thoſe of other turnips; and they will become as ſoon ſticky, if not adverted to. But where they are to be applied as above, the ſtems ſhould be cut over before they become ſticky, and given either to ſheep or cattle. New ſtems will ſhoot out in their ſtead, which will continue tender for a conſiderable time. In the mean while, the bulb loſes none of it's ſucculence, if it ſhould be even allowed to ripen it's ſeeds before it be uſed; only the ſkin becomes hard and ſticky towards the month of June, at which advanced ſeaſon it could ſcarcely be gnawed even by young ſheep. But every one knows that, after the beginning of May, there are very few ſituations in Britain in which graſs cannot be obtained in abundance for ſuſtaining ſheep, ſo that it is unneceſſary to provide a ſupply from this plant in *any ſituation* beyond that period; and in few ſituations can it be wanted, even ſo long as that time. It would be improper in me to ſay more on the culture (which differs in ſome reſpects from the common turnip,) of this plant, which is truly a

valuable addition to the farmers catalogue of plants, where the uſes of it are properly known.

My limits prevent me from entering on an examination of various other modes of applying turnips, which have hitherto been little adverted to, particularly for dairy cows, which under a judicious management can be fed by them, without affecting the taſte of the milk in the ſmalleſt degree, and of courſe requiring no proceſs for removing that taſte; and for rearing young horſes, to which uſe turnips can be applied with ſingular economy, as well as for various other purpoſes, which the attentive economiſt will diſcover when he directs his attention ſteadily to this ſubject.

CONCLUSION.

I SHALL not at preſent proceed farther in this diſquiſition, though there are many other particulars I did intend to have touched upon. But the volume is already of ſuch a ſize, and the reader, I fear, ſo much tired of theſe (to many) unintereſting details, that I willingly deſiſt from proceeding farther at preſent. If only a few perſons ſhall be induced, in conſequence of what

has been ſaid, to turn their attention to theſe ſubjects, who otherwiſe would not have done it, I ſhall be ſatisfied: but it would give me ſtill more pleaſure, if I could indulge the hope that, in conſequence of theſe hints, the reader ſhould be induced to think for himſelf in all caſes; to reflect upon the objects he ſees; to examine the foundation of popular opinions, and then to draw his own concluſions from the whole. It is thus he will acquire ſound knowledge, much better than by relying on the inſtructions he ſhall receive from any writer whatever; for there is no propoſition in Euclid more certain, than that, in this way, every man may ſoon become the beſt, as well as the moſt pleaſing inſtructor of himſelf.

THE END OF ESSAY THIRD.

POSTSCRIPT.

Curſory remarks on the corn laws of Great Britain.

I INTENDED to have here made ſome remarks on the corn laws of Great Britain, and the cauſes of the high price of grain, on which theſe laws have had a conſiderable influence. With that view I omitted treating of them in the 14th ſection of eſſay firſt. But upon digeſting my thoughts upon this ſubject, I found that, before I could elucidate the matter, ſo as to make it be fully underſtood, it could not be compreſſed into a ſize to admit of being brought within the compaſs of the preſent volume; ſo that I have been forced to abandon the idea of it. This, indeed, becomes the leſs neceſſary, now that the very intereſting treatiſe on the corn laws by Mr. Dirom, with the additions to it by Mr. Mackie, have been publiſhed. For although, the ſubject is there taken up under a ſomewhat different point of view from what I ſhould have done, and ſeve-

ral particulars that I conſider as of great importance, have been in a great meaſure overlooked by theſe gentlemen; yet as the concluſions they draw nearly coincide, as far as they go, with my own, I am well pleaſed to abandon the ſubject for the preſent, hoping the public will beſtow ſo much attention to the forcible arguments founded on undeniable facts, brought forward by them, as to pave the way for the obſervations of other men who may at a future period puſh their inveſtigations a little farther than they have, perhaps wiſely, choſen to do on the preſent occaſion.

Referring then to that treatiſe for reaſons that will ſatisfy moſt men, I ſhall here, with a view not to leave the treatiſe incompleat in one of it's moſt eſſential articles, barely ſtate the concluſions I ſhould have been forced to draw on this ſubject: viz. That the corn laws of Great Britain, as they at preſent ſtand, are extremely inadequate for the purpoſes intended by them: that the principle of them, if any conſiſtent principle can be fairly recognized, is erroneous: that as they at preſent ſtand, they neither are, nor have been, nor can be executed: that they are calculated to give riſe to jobs, chicancery, and frauds innumerable: that they unneceſſarily interrupt the internal commerce of grain, ſo as to diſtreſs the peo-

ple and depreſs the agriculture of the nation: that under the pretext of attempting to lower the price of corn, they really enhance it beyond what it ought to have been, and give occaſion for the interference of government in innumerable caſes, where that interference can only prove hurtful to the public at large, with ſome other evils, which it would be tireſome here to enumerate.

