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Mr John

Geo. Miller
of FRANKFIELD

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AGRICULTURE,

THE

PRIMARY INTEREST

OF

GREAT BRITAIN.

BY

DAVID YOUNG,

AUTHOR OF

NATIONAL IMPROVEMENTS.

Oh! is there not some Patriot, in whose pow'r
That best, that godlike luxury is plac'd,
Of blessing thousands, thousands yet unborn,
Through late posterity? Some, large of soul!
To cheer dejected Industry! To give
A double harvest to the pining swain?
And teach the lab'ring hind the sweets of toil?

THOMSON.

EDINBURGH:

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M DCC LXXXVIII.

Commissions may be addressed to D. YOUNG, *Perth*.

TO THE
RIGHT HONOURABLE
WILLIAM PITT,
FIRST LORD COMMISSIONER OF THE
TREASURY, &c. &c.

SIR,
THE truly patriotic character which you have uniformly supported, renders it unnecessary for me to apologize, for presuming, without permission, to offer to your consideration, a subject of the utmost national importance.

That the strength of a nation consists in the number of the people, is an axiom in politics; and that the populousness of any country can only be in proportion to the means of subsistence, is a self-evident truth. And hence it follows, as an undeniable consequence, that Agriculture is the principal source of national affluence and power.

If then a plan can be devised by which the produce of Britain may be increased in a ten-fold

fold *ratio*, it is sufficiently obvious, that the riches and strength of the kingdom will be equally increased. Such a plan I have the honour to propose to you in the following treatise. And permit me to assure you, that it is not the fruit of closet speculation, but the offspring of real practice, and long experience.

The present period is peculiarly favourable to the most enlarged schemes of national improvements. Providence has favoured us with universal peace. By the wisdom of his Majesty's councils we are blessed with an unanimity to which we have long been strangers; and a liberal and enlightened spirit is diffused through the nation.

At such a period, may it not be expected, that you will turn your thoughts to the too much neglected science of agriculture. If a well-digested plan were authorised by the legislature, compelling the cultivation of waste lands, and encouraging a rational system of husbandry throughout the island, its success would probably answer the most sanguine expectations that could be formed.

The name of PITT was once rendered illustrious, by directing the thunders of Britain

tain in every quarter of the globe, and humbling her proudest enemies. But if to give bread to millions, and sow the seeds of plenty for future generations, is more laudable than the destruction of our enemies, that name may still rise higher in glory, if you become the patron of agriculture.

Allow me to add, that if the enormous load of national debt with which we are burdened, is to receive any considerable reduction, the principal source from which the funds must be drawn, is not the riches of Hindostan, nor even manufactures and commerce at large, but the arable fields of Britain.

Should any thing suggested in this publication afford the smallest assistance towards the effecting these important purposes, it will fully satisfy the ambition of,

S I R,

Your most obedient,

and very humble servant,

EDINBURGH, }
May 22. 1788. }

DAVID YOUNG.

P R E F A C E.

THE favourable reception with which a former publication was honoured by the most eminent practitioners of agriculture, has encouraged the author to usher this second treatise into the world.

It did not appear to him sufficient, merely to point out the methods most proper to be followed by those who were actually engaged in the practice of agriculture. Something seemed necessary to be done in order to awaken the attention of those who have it in their power to promote the improvement of this most useful art, by giving advantages to the farmers which they do not at present possess; and without which it can scarce be expected, that great progress can be made. It is necessary also, to call off the attention of individuals of all ranks from speculations of a different kind, in which too many are now engaged, frequently to their own detriment, as well as to the manifest hurt of the community.

For

For this purpose, he has presumed to offer his opinion to those who are entrusted with the management of public affairs; and has endeavoured to demonstrate, that no method of raising the wealth and power of any nation can be compared with that of encouraging agriculture. He has shewed, in the most clear and demonstrative manner, that this must far exceed every scheme merely commercial, whether foreign or domestic; nay, that the only true way of encouraging manufactures and commerce, is by giving encouragement to agriculture as their foundation. He has taken the liberty to point out several methods by which agriculture might, with very little expence, receive such encouragement from government, as would not only amply repay the sum laid out at first, but bring in an immense revenue, impossible to be raised in any other way. Many of his plans are original, and the subjects handled in a manner entirely new; though the Author can certainly declare, that they are not the results of mere theory, but most of them confirmed by his own observations, and the experience of many years.

To landholders in general he has pointed
out

out the methods of managing their estates in such a manner as to ensure wealth to themselves, and happiness to their tenants; and to the latter he has also shewn how they may always keep their farms in good condition; and thus live comfortably without embarrassment or difficulty in paying their rent. And lastly, from many convincing arguments, it is shewn, that the produce of Britain might in less than half a century be augmented to ten times its present value.

The work is interspersed with many curious remarks relating to the construction of villages, for the encouragement of fisheries as well as of agriculture; the whole designed to shew how the population, and consequently the strength of the kingdom may be augmented to an amazing degree; how the great may increase their wealth, and the poor may be made happy: Every thing being illustrated from observations made in different parts of the country, and thus adapted to every possible variety of local situation.

The subjoined attestation of a number of eminent farmers, several of whom have acquired considerable fortunes, by pursuing a mode of cultivation similar to that recommended

mended in these Essays, fully evidences, that it would be highly advantageous to Britain, if it was universally adopted. But whether the plan proposed by the Author is adequate to the end or not, the subject merits the consideration of the legislature.

If what he has proposed shall appear to be founded on facts, it certainly ought to obtain every public encouragement: Or, if it should meet with disapprobation, some other method, to effect the same great purpose, should surely be adopted. For, it is certain, that no scheme equally permanent can be devised to increase the riches and population of the nation, as giving proper encouragement to improvements in agriculture.

R E C O M M E N D A T I O N.

WE have read, with great satisfaction, Twenty-seven ESSAYS ON NATIONAL IMPROVEMENTS UPON AGRICULTURE, BY DAVID YOUNG, IN PERTH.

We cannot help thinking we only do Mr YOUNG justice by testifying our approbation of these Essays. They are, in general, plain, practical, and suited to the capacities of the Farmers, who ought to read and practise them, and extremely useful for the improvement of the nation in general, and of many farms in particular.

The author's chief design is to shew, were the methods he recommends adopted, that two thirds of the average seed sown in Scotland may be saved; and also, that the lands in Britain, particularly in Scotland, might be made productive of ten times the quantity of corn and grass, forty years hence, that they produce at present.

We are convinced of the practicability and propriety of the methods pointed out by Mr
YOUNG

YOUNG, to accomplish these two important designs; and that, were they carried into practice, we may safely venture to assert, the advantages arising from them would exceed his calculation.

It is with the greatest pleasure, therefore, we join in testifying, in the warmest manner, our inclination to adopt the methods, and promote the important purposes held forth by the Author in these practical Essays.