I am far, however, from agreeing with the ingenious author of the inquiry into the cauſes of the wealth of nations, in thinking that no corn laws at all are neceſſary: on the contrary, I believe a judicious ſyſtem of corn laws would contribute, more than almoſt any other political regulation, to promote the tranquility and internal proſperity of this nation. This opinion of Dr. Smith I combated ſoon after the publication of his book. [Obſervations on Natural Induſtry, Letter XII. P.S.] He at one time declared, that he did intend to anſwer it, and took ſteps to aſcertain facts reſpecting that ſubject; but afterwards laid the deſign aſide. Moſt of the facts that he enquired after are now brought forward by the very ingenious writers of the treatiſe above quoted; and theſe facts, in the moſt deciſive manner, overturn his theory. I therefore hold it as a point proved, that, in this particular, the judgment of Dr.

Adam Smith, which in many other articles is much to be relied on, had been miſled by the faſcinating charm of an attachment to a favourite ſyſtem; and I take notice of it here merely to put the reader upon his guard againſt being miſled by an attachment to that great name, ſo juſtly reſpected in general in this country.

That a well regulated bounty on the exportation of corn, and duty on it's importation, would tend to encourage the agriculture of this country, and to *moderate*, not to enhance, the price of corn, is evident, not only from abſtract reaſoning, but well-eſtabliſhed facts, the reader will be ſatisfied, if he ſhall conſult the works above quoted. And although the corn laws of Britain, from the revolution, when the bounty on corn was firſt adopted, till the year 1773, were defective in ſeveral eſſential particulars, ſo as to operate in a very imperfect manner, compared to what they might have done; yet, even under that defective application of them, and notwithſtanding the other diſcouragements to agriculture, developped in the firſt eſſay in the preſent volume, this nation was found to be capable of not only ſupplying it's own conſumption of corn entirely, but of ſparing annually a conſiderable overplus to other nations. Whereas, ſince the year 1757, when the

corn laws began to be ſuſpended, and frequently thereafter, till 1773, when the old ſyſtem was in a great meaſure abandoned, the manufactures of this country being cheriſhed, advanced into the moſt flouriſhing ſtate, while it's agriculture received ſo ſevere a check, that the production of corn has been thereby diminiſhed to ſuch a degree, as to force us now to rely on foreign nations for a conſiderable part of the neceſſaries of life; and thus the prices have been gradually enhanced. But it was not till the year 1791, when the new *regulating* ſyſtem was adopted to it's full extent, that the *coup de grace* was given to our corn laws. It is ſince that time only, that the pernicious conſequences of that ſyſtem have been fully experienced.

It appears, from the tables exhibited in the work referred to, that the average importation and exportation of corn to and from Great Britain for forty years; viz. from the year 1710 to 1750, incluſive, when the original bounty laws were in force, compared with the ſame average for twenty years, from 1773 to 1793, when the alterations blamed were adopted, were as follow; viz.

	Quarters
From 1710 to 1750, the average quantity of grain of all kinds imported into Britain, was *per annum* - - - - -	20,976
Ditto exported - - - - - - - - -	665,435
Balance *per annum* during this period in favour of Britain - - - - - - -	644,459
From 1773 to 1793, the average quantities of corn of all ſorts imported into Great Britaim, was *per annum* -	733,938
Ditto exported - - - - - - - - -	303,781
Balance *per annum* during this period againſt Great Britain - - - - - -	430,157
During the firſt period the exports exceeded the imports - - - - - -	644,459
During the laſt period the imports exceeded the exports - - - - - -	430,157
making together - - - - - - being the difference between the produce and the conſumption of Great Britain, during an average of years at theſe two periods.	1,074,516

This ſingular change of circumſtances may be eaſily accounted for, (without attending to leſſer particulars,) merely by adverting to the ſtate of the importation laws during theſe periods.

During the firſt period, wheat could not be imported till the price amounted to 53s. 4d.: nor even then under a duty of 16s. *per quarter*; if above that price, and not exceeding 80s. the duty 5s. In the latter period, wheat, when at or above 48s., might be imported, on paying a duty of only 6d. *per* quarter.

Rye, &c. during the firſt period, when not above 40s. paid a duty of 16s.; if above that price, 4s. *per* quarter.

During the 2d period, if above 32s., the duty was only 3d.

Barley, during the 1ſt period, when not above 32s. *per* quarter, paid 16s. duty; above that price 2s. 8d.

During the 2d period, when above 24s. the duty was only 2d. *per* quarter.

Oats, during the 1ſt period, when not above 16s. paid 6s. 5d.; when above 16s. the duty was 1s. 7d. *per* quarter.

During the 2d period, oats, when above 16s. paid a duty of only 2d. *per* quarter.

Theſe alterations were avowedly intended to lower the price of corn in Britain, below the natural ſtandard that the ſtate of this country muſt fix upon it, in ſpite of any laws that can ever be made to prevent it; yet, inſtead of producing that effect, it has unfortunately, though neceſſarily, happened, that in conſequence of the full operation of that ſyſten of legiſlation, which was evidently calculated to make this nation depend upon others for bread corn, the riſe of prices, occaſioned partly by a neceſſary diminution in the quantity of corn produced in Britain, but chiefly by ſpreading an alarm, which under theſe circumſtances is ſcarcely to be avoided, has been ſuch as to involve the nation in great calamity. Nor have half the evils that will ariſe from the derangement of economy produced by that cauſe been as yet experienced. The nation will ſoon but too ſeverely feel them.

That the alteration in the courſe of the corn trade is to be attributed chiefly to the ſtate of the corn laws, is evident by inſpecting the tables above referred to; for, from the union till the beginning of the year 1757, the corn laws being allowed all that time to remain unchanged, the exportation of corn went on gradually encreaſing, while the imports were next to nothing; ſo as

that, in the year 1750, the exports exceeded the imports by 1,667,459 quarters. In the year 1757 the corn laws were firſt ſuſpended, and never afterwards were permitted to operate freely. From the moment when theſe laws were firſt ſuſpended, the importations began to encreaſe, and the exportations to decreaſe, ſo that in the year 1775, the imports exceeded the exports by 972,400 quarters, making a difference between the quantity of corn produced in this iſland in the years 1750 and 1775, of no leſs than 2,679,859 quarters. This difference, amounting to about one fourth part of the average conſumption of Great Britain, cannot be attributed to a change of ſeaſons, but to other cauſes. What the balance will amount to in the years 1795 and 1796, remains yet to be aſcertained; but it is eaſy to perceive that it muſt be very great.

I do not now enter into the conſideration of the corn act 1791, as it would require elucidations far beyond my preſent limits. I ventured to point out to the public, in the year 1793, in a very conciſe and curſory manner, a *few*, and but a very few, of the ſtriking abſurdities of that law. Theſe animadverſions happened to fall in the way of ſome perſons pretty high in adminiſtration at the time, who, inſtead of endeavouring to cor-

rect the glaring abſurdities there expoſed to view, have only ſince then expreſſed their aſtoniſhment that any individual ſhould dare to point out errors of legiſlation with ſuch undiſguiſed freedom as is there done. Since that time, the effects of theſe laws have been more ſeriouſly felt than before; and had I been able to enter at all upon the ſubject at preſent, it muſt have called forth a much more ſevere tone of indignant reprehenſion than it produced on that occaſion.

That theſe laws have tended to diminiſh the production of corn in this iſland, and to enhance it's average price, and muſt continue to do ſo as long as they ſhall be ſuffered to exiſt,—could be eaſily proved, did circumſtances admit of it at preſent: but I am far from attributing the enormous prices that have for ſo long a time deranged the economy of this nation, entirely to a diminution of the crop, originating either from this or from any other cauſe. This phenomenon muſt be aſcribed chiefly to political manœuvres of various ſorts, ariſing from circumſtances that, when explained, would tend to excite a ſmile, if it were not checked by a contemplation of the extent of the pernicious influence of effects that have originated from ſuch trifling cauſes. Among theſe circumſtances, *one* of very great influence

indeed, is, that the ſubject chanced to attract the notice of the public, towards the cloſe of a parliament, when a general election was expected to take place: for had it happened ſoon after a general election, when men's minds are in a comparative ſtate of repoſe, many diſcuſſions that have been brought forward with great eagerneſs by a variety of individuals, would have been paſſed by with indifference. In that caſe, a member of parliament, inſtead of opening, like the leader of a pack of hounds in full cry, on the popular ſubject of a care for the welfare of the lower orders of the people, with a view to excite their veneration for his character at the next election, would have contented himſelf with eating his own bread in quietneſs, and allowing others to do ſo in the way they pleaſed, at ſuch prices as they could obtain it for. Nor would others, fearing they might be thrown out at the next general ſcramble, have found that it was neceſſary not only to follow, but to try to outdo theſe firſt ſtarters by ſtill more violent vociferations. Neither would the miniſter, with a view to diſplay his parental regard for the flock over which he for the preſent watches, have thought it incumbent on him, to depart ſo far from his proper buſineſs as to become, like Julius Cæſar, and many other

Cæſars, the diſpenſer of corn to the people; and thus to derange the whole ſyſtem of that domeſtic economy which ought ever to be preſerved, like the apple of the eye, in a well regulated ſtate. No man can have ſuch a mean opinion of the talents of the miniſter, as to believe he did not perceive this long before the period arrived, when fearing that the great drains upon the treaſury, occaſioned by this meaſure, might afterwards be productive of diſagreeable conſequences to him, he obtained a recommendation from the committee of parliament not to interfere farther in the commerce of corn. Nor will it be credited but that many men of ſound underſtanding in the houſe of commons, and of all parties who have been emulous which ſhould come moſt forward in this ſtruggle of apparent humanity, did not perceive at the moment, as well as other ſenſible men did, that this conteſt only tended to fruſtrate the end it *apparently* aimed at, and to enhance the prices of corn to the poor, inſtead of lowering them. The hiſtory of the preſent period, if ever it ſhall be developped with the neceſſary degree of impartiality, intelligence, and preciſion, will afford one of the moſt intereſting leſſons to the political enquirer: for never before was the power of imagination of men, in over-ruling the

practical buſineſs of a great nation, in a matter of ſuch ſerious and univerſal concern as the price of bread corn, ſo clearly aſcertained; nor could the means that produced this wonderful effect be developed with ſo much facility and preciſion. Other inſtances indeed have occurred, in the preſent day, of the irreſiſtible power of the imagination of men over practical affairs of the firſt importance; but it will long remain a matter of much greater difficulty, to trace with preciſion the cauſes that led to theſe aſtoniſhing effects.