Signed by, George Ord, *Brownfield*.
William Watson, *Abbots Inch*.
John Cuming, *Inchinnan*.
James Richardson, of *Catochill*.
James Matthew, *Clashbenny*.
George Matthew, *Daleally*.
Andrew Morton, *Innernytie*.
Patrick Matthew, *Sheriffstown*.
Patrick Matthew, *Newbigging*.
John Whyte, *Kirktown*.
Dewer Lauder, *Pitfour*.
David Buchan, *Muirhead Gask*.
James Hunter, of *Sea-Side*.
David M'Cale, *Gorthy*.
William Blair, Jun. *Scone*.
Patrick Hill, *Inchmichael*.

The

The three first subscribers live in the neighbourhood of Glasgow, the others in the Carse of Gowrie, and the neighbourhood of Perth.

The above attestation proves, that the produce of Britain might be increased to ten times what it is at present; which, if done, the produce would amount to at least a thousand millions sterling annually; as it is generally admitted to be above one hundred millions at present.

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S E C T I O N I.

I N T R O D U C T I O N.

IN a country so much famed for its improvements in the various branches of science, and where agriculture in particular has by no means been neglected, it may seem surprising, that no regular or uniform system has yet been adopted. For my own part, after more than thirty years experience and study, not only by reading, but by the most diligent practical observations I have been able to make in many places of Britain, I must own, that I am every day more and more confirmed in what I have already laid before the public on that subject; not only from the observations which I still make, when occasionally passing through the country, but by conversation with the most intelligent practical farmers, who, in the general, from their own experience, agree with what has been said; as well as from a consideration of the great improvements which might still be

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made

made. The more I consider the subject, the more my ideas are enlarged, and the more I am surpris'd at perceiving the extreme difference in the management of farms just now prevalent in the country.

Were the present modes of agriculture to undergo a rigorous scrutiny, I believe it would be found, that not one hundredth part of the farmers manage their grounds properly, and that nine-tenths are actually undoing the improvements that have been already made. Nay, what is still more surpris'ing, it is too probable, that the very persons who have formerly made great improvements, will often be found undoing them, to the great detriment not only of themselves, but of the nation in general.

It is easy to see, that such absurd and contradictory conduct proceeds from the want of some proper and approved system of agriculture generally known and established throughout the nation: And nothing can prove the necessity for the establishment of such a system, more than the considerations above-mentioned; nor can any thing be more simple, or more easily comprehended, than the outlines of the system I would propose, as the
whole

whole consists only in keeping a certain portion of every farm in grass, another in corns, and another in fallow.

By pursuing this scheme, when once the proportions are universally laid down and determined, we could always ensure plenty of corn and grass, in ordinary seasons; as indeed there are few but what would be fit either for the one or the other; and those very dry seasons, which are bad for both would be best for fallow. The wet seasons are best for grass.

The many different schemes from time to time introduced into the agriculture of Britain, under the name of *improvements*, afford another, and a very striking proof, that this art is not properly understood among us at present. Whenever a science is brought to any degree of perfection, the methods of working are pretty generally the same.

The Jews were, by divine wisdom all tied down to one general rule with regard to their lands, and that without the smallest exception; namely, to allow the soil to rest every seventh year without being sown. Their obedience to the divine command was rewarded by such plenty during the other six years,
that

that an incredible number of inhabitants were supported within the narrow boundaries of their kingdom, besides the exportation of great quantities of wheat, &c. Now, as the divine wisdom thought proper to impose a certain and uniform method of agriculture on that nation, and the good effects of their adherence to it were manifested by the immense crops produced, it certainly cannot be thought an injudicious proposal, that an uniform system of agriculture should likewise be instituted throughout Britain. Nay, I will venture to affirm, that it is owing to the want of this uniformity that the produce is so small; and that, instead of hurting the landlord, the farmer, or the nation in general, an uniformity in the plan of agriculture would be highly advantageous to them all.

Let us suppose, that one half of every farm were laid out in grass. All soils would be the better for having a part in pasture, strong clay not excepted: For long experience has now discovered, that even in the most improved counties in Britain, the soil is exhausted when continued long with corns, even with clover and turnip; and, of course, the corn crops must every year be upon the decline,

decline, wherever this pernicious practice is followed. For even where the farmer has a great command of dung, the soil is liable to be tired or exhausted, when not allowed to rest by fallow and pasture. We shall allow, as some pretend to say, that there are parts of the country less fit for pasture, or, in other words, less profitable when applied to this purpose, (although that very soil would be the better improved by pasture); but it is very certain, that nine-tenths of the soil in Britain is of a different nature, and would be enriched by these means.

By this practice, indeed, some individuals might think themselves injured, but private interest ought, at any rate, to give way to the public good; and it might be demonstrated that, upon a fair trial, the farmers would find themselves, as well as the nation at large, ultimately benefited by a practice of this kind. In some cases it might not bring so great immediate profits, but it would always certainly prevent them from ruining the soil, as well as themselves, which they often do by over-cropping. Binding down the farmer, therefore, not to hurt himself, and not to exhaust the soil, would be of very considerable

considerable advantage to the nation ; but, if this method should still be thought detrimental, he might be indulged with following his own plans, for the trifling expence of fixpence to government for every acre laid out in a manner different from that of the established system. Perhaps some might think it would be a better plan to assess all the farms in the country at two-pence halfpenny an acre, for the purpose just now mentioned. This is no more than a voluntary contribution, only the sanction of parliament would be necessary to make every one equal.

It might indeed be worth the consideration of government, how far it would be proper to impose a tax upon those farmers who found it for their interest to differ from the national plan. Each person might be assessed in so much for every acre kept in corns and grafs above the established proportion, and so much for each acre of waste ground that was neither improved nor planted. The taxes raised from these would be very properly employed in premiums to such farmers as raised the greatest quantities of corn and grafs, in following the rotation of crops fixed upon by government for a national improvement ; nor
would

would the farmers have any occasion to grudge this tax, as they would have it in their power to be free when they pleased; and the sums raised in this way might be given to such of their brother farmers, as, in every county or shire, received, we shall suppose *L. 50*, for ten acres of the best crop of wheat the first year, and so on every year, for the different crops mentioned in the plan fixed upon by government; so that the farmers who were not concerned in the national plan would reap great benefit, much more than the amount of the taxes they paid. Thus also, the general improvement of land would spread very rapidly throughout the kingdom; for, by a comparative view of the produce of each acre in the different shires, when cultivated according to the government plan, farmers would soon see it their interest to adopt the same method, thus gaining experience from the experiments of others.