On the whole, there can be no doubt that this nation poſſeſſes the means of abundantly ſupplying itſelf with proviſions of all ſorts, were it's population augmented even to a degree far beyond what is in the contemplation of any perſon at the preſent moment, if ſuch meaſures were not adopted by the legiſlature, and leading men in the country, as tend to depreſs that buſineſs below the level of other profeſſions that are open to every man in this iſland; and of courſe to abſtract from agriculture that capital, genius, and induſtry, which ought to have been appropriated to rural enterpriſes. Among the meaſures that would lead to this ſalutary end, no one could prove of ſuch extenſive influence as a ſyſtem of corn laws grounded on principles that ſhould tend to enſure a

ſteady market to the farmer, at reaſonable prices, under all circumſtances. Were ſuch a law made, which ſhould be ſimple in it's operation, comprehenſive in it's influence; and ſhould it be freed from thoſe numerous petty *regulations* that tend to fetter individuals in the management of their own private affairs, which it is ſo much the ſpirit of the preſent day to delight in; and which, as they cannot be executed, give riſe to innumerable frauds and evaſions that derange the public economy,—render the laws diſreſpectful in the eyes of ſenſible men,—perplex the legiſlators, and occaſion thoſe innumerable alterations, under the title of *amendments*, of our laws, which ſo much diſgrace our code; and were this ſimple efficient law, when once made, to be ſuffered to operate ſteadily for a ſufficient length of time, no perſon can form an adequate idea of it's beneficial tendency. But till a ſet of men can be found, who ſhall be ſeriouſly diſpoſed to enquire with candour into the principles upon which ſuch a law ſhould be conſtructed, without having a view to any kind of party influence whatever, nothing elſe can be expected but a ſeries of futile expedients, that are ſubjected to a ſtate of perpetual fluctuation, the natural tendency of which is to drive us, in time, like ancient Rome, to de-

pend upon other nations for our ſupport. If the experience of paſt times, the ſufferings that we ourſelves at preſent experience, and the derangements that muſt ſoon flow from it, do not produce a conviction of the neceſſity of ſeriouſly adverting to this ſubject, nothing that I could ſay would prove of any avail. Here, therefore, I conclude.

THE END OF THE THIRD VOLUME.

NOTES

TO VOLUME THE THIRD.

(a, Page 48.*)* The Reader will here advert to the difference between the law of primogeniture, and the law of *entail*, which, by appropriating the whole property unalienably to one, is productive of the moſt deſtructive conſequences to a ſociety of men who are engaged in projects of induſtry.

(b, Page 65.*)* I know no exception to this rule; unleſs the following practice, which the beneficence of Mr. George Dempſter, ſo well known in this country, ſuggeſted to him, be conſidered as an exception. In an eſtate in one of the highland counties of Scotland, that lately came into his poſſeſſion, and on which, as is uſual in thoſe diſtricts, there was much uncultivated land, and many perſons who had little employment; he, with a view to encourage ſome induſtrious exertions on their part, agreed to give full permiſſion to each perſon, who ſhould ſettle on any of the waſte lands belonging to him, for a cow to go on theſe; and alſo to cut fuel in his moſſes, and to cultivate as much of the land as they ſhould think proper; giving them a perfect ſecurity of poſſeſſion, free from rent, during the natural life of the original ſettler; and, on the demiſe of the firſt ſettler, a continuation of poſſeſſion by his heirs for years more, at a rent to be fixed by two neutral perſons to be mutually choſen by the parties; with ſome other ſmall bounties, unneceſſary to be here ſpecified: and he has now the ſatisfaction of ſeeing a great many ſmall patches of land cultivated along the waſte and more coming gradually into culture.

This is a fine object for benevolence to delight in contemplating; but the unceasing exertions of a beneficent owner are necessary to be continued, or the industry must slacken. In few situations, perhaps none, could the exertions of men in these circumstances be sufficient to maintain their families, even without paying any rent. Where they are furnished with employment so as to enable them to earn as many days wages as they incline, they will be enabled to benefit themselves by their own exertions upon their little field. This employment Mr. Dempster has furnished them, by setting on foot certain manufactures in their neighbourhood for that purpose. The ground, in this case, comes to be cultivated in consequence of the manufactures: and, in a few particular situations, this may become practicable; but situations of this kind are so rare, and the requisite exertions of the proprietor so great, though, perhaps, under judicious management, not extremely expensive, that it's influence must always be confined to such narrow bounds, as scarcely to deserve to be taken into the account as a national object: neither can it be considered as *farming*, in the strict appropriated meaning of the word. All the observations in the text, it is evident, respect land under the management of a *farmer* properly so called.

(c, Page 73.) I am inclined to think, that the general prejudice which prevails among the vulgar against large farms, and rich farmers, may be referred to the same source. In the state of society to which I allude, there were no classes of men who were thought to be entitled to enjoy the advantages to be derived from wealth, but landed proprietors alone: for lands were originally appropriated by the sovereign to those who had distinguished themselves by their military prowess; and military prowess in those days, being the only criterion of merit, whoever discovered that they possessed that merit in an eminent degree, were immediately invested with lands to exalt them above the vulgar. Witness the

well-known origin of the family of Errol, and many others that are on record. Military proweſs was, in thoſe days, deemed a virtue of ſuch an exalted nature, that few among the lower claſſes could aim at it. And landed chieftains, with their immediate deſcendants, were ſuffered to enjoy the glory ariſing from it, without being envied by their inferiors: but when one of the people themſelves acquired, by cultivating the ſoil, a ſmall degree of wealth above his neighbours of the ſame claſs, it rouſed their envy; and they all, of courſe, concurred with the landlord, in wiſhing to pull down this upſtart, who was ſuppoſed to have obtained this wealth, not in conſequence of a laudable degree of induſtry, that ought to be encouraged; but to the unfair bargain he had obtained from the owner of the ground, who conceived that every ſhilling that ſuch a man acquired, was actually filched, as one might ſay, from himſelf; and that, of courſe, he had a natural right to reſume it, if he could. Nor are theſe ideas totally obliterated, even till the preſent hour, either among the owners of land, or the herd of the lower claſſes, who in general borrow ideas from father to ſon, through many generations, without the ſmalleſt attempt to aſcertain whether theſe be well or ill founded.

(d, page 92.) I have ſeen men of conſiderable talents, who, from ſpeculative notions of ideal poſſibilities, have deemed it practicable to deviſe a leaſe by which a man, without having any ſecurity of a continued poſſeſſion, in a farm, ſhould be laid under certain reſtrictions that would prevent him from ever having it in his power to hurt the landlord; and, at the ſame time, to bring the farm into as high a degree of productiveneſs, as it ever could attain under the ſyſtem propoſed. But, though we were to admit, (which I am far from doing) that the thing was *phyſically* poſſible, I would ſtill maintain, that it is morally *impracticable*; ſeeing no conſideration whatever, except a perfect *conviction* of abſolute ſecurity, can ever induce the farmer to exert himſelf con-

tinually, and without intermiſſion, to the utmoſt of his power; and nothing but a leaſe, legally certain, can impreſs this conviction on his mind. I conſider that kind of metaphyſical refinement in reaſoning, which confounds *poſſibilities*, with things *practicable* by man, as one of the greateſt curſes that can be introduced into ſociety: and I fear, that here, as well as in other inſtances, it's effects have been exceedingly baneful among mankind.

(e, page 94.) Thoſe who are fond of political calculations may have here full ſcope for their ingenuity, by ſuppoſing that two men, of equal ſpirit, knowledge and capital, ſet out in the agricultural line,—one of them as a *farmer* on a leaſe of the kind here propoſed, and the other as a ſmall proprietor, or *Yeoman*. Let the capital be taken any how at random, ſay 2000l. The *Yeoman* we ſhall ſay, lays out 1500l. of that ſum on the purchaſe of a farm, which, at thirty years purchaſe, the uſual rate at preſent, would be worth 50l. a year; and he has 500l. left for ſtocking and improving it. The other leaſed a farm, which, at a fair rent, was worth 200l. a year. Let him follow out the calculation,—firſt in regard to the profits that the different occupiers themſelves can enjoy, and the rate at which their families may afford to live; —and, ſecond, with regard to the augmentation of agricultural produce that each of them could afford to the ſtate; and let this be continued for the ſpace of an hundred years. Let him then ſtrike the balance, and ſee what an amazing difference!

(f, page 120.) I conſider entails, and other ſuch ridiculous attempts to perpetuate a name, as alike impious, impotent, and impolitic, in a ſtate of ſociety like that which prevails at preſent in Europe, and liable to produce political diſorders of the moſt dangerous ſort. Wherever ideas of luxury prevail, and thoſe ideas of perſonal freedom which alone can give energy to human exertions, entails produce a kind of fetters that are incompatible with theſe notions, and therefore prove exceedingly galling to a

vaſt variety of deſcriptions of men. They ought not perhaps to be tolerated; but if at all tolerated, it ſhould be under ſuch reſtrictions, as to mitigate, in ſome meaſure, the evils that neceſſarily originate from them. A wiſe legiſlature looks forward to things of this nature; and, in time, guards againſt the evils of violent convulſions of any ſort, by making cuſtoms which have been ſanctioned by law, gradually give way to the changes in men's minds and circumſtances that are imperceptibly taking place in all ſtages of civil ſociety.