Another great advantage would arise from this annual register, namely, that the time of sowing would be specified, and it would soon be seen, that it was greatly for the emolument of the farmers to sow their grain earlier than they do at present; as the early sowing
 does

does not run such risks as the late does of being shaken and broken by the equinoctial storms, and destroyed by the early frosts, which prevent the late sown from coming to maturity; witness the harvest 1787.

Were government to adopt such a plan, a very large sum would soon be raised, by which a great number of farmers of the first rank might be induced to follow the same method. The consequence of this would soon be the raising such quantities of corn and grass, that the price of provisions would be greatly reduced, at the same time that trade and manufactures would be encreased proportionably, besides the annual exportation of great quantities of corn.

It is owing to ignorance or inattention to these things, that so few people understand what is the primary interest of Great Britain. The greatest part of mankind, indeed, are led by what they suppose to be their interest, or what has an apparent tendency to promote it; and upon this principle they determine what ought to be the great object of the nation. Thus, the merchant declares in favour of trade, the manufacturer in favour of business, the farmer for agriculture, and so on in every other

branch. Unhappily, however, the generality of mankind are so selfish, that if they can get their own ends served, they care not; though, by so doing, they injure their neighbours, as well as the nation at large; nay, though they should even, to serve a present turn, most materially injure their own interest in time to come. How often do we see children, even those endowed with the greatest natural parts, so much addicted to play, as for its sake, not only to neglect their education, but even sometimes scarce allow themselves the time necessary for food or rest: And how often do we see great numbers of people, more inexcusable than those children, whose situation in life might otherwise entitle them to some degree of splendor, yet suffering their minds to be so engrossed by childish, if not worse diversions and entertainments, that they will not even take time to look into their own affairs, much less to consider the general interest of the country where they live, or of the nation at large. When such customs become universally prevalent, it is certain that the nation is running headlong to its destruction, and not far from it, as is evidently

seen from history, in the ruin of the Roman as well as of other empires.

In order to prove whether agriculture, or trade and commerce be most for the advantage of Britain, first, Let us enquire what may be the value of all the trade in England, in its most extended state, and how much it may be increased above what it is at present.

From the most authentic account lately published by the ingenious Mr William Playfair, in his Political Atlas, the whole value of the trade of England, for all the goods exported to every part of the globe, and all the goods imported from those places, does not amount, in the best year, to above thirty millions sterling for both. Now, it may be said, trade is as much extended as it can well be ; indeed, many articles are extended beyond what they can continue at : But supposing, for argument's sake, that it was possible to extend the trade to double of what it is at present, say to sixty millions sterling, in the first place, it is very doubtful if this could be done, as the average of twelve years export and import is only *L.* 25,500,000. This calculation, being from 1771 to 1782, is the highest average of
seventy

seventy years back. Again, if it be considered what is the present produce of all the lands in Britain; some say one hundred millions, others assert two hundred; but, to speak with certainty, say only one hundred millions sterling, it is proved from the Practical Farmers recommendation annexed, and likewise from what is said in the work itself, that, if the methods pointed out were reduced to practice, the produce would be ten times what it is at present, in the course of forty years, which would be a thousand millions of additional produce at least; and, if the plan proposed were persevered in, it would be every year increasing, so long as any land remained capable of improvement.

The peculiar excellency of this plan is, that it would neither hurt trade, nor manufactures, but would tend to increase both very much; whereas, pushing trade and manufactures above what they can continue at, hurts agriculture, by taking away both men and money. The only sure method is, let agriculture and trade keep at an equal pace, the one not going before the other, as they are mutual helps to one another.

Many persons, upon the first hearing of
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the amazing increase that might be made upon the produce of Britain, in the course of forty years, that is ten times the present produce, which would be a thousand millions, provided the methods recommended were adopted, are filled with surprize, and cannot be brought to conceive how it is possible to accomplish it in such a short time.

The greatest, if not the only objection, is to get the whole nation to adopt the plans mentioned. If once the prejudice were removed, and the farmers in general only considered their own interest, and agreed to make a trial of it, the end would be gained; but, let a plan be ever so good, if the gentlemen and farmers are determined not to alter their old schemes, although bad for themselves and the country, the end proposed cannot be gained.

If the plan proposed were reduced to practice, the whole land of Britain in tillage at present, in the course of ten years, would be improved, and the half of the whole would be in sown grass; the farmer, having such a great quantity of grass, could every year summer-fallow so much out-field, or waste ground now in pasture, as would be equal to

a tenth part of his improved farm. Now, let every farmer in Britain begin to follow a regular course of cropping his farm, by dividing it into ten inclosures, having the one half of grafs, as is mentioned in National Improvements, beginning to summer-fallow a tenth part of the best of his farm every year. In ten years he improves the whole he has in tillage at present, and the half in grafs: Whenever that is done, he begins to summer-fallow as much every year as he can easily overtake, which may be at least a tenth part, new brought in from waste ground, or pasture to his farm; which would be every year improving not only as to quantity, but in quality. So that, agreeable to this plan, every farmer in Britain, from the least to the greatest, might begin and improve the best soil of his farm, the first ten years, which will do more than pay him the whole expence in that time, and afterwards he might go on in a similar manner, improving every year, as long as he has pasture and waste ground to bring in. So that, if this plan were universally adopted, the average produce would be more than ten times the present, in the course
of

of forty years. It is not meant by this, that every farm that is improved at present would produce ten times its quantity ; but, one farm, taken with another, good and bad together. This will not be at all surprizing, if it be considered, how much the produce would be increased by improving the land that is just now in tillage, in pastures, and waste ground.

S E C T I O N II.

The comparative advantages of agriculture to trade and commerce, exemplified from the history of various nations, in different ages of the world.

THOUGH, from some accidental causes, it has been, for a long time past, the usual practice of the inhabitants of this country, to view, in their utmost magnitude, the advantages arising from trade and commerce, as well as the disadvantages and inconveniences arising from attempts towards the improvement of agriculture; yet, I am persuaded, that every person, who gives himself the trouble of seriously considering what has been delivered in the foregoing pages, will find himself already convinced, that to improve agriculture must be the primary interest, not only of this, but of almost every other nation in the world.

That

That commerce and manufactures are the most effectual, if not the only means, by which any nation can be enriched, or rendered potent and flourishing, has been supposed an undoubted truth; and, in support of this, the examples of antient Tyre, Carthage, the Venetians, Dutch, and British are adduced.

Indeed, if by riches and power, we mean the possession of money, or having among us a vast quantity of it in circulation, the maxim, in some respects, may be allowed to hold good; but, if to these words we annex the ideas of happiness, and plentiful means of subsistence universally diffused among a vast number of inhabitants, we shall scarce find any thing more inadequate to such desirable purposes, or rather, more inconsistent, if not totally opposite to them.