(g, page 137.) Farmers who pay tithe in kind, for the moſt part, conſider thoſe who draw the tithe in the ſame light nearly that brewers or diſtillers view the officers of exciſe; and the ingenuity of theſe two deſcriptions of perſons is almoſt continually on the ſtretch to diſcover ſome way in which they can be cheated: it is eaſy to perceive, that a perſon whoſe wits have been thus exerciſed from his infancy to diſcover modes of evaſion, will at laſt acquire a conſiderable degree of dexterity in it, ſo as often to foil an honeſt man, who happens to acquire a right to the tithe. This is an evil whoſe conſequences are of wider extent than I chooſe to develope at preſent.

(h, page 184.) I cannot produce a more ſtriking proof of this, than occurs in reſpect to the irrigation of land; a practice that has been found in the higheſt degree beneficial in Wiltſhire, and ſeveral other counties in Britain, where it has been practiſed as an improvement of the very firſt conſequence for ages. Yet, through the greater parts of the kingdom, it was never heard of till of late; and in many very extenſive diſtricts, the farmers in general know nothing about it, even at this preſent time. Though there is not a doubt, that were this practice introduced as generally as it might be in every diſtrict, the total produce of the iſland might be augmented by that means alone to the value of many hundred thouſand pounds *per annum*.

(i, page 229.) For the ſake of brevity, I mention *lime* only in the text; but the ſame obſervations will apply to any other calcareous matter, of equal purity, that can be obtained: of theſe ſhelly ſand, and ſhell marle, are the moſt eaſily diviſible, and, where free from extraneous mixtures, are nearly equal in value to lime. Chalk is a pure calcareous matter; but is not ſo eaſily diviſible; and clay marle is often impure, ſo as to require to be employed in very *large* quantities to produce a ſenſible effect. All theſe ſubſtances operate nearly in the ſame manner.

(k, page 244.) Perhaps turnips can be reared to a larger ſize on clayey lands than any other, if merely the rearing them to a greater ſize were to be adverted to; of which the following well authenticated fact will afford a ſufficient proof. Mr. Campbell of Shawfield occupies a farm at Woodhall, near Glaſgow, conſiſting of a ſtrong clayey ſoil, upon which he had ſome turnips laſt ſeaſon (crop 1795,) of a ſize that attracted the notice of every perſon who ſaw them. One day an argument having ariſen among the gentlemen at table, about the greateſt weight to which a turnip could be raiſed, and opinions varying very much on this ſubject, Mr. Campbell ordered one of the largeſt of his turnips to be pulled and weighed. This was done; and moſt part of the company were very much ſurpriſed on finding that it weighed full *forty* pounds. On ſearching, however, with great care, through the field at a future period, when they had attained a greater growth, one turnip was found which, when perfectly cleaned from earth and rubbiſh of any ſort, weighed SIXTY THREE POUNDS AND A HALF. This turnip was kept for ſome time, and repeatedly weighed before different perſons; among the laſt of whom was the Duke of Argyle, who ſaw it weighed ſome weeks after it had been taken up, when it was found to have loſt juſt half a pound; it weighing then no more than ſixty-three pounds neat. Many perſons are now alive who ſaw this turnip weighed, and can correct me, if I

miſ-ſtate the fact, which I ſhould not have ventured to give, but upon *the very beſt authority*; for it is ſo great, that I am ſenſible it will occaſion ſome ſurpriſe. I record it here with ſatisfaction, for two reaſons; firſt, becauſe it affords the cleareſt proof that turnips can be reared well on clayey ſoils, as I have often experienced; and ſecond, that turnips are reared in Scotland to a larger ſize in general than perhaps in any other country, as I had ventured to hint at in the agricultural ſurvey of Aberdeenſhire, publiſhed by the Board of Agriculture.

(l, page 244.*)* Turnips may be carried off even a clayey ſoil, without poaching it, by the following contrivance. Let the turnips be ſown in drills at a convenient diſtance for horſe-hoeing, ſay three feet, and let them be properly earthed up for the laſt time to as great a depth as the plough can go; let care be then taken that no clods be ſuffered to remain in the bottom of the furrow, to detain the water when rain falls. If this be carefully attended to, the rain will run clear of as ſoon as it falls; and that wet poachyneſs, which is frequent on ſuch lands, will be in a great meaſure prevented. Let no animals of any ſort come upon the field after this laſt hoeing, till the turnips are to be carried off.

Have a cart provided, of the nature of a waggon, having three wheels, two on one end, placed at ſix feet aſunder, and one at the other end, exactly in the middle line of the cart; of courſe the two firſt wheels will ſtretch over two rows, and the wheels go exactly in the outſide furrows of theſe; the other wheel will go in the furrow in the middle that divides the two ridges. This cart may be drawn by one horſe, or by two, one before the other; the horſes will go in the middle. In this way, neither the horſes nor the wheels will touch the plowed land; the cart being introduced at one end, and drawn along the courſe of the ſame ridges as far as is neceſſary for loading the cart. When it is loaded, the horſe or horſes ſhould be unyoked, (the cart reſting as a waggon

on it's wheels,) and turned about, be then yoked at the other end of the cart, and ſo return in the ſame tract in which they came. Care ſhould be taken, in general, to draw the loaded cart down the hill, not only becauſe of the eaſineſs of the draught, but alſo becauſe the wheels will make a clear tract, to ſerve as a good water furrow afterwards.

(m, page 259.) In a practical treatiſe of this nature, it is impoſſible to avoid uſing technical phraſes, without employing great circumlocution. But technical phraſes are ſometimes of a local nature, and in danger of not being generally underſtood. The words *Tilth* and *Tid* may be of that nature, for which reaſon they require to be explained.

Tilth has always a reference to the ſtate of the ſoil reſpecting manures and culture. When it is richly impregnated with manures, and well divided by means of good culture, it is ſaid to be in good *tilth*; or in bad *tilth*, when the reverſe.

Tid has always a reference to the ſtate the ſoil has been in, chiefly as reſpecting wetneſs or dryneſs at the time of labouring. It has been found by experience, that whatever ſtate ground may be in at a particular time, as to *tilth*, if it be laboured when very wet, or ſubjected to a deluge of rain, under particular circumſtances, immediately after ploughing, the effects of the former good culture will in a great meaſure be deſtroyed; and the ſucceeding crop, which, if this ſtirring in improper circumſtances had been avoided, would have been abundant,—will, in conſequence of this circumſtance, be very poor. A farmer, in this caſe, would ſay, that the land had got a very bad *tid*; or, where the ſeaſon, when labouring, and immediately after it, was very favourable, he would call it a good *tid*.

(n, page 265.) This is the general eſtimate in thoſe counties where the ſheep-fold has been long uſed. I myſelf am inclined to think it could not dung ſo much: on that point I will not diſ-

pute. The general concluſion will be the ſame, whether it be ſuppoſed to be above or below the truth. It muſt vary in different caſes.

(o, page 269.) *Ebb* differs from *ſhallow* in this reſpect. *Ebb* denotes a ſmall depth in a ſolid body; *ſhallow* the ſame of a fluid. Therefore we ſay an *ebb* furrow, and a *ſhallow* pool.

(p, page 355.) Though I think it beſt in general to obtain young plants from nurſeries, and therefore do not in the text enter into the minutiæ of raiſing them from ſeeds; yet where *very extenſive* plantations are to be made, it will be beſt to raiſe the young plants. This has been the practice for many years paſt by the Duke of Athol, who has made more extenſive plantations of larch trees than perhaps any other perſon in Europe: the mode of rearing them at Dunkeld is as follows:

Dunkeld method of raiſing larches in the nurſery.—" A well dug bed in your nurſery garden being prepared, three inches deep of the earth muſt be removed from the ſurface of the bed, with a ſpade or the back of a rake: place the earth round the edges of the bed, and beat the bed with the flat ſpade. In the month of March, or beginning of April, lay the cones very thick and quite cloſe to or covering one another on the bed. About 10 or 14 days, or three weeks, according to the weather, you will find the cones have dropt a great deal of ſeed on the bed; rake them off, and lay them on another bed prepared in the ſame manner; then, with the rake, draw the earth over the firſt bed; proceed in the ſame manner with the ſecond bed, and you may expect a full crop of larch plants or ſeedlings:—cover them with ſtraw or ſhilling-ſeeds, during winter,—let them remain next ſummer in the ſeed bed,—tranſplant them the following ſpring or autumn,—when they have been tranſplanted two ſummers, plant them out in your plantation ground,—make a ſmall pit for them to looſen the earth, and ſet them into the hole, replacing the turf, cut in two, and with the earthy ſide

of it uppermoſt: no ſoil ſuits them better than moors, with a peaty or black mould: the ſame cones will ſerve for two or three years.

Theſe inſtructions I copied, Auguſt 1795, from the mouth of one of the Duke of Athol's principal gardeners, and are the moſt perfect that ever were given, and will be found the moſt effectual for raiſing larch nurſery." G. D.

To the above I ſhall only add, that in nurſeries, where they are reared in very large quantities for ſale, a very different practice is adopted. In theſe caſes, the cones are always ſplit, and the ſeeds threſhed and winnowed: they are ſown in a bed of good garden mould, prepared as if for carrots or onions. The ſeeds are equally ſown in the month of April *very thick*; for it is found that, on an average, of the beſt ſeeds not more than one in three will germinate, and ſometimes a ſmaller proportion. They are covered with mould directly after ſowing, as with onions, and ſmoothed by a light wooden roller drawn along each bed. The plants appear in a month or ſix weeks, with the ſeed huſk upon the top, when they muſt be watched, to drive away birds, which would pick them up very faſt, if not guarded continually, while they are coming up: afterwards they require no other care, except to pull up the weeds frequently before they get firm roots: if the ſeaſon be dry and hot ſunſhine, it is a great advantage to ſhade them for ſome time from the ſun by means of mats, otherwiſe they run a riſk of being ſometimes wholly killed by it; but in moderate weather, in this climate, they often eſcape unhurt, though unprotected. In very rich ſoils ſome of them may be planted out when only one year old; but for the moſt part they may be allowed to ſtand two years in the ſeed bed, and then be planted where they are to remain. A plant from 6 to 9 inches high, is what I ſhould deem the beſt for ſuch ſoils as have not a tendency to produce much graſs.