The richest and most powerful people we read of in history were the Jews. The whole of their territories, even in their most extended state, did not exceed the kingdom of Scotland in magnitude, but the population was prodigiously greater. From the account we have of David's numbering the people, it
appears

appears, that those capable of bearing arms were upwards of a million and a half, exclusive of the tribes of Levi and Benjamin. Supposing, therefore, the fighting men in a nation to be only one fourth of the whole, we can scarce imagine the number of the Jewish nation, at that time, to have been less than eight millions: Nearly as many as, by a reasonable calculation, can be supposed to exist in the whole island of Britain at present.

If we compare these numbers with what we read of the most celebrated nations of antiquity, we shall find the population of Judea incredibly superior to that of any of them. When Sidon was destroyed by Ochus King of Persia, the heads of families and warlike inhabitants are said not to have exceeded 40,000. Nor does the population of Tyre seem to have been much, if at all superior; for that city was totally depopulated by Alexander the Great, when he crucified 2000 of the inhabitants, and sold 30,000 for slaves. Carthage seems to have been the most populous, as well as the most powerful commercial city we read of. Though, with regard to the number of its inhabitants we are much in the

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dark. The great quantity of money, indeed, imported into that city, enabled them to hire vast numbers of mercenaries for their wars: But this instead of evidencing the *strength* of their empire, was an undoubted proof of its weakness; as was particularly manifested after the first Punic war, when the whole force of Carthage was scarce sufficient to repel that of their revolted mercenaries.

With antient Rome, which was not a commercial city, the case was quite different. The number of people there was so immense, that King Pyrrhus compared them to the fabulous hydra, of which one head was no sooner cut off, than a new one sprung up in its stead. The population of antient Rome, indeed, according to the accounts transmitted to us, seems to have been almost incredible. Though engaged in endless wars, which might naturally have been thought sufficient to counteract any advantages with respect to population their circumstances could afford; yet, before the second Punic war, when threatened with an invasion by the Gauls, they were able, not only to repel those barbarians, by dint of superior military skill and discipline,

discipline, but even to outnumber them ; the Roman army at this time consisting of little less than 900,000 men. It is true, that at the time we speak of, they had the whole of Italy in subjection : But we are not from thence to infer, that they derived this strength from their Italian allies ; on the contrary, when invaded by Hannibal, deserted by many of their allies, and weakened by many dreadful defeats, they found themselves still able to supply *men*, even when they were almost destitute of *arms* : So that they could muster armies sufficient to chastise their ungrateful allies, and render fruitless the astonishing military efforts of Hannibal ; nay even to transport forces into Macedon, in order to prevent an invasion from thence.

In more modern times, we find the most commercial states far from being the most populous. The Venetians, though once powerful, and famed for military exploits, are dwindled into insignificance proportioned to the smallness of their number ; and though they still continue formidable to their barbarous rivals the Turks, are yet of very small consequence in comparison of any of the powerful nations of Christendom.

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The most populous, and richest commercial nations on earth at present, China excepted, are the British and Dutch, especially the former; though it cannot by any means appear, that they derive those advantages from their commerce. Indeed, from a very slight view of the present state of our own nation, it must be evident, that its commercial advantages for some time past have been bought too dear. We shall not doubt, that whatever wars have been entered into for fifty years past, have been for the sake of protecting and increasing the commerce of the nation; neither shall we doubt that they have fully answered the purpose. But what is the consequence? More than 200 millions of national debt, besides many millions expended annually to support the war; and such a number of taxes to pay the interest, that the whole produce of the commerce seems not sufficient to balance the expence: At the same time that our population seems so far from being on the increase, that perpetual emigrations take place to different countries; as if our own was still insufficient to maintain those who are born in it.

It is to little purpose to enter into any detail

tail of the particulars by which this enormous expence has been incurred, with a view to alleviate it. Vast sums have been expended in the German wars, but these were supposed necessary to the well-being of our commerce, and ought now to be stated as commercial expences, as much as the ordinary requisites for trade.

The American colonies were also very expensive for more than a century; Britain has expended, if we take into the account accumulated interest, above a thousand millions in support of them, (ungrateful America!) if that sum had been laid out for the improvement of Britain, what a figure would she have made this day, but this expence was incident to commerce, for it was only in the commercial line that they were supposed to be beneficial to this island. If they have now ungratefully withdrawn their allegiance, as we say, or unable to bear the British yoke, as they themselves say, we must only reckon this to be an adventure in the commercial way, and such as may be expected by every nation which endeavours to monopolize the trade of the whole world.

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To the same account we must also place the hundred millions expended in an unsuccessful attempt to reduce the rebellious colonies; nor is it any thing to the purpose whether the colonies could, or could not have been reduced; whether our generals behaved well or ill; or whether we had the right or wrong side of the question.

Let our opinion with regard to these particulars be what it will, the event is manifest, that adventuring deeply in commercial schemes is dangerous for a nation, as well as an individual; and, with respect to our own particular case, the fact is undoubted, that all our attempts to aggrandize ourselves have ended in the loss of money, embarrassment of our affairs, and considerable diminution of our national character.

Perhaps, it may be said, that the errors committed in the management of any scheme are not to be attributed to the scheme itself; and, of consequence, that the folly of the British ministry, in not sending a sufficient force, under the command of generals (that could be trusted) in due time, to subdue America, is, by no means an evidence of the insufficiency of a commercial plan for the aggrandizement

grandizement of the nation. There was, indeed, a possibility, that, by constantly keeping a very great standing army in America, the colonies might have been retained in subjection ; but then, it would have been necessary to have kept this force there from the beginning of the settlement with strict discipline ; to have persevered in it, and to have increased it as the colonies grew in strength : Nor can we, from what is past, calculate the force requisite to have subdued them at the time of their revolt, at less than 100,000 men, so that, in all probability, the expence would have been greater than all the benefits which could have been derived from our connection with them.

It must be owned, that, if the Americans had been checked when they were but a mob, a less number would have served the purpose ; the error was, allowing them to get to such a head at first, and in many in Britain espousing their cause. So that it might be said, that America was lost in Britain ; and this is the more to be believed, as it is certain that their friends told plainly in parliament, what steps the Americans ought to take, in order to render themselves independent.

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With regard to our possessions in the East and West Indies, as well as in Africa, it cannot be made to appear, that they are of any real benefit to the nation. Its population is certainly not increased by them; but, on the contrary, very much diminished. The unhealthiness of the island of Jamaica and the continent of Africa, has procured them the name of the *graves* of Englishmen, nor is the continent of Asia much better in this respect; not to mention the immense sums expended for the protection of the colonies, and the total annihilation of morality among those who go to the East Indies in order to make their fortunes; as well as the immense sums of gold and silver sent to the East Indies to purchase goods which we might easily be without.

Schemes of foreign commerce and colonization, however, seem to be so great favourites of the British government, that no experience of past ill success, nor prospect of future expence, seem to be sufficient to deter them from pursuing the same destructive plans.

The frozen regions of Nova Scotia have cost immense sums, never to be repaid by any thing that country can produce; and which, perhaps,

perhaps, at a future period, may be taken from us with all the improvements we have made. And, as if this fine colony had given such great encouragement in the northern hemisphere, we are now about to have another of the same kind in the south; the success of which is even more uncertain than that of Nova Scotia, as the burning regions of the torrid zone, for more than 40 degrees latitude, must be crossed before we can get at it.

The island of New Holland is situated in a climate by no means the most agreeable; its productions are, as yet, unexplored; different, indeed, they certainly must be from those of this country, but how far they can be of service to us, in preference to our own, must certainly be very doubtful. One thing is certain, that before any of these can be conveyed to Britain, they must cost ten times more than they can possibly be worth.

The colonists, it seems, are to be mostly composed of those, who, for their crimes, are reckoned unfit to stay in this country. This may, at first, seem to be a piece of good policy, but it will require no great judgement in calculation to foretel with certainty, that they must thus be much more expensive to the nation,

tion, than they could possibly have been by keeping a guard over them, while they were employed in carrying on some public works. Their being constantly confined to labour in public works would strike a greater terror into their accomplices, than death itself; as a person accustomed to idleness would almost rather be hanged than work. The island, to which they are to be transplanted is inhabited by savages, who will not fail to resent the settlement of these new comers in their territories. Nor is it at all probable, that such colonists will long refrain from giving provocation. The consequences, undoubtedly, must be, frequent scenes of slaughter, accompanied with circumstances of the most dreadful barbarity. To prevent these, as much as possible, a very considerable military force must constantly be kept there; as well as to prevent disorders among those wretches who compose the colony. Nor is it all improbable that this wretched settlement may excite the jealousy or avarice of some other power, by which we may be involved in a new war, not to be got rid of for less than fifty or sixty millions. To all which we may add, that the expences of this colony will undoubtedly be

be greater than those of keeping a guard over them while employed in making of high roads, canals, or working in mines.

So great, indeed, is the rage of colonization, with which this country for a century past has been infected, that one would be tempted to think, there was not a foot of our own land that was not improved; the contrary of which is notoriously known, as shall afterwards be particularly taken notice of.

Previous to this, however, we shall a little more fully consider the state of the different nations who have applied themselves to commerce, and whose grandeur we shall always find to have been more specious than solid.

Among all the nations of antiquity, we shall scarce find one whose rage for colonization equalled our own, Athens only excepted. The territory of Attica was barren, the people restless, idle, and fickle; and prone to war, rapine, or any thing rather than the improvement of their country.

So great was their aversion to this, that Pisistratus was reproached as a tyrant, because he obliged them to apply to agriculture, and restrained the mob, by whom every

ry thing, before that period, had been managed, from committing their usual outrages. It may indeed be observed, that when people once have got an inclination for a martial life, they cannot by any means be induced to apply, either to commerce, agriculture, or manufactures.

The Athenians by their commerce with different nations, but more especially by their depredations on the effeminate Persians, had acquired very considerable wealth; but so little was population encouraged by the possession of this wealth, that in the most flourishing æra of this city, it never could produce 20,000 men capable of bearing arms. Hence, notwithstanding all this apparent grandeur, this celebrated state had no solid foundation; and it was rather owing to the want of a proper enemy, than to any intrinsic strength, that it made such a figure among others.

This was, indeed, the case with all the states of Greece; and therefore, by reason of their want of inhabitants, every one of them was in danger of being overthrown by a single defeat. The victory of Leuctra, where 4000 Spartans were killed or taken, had almost ruined the state; and it was only owing

ing to a fimilar want of inhabitants in Thebes, by which they were difabled from fupporting their general, that the Spartan republic was not then totally overthrown.

A fingle defeat by Lyfander ruined the Athenian ftate, and occafioned the lofs of the city.

The fingle battle of Cheronea ruined all Greece, merely becaufe they had no men to replace thofe who were loft at that time ; although their numbers were by no means very confiderable.

It is almoft incredible, that a city incapable of furnifhing an army of 20,000 men, fhould aim at univerfal empire ; yet, it is certain, that the inhabitants of Athens reckoned their power irrefiftible, and fancied themfelves able to fubdue the whole world.

We laugh at abfurdities of this kind, without confidering that we ourfelves are chargeable with a fimilar folly. We have grafped at the dominion of both ends of the earth, and we fucceeded in acquiring it, when we had only fuch enemies to contend with, as the Greeks found in the ancient Perfians. But, when we engaged with thofe who where somewhat more upon an equality with us, in point
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of military skill, the case was altered. General Howe, finding himself unable to accomplish the conquest of America with the force originally sent, wrote to the ministry for a reinforcement, first of 20,000, and then of 15,000 men. They were not sent; and why? because the population of the country was not sufficient to spare such a number. This had, indeed, been originally put to the trial, when the first army was sent to America, and where, in order to complete a force of 56,000 men, we were obliged to hire 17,000 mercenaries from the small states of Hesse and Brunswick. But, how came these pitiful states to be able to spare so many men? The answer is plain, they are not commercial countries, and, therefore, they are strong and full of people; while Great Britain, notwithstanding her splendid shew of power and riches, is, in reality, weak, and unable to stand any contest which requires a considerable number of men to support it.

This was further manifest throughout the whole contest with the Americans. The army under General Burgoyne did not amount to 10,000 men; nevertheless, the loss of it threw us into the utmost despondency, while
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the capture of Lord Cornwallis, with about 7,000 more, obliged us fairly to own ourselves overcome, and to conclude peace upon any terms we could get. These, it must be owned, were terrible disasters; but what became of all our successes? Were not the victories at Long-island, at Brandy-wine, at German-town, Savannah, Charlestown, Cambden, Guildford, &c. &c. able to balance two defeats; especially when it is considered, that, in every action, the enemy lost two or three men for every one that perished on the British side; at least, if we may believe the accounts published at the time. The constant cry was, that the British were overpowered by numbers: But whence did these numbers come? At the beginning of the contest, the Americans themselves only stated their numbers at three millions; but this was not one third of the computed number in Britain and Ireland, with whom they had to contend. The numbers of the Americans, at first, were but small, if they had met with a proper check; but, they were rather encouraged by commanding officers not doing their duty, and the generals not co-operating with one another. Add to this, that, in every action, the Americans
lost

lost two to one. They contended with Britain, therefore, under the immense disadvantage of two to one, which, undoubtedly, must have made up for the distance to which the British forces were to be exported. The French, it is true, assisted the Americans, but the force they sent amounted to no more than 10,000 land forces, which was more than balanced by the 17,000 Germans, by whom Britain was assisted. As for the fleets on both sides, they must be considered as entirely out of the question, and only calculated to let both parties try their strength by land; for no engagement of any consequence happened by sea, till after the affair of Cornwallis was decided; nor were the French fleets ever able to hinder the British from sending as many troops as they pleased to America, during the whole course of the war.