(q, page 388.*)* I am inclined to think this will be but a very moderate dunging; but I ſtate the facts as they are there ſtated. Should double the quantity of dung, or more, be required for certain purpoſes on particular occaſions, it will not affect the concluſions deducible from theſe facts in *kind*, only in *degree*.

(r, page 460.*)* The duty on ſalt is in a particular manner to be regretted in Britain; becauſe it enhances the price of this neceſſary article to a much higher degree than would be experienced in other countries where no ſalt mines are found. Were it not for this tax, rock ſalt, without any purification, would anſwer perfectly well for the uſe of beaſts, and could be afforded to farmers at perhaps one twentieth part of the price of ſalt at preſent; but we all know that rock ſalt dares not be ſold in Britain.

Again.—Were the duty on ſalt taken off, it would be eaſy to ſhow how the manufacture of ſalt could be carried on in Britain to an extent that ſcarcely knows any bound, *without the waſte of one particle of fuel*, ſo as to admit of being ſold to foreign nations at a much lower price than it can be had from any other place; while it could alſo be made of a finer quality than is yet known any where on the globe. Thus would be eſtabliſhed an immenſe trade in ſalt; which, as a neceſſary article, could admit of few interruptions; for no other nation is ſo circumſtanced as to have it in their power to become our rivals in this manufacture. It is foreign to my purpoſe here to ſtate farther particulars, but I pledge myſelf to do it, if ever properly called upon for that purpoſe.

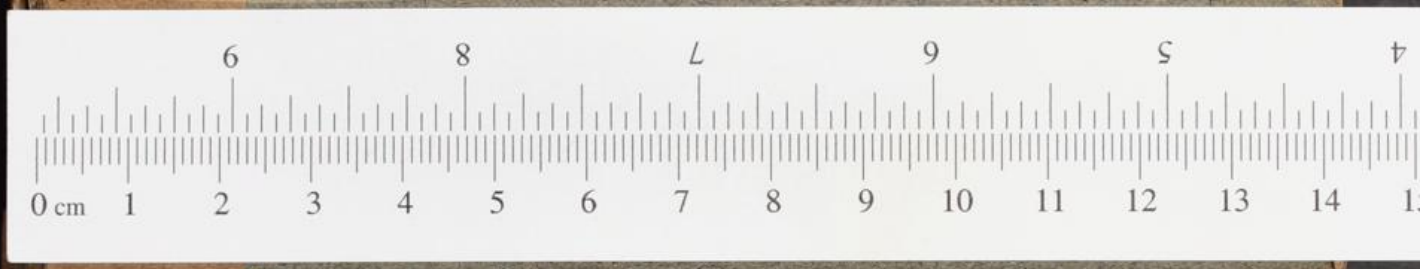
(s, page 462.*)* I am afraid that the phraſe, *winning* of hay, is provincial, and may not be generally underſtood. By *winning*, I mean to denote the proceſs of converting ſucculent herbage into a ſtate of hay that can be kept in quantities. I intended to have made uſe of the word *drying*, in this caſe, but it did not expreſs my meaning. Graſs, when wetted by rain, may be dried ſo as not to feel wet, when it is by no means in the ſtate of hay.

(t, page 466.*)* I once ſaved a great quantity of clover hay, being a late third cutting, when the ſeaſon was too far advanced to admit of it's being made in the uſual way, by putting it up when new cut, thus intermixed with a large proportion of good ſtraw. It kept perfectly well; and when cut down and given to the beaſts, was reliſhed by them better than any other hay I had, and was equally valuable, I am perſuaded, for every purpoſe. This mode of ſaving a late crop of clover is by no means uncommon.

(u, page 469.*)* No hay has yet been ſeen that is equally fattening as ſucculent graſs. I believe hay thus made would be more ſo, becauſe it's native juices would be fully retained, and only it's ſuperfluous moiſture be drawn off; and that this watery juice is more hurtful, is proved by experience; for every grazier knows that, in a dry ſeaſon, when that moiſture is exhaled from the graſs, his beaſts fatten much faſter than in a rainy ſeaſon, when it continues fully ſucculent; although the herbage upon the field be, in this laſt caſe, far more abundant.

(v, page 477.*)* The method recommended in the text for houſing corn, is extremely different from that which is pretty generally adopted in England, where *large* barns are in uſe. In particular, it admits of taking down any part of the corn that ſhall be firſt wanted, wherever it is placed; for, as any one of the ſix feet diviſions can be taken down without affecting the others, it allows the moſt perfect freedom in this reſpect. Whereas, the mows in a large barn can only be taken down in the exact form they have been originally put up. The danger of a large mow heating in the barn is thus alſo entirely obviated.

END OF THE NOTES TO VOLUME THIRD.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Colour & Grey Control Chart
Danes Picta
Blue
Cyan
Green
Yellow
Red
Magenta
White
Grey 1
Grey 2
Grey 3
Grey 4
Black