What I have just now said is with no view to depreciate the British, or to exalt the Americans, but to lead to the establishment of the following position, (though this, in a great measure, was owing to the distraction of our councils at home, as, had we been united, America could not have obtained such a footing at this time) that the Americans, for six years,

years, contended with the most powerful and most commercial nation in the world, under the prodigious disadvantage in numbers of two to one at first; and yet at last overpowered by numbers all the armies which that nation could transport, owing to their being in their own country. Add to all this, that, during the time of the American war, our commerce and manufactures flourished more than ever, while that of our enemies was utterly destroyed, and great numbers of their towns burnt. Some cause therefore must be found, by which the population of America continued undiminished, nay, seemed rather to increase under all the calamities of war, while that of Great Britain, though at a distance from all these calamities, was by no means increased.

To find out this cause, we must again take a review of the history of mankind from the earliest ages.

The Jews, as has already been observed, were the most populous, and strongest nation upon earth, in proportion to the extent of their country. They were under the peculiar tuition of the Deity indeed; but still we know, that natural means were employed for the

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subsistence

subsistence of the people ; and whatever these means were, we are sure, that they must, of all others, be the most fit for increasing the number of inhabitants in any country whatever. These means, in one word, were *agriculture*, and that, no doubt, on the best plan that could possibly be devised ; of which, however, we shall perhaps have occasion afterwards to speak more particularly. Here, it may be observed, that their course of labouring seems to have been perfectly uniform ; having a seventh year's rest. Great part of the ground was probably laboured with the spade ; and as it was called, a land flowing with milk and honey, we may hence conclude, that part of it was in grass, and part in corn. From this also we may learn, that one system of husbandry should be universally used throughout the kingdom.

Commerce was not introduced till the days of Solomon ; and then, though it enriched the nation, they complained that they were oppressed by it, and wished for a relief from their burdens. Afterwards, when commerce was totally annihilated, they continued very numerous, as was evident at their final destruction by the Romans, when upwards of

a million of them were destroyed at once at Jerufalem, after the most prodigious devastations in other parts of Judea, and all this without exterminating the nation; who, though dispersed into different nations, still continue very numerous.

The Romans, as we have also remarked, were excessively numerous; and to the very same cause are we to ascribe their vast population. In the infancy of the republic, we are told, that the principal inhabitants of the city *followed the plough*; and every one has heard of the celebrated warrior Cincinnatus, who was called from the plough to command an army.

The policy of the Greeks was entirely different from that of the Romans. The effeminate Persians presented an easy prey, and held out, as it were, wealth and every kind of luxury to the warlike Greeks, with little or no trouble in the taking; for the Persians were by no means able to contend with them almost in any number. Hence it was as fashionable among the Greeks to plunder the Persians, as it is now to trade to the East and West Indies. The consequences were the same

same to both. The Greeks continued a divided handful, invincible in equal numbers by any nation on earth, but utterly unable to export any number of forces sufficient for great foreign conquests. Alexander the Great, indeed, with the whole force of Greece and Macedon united, conquered Asia; but in doing this, he expended the whole strength both of Greece and Macedon; the consequence of which was, that none were left at home to controul the power of that army, who therefore did what they pleased; and having, under the conduct of Alexander, conquered Asia, returned, under other leaders, to conquer both Greece and Macedon, and utterly to exterminate the family of their king.

But, however much, from the history of the conquest of Asia by Alexander, we may reckon the Greeks fitted for war and victory, they were found utterly unable to establish any empire over those nations who had any tolerable skill in the profession of arms. Alexander the Great had scarce accomplished the conquest of Asia, when his nephew, Alexander king of Epirus, undertook the conquest of all Europe.

Europe. He began with Italy, but the nations there were more warlike than those of the East. Still, however, they were by no means able to stand an engagement with the Greeks, but, though frequently defeated, unless Alexander's army had been much more numerous than it was, he could never have established any permanent conquest over them. He, therefore, failed in his attempt, and lost his life, after having performed such exploits as well entitled him to a relationship with the great Alexander.

On the other hand, the Romans proceeded in a quite different manner. They were, originally, a poor colony, and situated in the midst of nations more powerful than themselves. Being of a martial disposition, however, and having a very skilful commander, some victories were gained, and one or two cities taken, the inhabitants of which were transplanted to Rome; and thus the city received an increase of power, and became more able to contend with any succeeding enemy. In all their wars, also, the Romans had a particular eye to the *lands* of the conquered. They never thought of first procuring wealth by commerce, or even by plunder, and then purchasing

purchasing land with the fruits of their commerce or rapacity ; their primary object, always, was the possession of land ; and so exact were they in the improvement of it, that, in the early ages of the republick, a single acre was sufficient to maintain a Roman family ; which, it may be supposed, was laboured with the spade. Hence, it is easy to account for the numbers of people with which ancient Rome abounded, as well as the ease with which her armies were recruited, in case of any misfortune.

In process of time, it became necessary to send forth colonies from the city, and these were sent out, not for the purposes of commerce, or traffick, but for those of agriculture. The colonists were complimented with the citizenship of Rome, by which means they were attached to the parent state. There is good reason to believe, that the first improvements in agriculture, Britain received from the Romans, who did much with the spade, at the same time that vast armies were every where kept on foot, sufficient to prevent disturbances in the countries where colonies were situated, as well as to defend them from the incursions of barbarians. By steadily

dily pursuing this method, the Romans became, at last, in appearance, invincible by any power on earth, as they not only possessed a great degree of military skill, but were capable of overpowering, by numbers, the few nations who could contend with them, for a short time, in the field ; and, had it not been for their dissipation and divisions, the certain forerunners of destruction to all empires, they might have continued much longer.

In the time of the first Punic war, Hamilcar, the father of the great Hannibal, clearly perceived the sources from whence the immense power of the Romans was derived. He, therefore, projected the conquest of Spain, a country equal, in extent to Italy, and which, of consequence, would be capable of furnishing sufficient resources for recruiting his armies, in time of war, without having recourse to the dangerous expedient of hiring mercenaries.

It would be foreign to our purpose, to enter minutely into the causes of Hannibal's failure, in his attempt to subdue the Romans. It is sufficient to observe, that his countrymen differed totally in their ideas, and fancied themselves

themselves great, only in consequence of the quantity of silver they could extract from the Spanish mines, the estates they could boast of in that country, or the money they could procure by means of trade. In these early ages, the kingdom of Spain abounded with silver mines, perhaps equal to any of those in the new world, but, which were quickly exhausted, by the insatiable avarice of the Carthaginians and Romans. To these things, therefore, they applied themselves, leaving the brave general to shift for himself, and, at last, to fail in the conquest of a country where he had remained for 17 years, in defiance of the most warlike nation in the world, and, in opposition to the best commanders they could produce against him. So sensible, indeed, was Hannibal of the necessity of agriculture, that, even while in Italy, he sometimes employed his men in planting olive trees, and, when he returned to Carthage, did every thing in his power to encourage and promote that most useful art.

During the long tract of time, in which agriculture was the principal occupation of mankind in time of peace, and commerce but
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little known, we find those nations who applied themselves to it, very strong, and capable of resisting the most powerful enemies. The northern barbarians, indeed, who invaded the empire, were as ignorant of agriculture as of commerce. They destroyed and depopulated, therefore, every where, to such a degree, that the Romans, numerous as they had been, but now much enervated by divisions among themselves, and dissipation, were almost entirely exterminated; while their savage conquerors found themselves in danger of starving from the effects of their own devastations. Agriculture, therefore, once more, became the general object, and, while it continued to be so, the European nations, notwithstanding their continual wars among themselves, were numerous and strong; so that, when the rage of crusading commenced, they were able to spare a million of warriors at once, not only without disadvantage, but to the very great emolument of those who were left; as those warriors were the persons, who, under pretences of glory and honour, kept every nation in Europe in a ferment.

History, however, is not at present our object. Every one knows, that, with the cru-

fares ceased all that violence of war which had for so long depopulated the western parts of the world. Since that time, the arts of peace have gradually prevailed, the horrors of war have been mitigated, battles have been reduced, comparatively, to skirmishes, and learning and the arts have increased to a degree unknown since the foundation of the world.

By what means, therefore, shall we solve this paradox, that, while different nations waged perpetual war with each other, mankind were not thinned, and now, when they, comparatively, live at peace, their numbers are not increased. Nay, to add to our surprise, in this respect, we must take into our account the much greater frequency of plagues and famines in former times than now. To what secret cause, then, are we to ascribe this hidden and invisible destruction of our species, which, amidst the appearances of peace and plenty, proves an equivalent to all the ravages of war, famine, and pestilence! Nay, which actually seems in a great measure suspended during our modern wars, as the loss of men by them is scarcely felt more than in time of peace?

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The cause, indeed, besides the dissipation already mentioned, may be traced as far back as the time of the crusades themselves, when the view of eastern magnificence first inspired the Europeans with a desire of running hither and thither in quest of luxuries and finery. No sooner was this idea entertained than the invention of the mariner's compass put it in the power of mankind to gratify their wandering inclinations, and Africa first, and afterwards the East and West Indies quickly became receptacles for crouds of adventurers from all nations in Europe. Thus, the attention of mankind was drawn from the improvement of their own country, towards the importation of commodities of which the distance from whence they were brought very often constituted the greatest value; and thus, to the present day, every European nation has continued, like the daw in the fable, to dress herself in borrowed plumes; without considering, that, these being very liable to a removal, may soon leave them naked and destitute, even of what they might otherwise possess.

It is evident, therefore, that before any nation attempts either foreign trade, or foreign conquest, the territory properly belonging

longing to it should be improved, and made to yield all that it is capable of yielding; for thus only it can be possessed of any superfluous strength, that can be exerted with propriety in adventures either of trade or conquest.

Of all nations in the world, I have heard only of one, which, according to our present method of reckoning, is in a condition to undertake projects of this kind; and that is, the empire of China. All the accounts we have of that vast country, represent it as improved in the highest degree, and so full of inhabitants, that they have exhausted every resource for subsistence, whether derived from agriculture, internal fisheries, or even commerce: Though in this last they never chuse to venture far; as a foolish attachment to their own country would prompt them to starve in China, rather than go out of it, in order to find subsistence.

In that country many people, for mere want of room, as they say, are obliged to stay in wooden houses, constructed upon floats in the water; and some cities are supposed

posed to contain two millions of inhabitants each.

The strength of this country would evidently be increased by sending forth colonies ; as such immense population could well spare the emigrants, afford sufficient force to defend them ; and those who remained, by having more room, would be able to subsist more comfortably.

It is needless to adduce more examples, in order to prove, how much the encouragement of agriculture promotes the real interest of a nation. By application to this most useful art, not only the population is increased to an incredible degree, but the wealth is augmented in equal proportion.

Few nations, in this or any other age, have paid that attention to agriculture which it deserves. The Chinese, in the present age are almost the only exception. In that country, agriculture is carried to the greatest perfection that perhaps the nature of the soil will permit : And as their hills are cultivated to the very top, it is most reasonable to think, that this is done by means of the spade, and the bare rocks covered with earth. The consequence

sequence is, that the nation is by far the most numerous, as well as the richest of any in the world. The revenues of the Emperor of China exceeded those of the Great Mogul, even when he was in the height of his splendor; yet this mighty monarch, by an annual procession, in which he himself holds the plough, never fails to acknowledge the obligation he owes to agriculture.

The amazing increase of population is nowhere more evident than in this great empire. When invaded by the cruel Moguls, whose principle of conquest was to destroy every human creature in the countries they invaded, it is incredible what multitudes were cut off; yet the Chinese not only soon recovered themselves, but even civilized their conquerors. The smallest trace of this invasion does not now remain in that country; though in the western parts of Tartary, where similar devastations were committed, and where the inhabitants chuse pasturage rather than agriculture, the country has never regained its former populousness.

Agriculture, therefore, being the only proper means for making a rapid increase of
population,

population, is likewise the only proper foundation of arts, manufactures, and commerce. This is likewise manifest from the example of the Chinese, among whom commerce is carried to an incredible height; and the arts are come to as great perfection as can possibly be supposed in a country where the self-conceit of the inhabitants makes them think themselves superior to all the rest of the world.

In all countries these must be somewhat unfavourable to population. Commerce is particularly so, by carrying people out of their own country into foreign climates, which is more destructive than even the sword of an enemy. This is evident even from the accounts which, from time to time, are published by authority, of those aboard his Majesty's navy who die natural deaths, and those killed in battle.

From an account of this kind, published in January 1781, it appears, that from the year 1774 to 1780, there were raised for the service of the navy 175,990 seamen: Of these, from the beginning of 1776, to the beginning of 1781, there had fallen in battle only

ly 1243; though, in the same space of time, no fewer than 18,545 had died naturally.

The same account presents us with a most suspicious article, under the title of *desertion*, and which includes 42,069. In what manner it was possible for such a number as 42,000 sailors to find an opportunity of deserting from the royal navy, will undoubtedly surpass the comprehension of vulgar intellects; unless by *deserters* we mean prisoners of war, those who perish in the ocean, as well as deserters properly so called; for the account alluded to gives no list of either of these. Upon this, however, or something similar to it, we must make our calculation. It cannot be supposed that less care is taken to preserve the lives of seamen in the royal navy, than in the trading ships fitted out by private adventurers, and they are evidently more free from the hazard of storms and shipwrecks, because the men of war are much stronger and better failers than the merchant ships. Every circumstance considered, therefore, we must suppose the destruction of mankind to be no less by the vessels employed in commerce, than on board the ships of war; nor can we estimate
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the number of those employed in maritime affairs, including the sailors on board the navy, kept up in time of peace, at less than between one and 200,000 men: But of these, according to the data with which we are already furnished, we cannot suppose that fewer than 30,000 are annually lost to their country; including such as die a natural death at sea, those who go into foreign countries and never return, who perish by shipwreck, by the uncommon dissipation natural to seafaring people, &c.

It is needless to expatiate on this subject, in order to shew how much population would be increased were that number to stay at home, marry, and have children; the thing is self-evident.

Arts and manufactures are unfavourable to population, rather in an indirect manner. Agriculture, we know, was the employment for which man was originally designed by his Maker; and therefore it is more natural and friendly to the constitution than any other. Many of the trades which man has invented for himself, evidently tend to shorten his days, either by the confinement necessary for carrying them on, or the pernicious na-

ture of the materials from which the commodities are produced.

But the worst consequence of these is, that they assemble the human species together in too great numbers, so that vice of all kinds obtains a much more firm footing among them than it can do when they are dispersed. Hence all great cities are exceedingly unfavourable to population. The unwholfomeness of the air produces diseases; the inhabitants enervate themselves by intemperance and debauchery; and the multitudes of prostitutes with which they abound, not only deprive the public of the service which might be expected from them, but likewise of their posterity; and their example communicates itself to the country.

On this disagreeable subject, however, we cannot enter into particulars at present. Every reader must assent to the truth of what we have advanced, and may make the calculation in what manner he thinks proper.

To evince the truth of the general point for which we have contended in this section, by further arguments, is unnecessary. To confirm our reasoning, we shall, however, here add a few extracts from an ingenious writer,

writer*, who has also endeavoured to awaken the attention of mankind to the superior advantages of agriculture above manufactures and commerce.

P. 31. " The produce of the earth is the
 " natural revenue of every nation: It is a
 " benevolence, or free gift from God, as the
 " proper and immediate maintenance of his
 " creatures; and a thrifty management of it
 " settles the tempers of the people to an affection for their rulers: It opens a credit with
 " foreign countries, and multiplies resources
 " to supply every artificial want. It is the
 " soul of commerce, and the finews of authority. It preserved Rome, and secured
 " Hiero in the possession of Sicily."

P. 37. " Four years after Dioclesian had
 " retired from the toils of government, to
 " enjoy the tranquility and ease of a private
 " person, Gallerius warmly solicited him to
 " resume the throne; but Dioclesian, with a
 " philosophical indifference, stopt his importunities, by this simple but significant interrogation: " Did you see, Gallerius, the
 " plants raised with my own hands at Salona?" Could language convey a stronger
 " proof, that Dioclesian was better satisfied
 " with

* Agriculture considered, in a series of letters inscribed to his Majesty, by W. Donaldson, Esq. late secretary to the governor of Jamaica.

“ with his vegetable dominion, where all his
 “ subjects were governed by one principle of
 “ action, and directed to the end for which
 “ they were designed, than with the empire
 “ he had quitted; where, from the depravity of human nature, nothing but disappointments could be expected.”

P. 38. “ Thus, upon a cursory review of
 “ the state of agriculture, through different
 “ ages, from the earliest time, we find it a
 “ favourite science with men of the most
 “ sublime and accomplished virtue in all nations. It was a relaxation from the toils of
 “ war, and the severer study of epic magnificence. An attention to husbandry is a
 “ compliance with the inclination of God:
 “ For the produce of the earth is interpretatively an intimation from the Almighty to
 “ cultivate it; and by making the most of
 “ his bounty, we not only estimate its value,
 “ but manifest our gratitude for his paternal
 “ indulgence.”

P. 74. “ Commerce enriched the nation,
 “ but wasted its inhabitants: the country
 “ was drained of its most useful people, to
 “ furnish cities and towns: London, in particular, tumified to an alarming size, by
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“ the charms of voluptuousness, and the at-
 “ traction of manufactories. Peasants being
 “ familiar with health, were ignorant of the
 “ mighty blessing ! Those deluded people,
 “ with an unreluctant carelessness, left the
 “ active business of the field, to encounter
 “ diseases at the loom, and other sluggish
 “ employments ! Innocence lost their affec-
 “ tion, when the country lost their assist-
 “ ance ; and their minds and their blood
 “ were corrupted in the same moment.

“ This desertion from the cause of industry,
 “ encreases the bills of mortality ; multiplies
 “ hospitals ; furnishes the temple of justice ;
 “ and, what is most melancholy, supplies her
 “ altar with victims ! Against these alarming
 “ truths commerce maintained her ground :
 “ She found powerful friends in every go-
 “ vernment ; and no wonder, as she poured
 “ immense sums into their respective trea-
 “ suries : Fiscal laws are the political estates
 “ of every prince ; and the paps which nourish
 “ the ministerial polygarchy. Commerce, in-
 “ creased by encouragement, grew unwieldy
 “ by an injudicious indulgence ; and declined
 “ by humours of her own generating : Com-
 “ merce, like other prodigals, never advert-

“ ed

“ ed to her constitution, but relied upon faith-
 “ less auxiliaries, for spirit and vigour.”

P. 78. “ Commerce is an avowed enemy to
 “ mankind: Kingdoms have been plundered,
 “ laid waste, and the inhabitants butchered,
 “ to push her interest ! How much blood has
 “ been shed to humour her jealousies ! How
 “ many millions have perished in her service,
 “ by endemial diseases, or swallowed in the
 “ ocean ! and how many thousands have been
 “ flattered out of the world, by her deceit-
 “ ful luxuries ! Commerce gives countenance
 “ to every extravagancy, by transmuting the
 “ vices of mankind into relative virtues.

“ Agriculture received her appointment
 “ from the hand of nature, and, like a faith-
 “ ful servant, has conformed to the instruc-
 “ tions of her great patroness ; she is a friend
 “ to mankind, she secures him health, and
 “ appetite, and provides him food to main-
 “ tain one, and gratify the other ; she gives
 “ strength to his body, and furnishes him
 “ with materials to cloath and preserve it :
 “ As an attentive handmaid, she dresses up
 “ the face of nature in loveliness, and feasts
 “ the eye of man with her incomparable beau-
 “ ties ; add to all these real excellencies, she,
 “ by

“ by restraining his passions, entails upon
 “ him long life, with the enjoyment of peace,
 “ and abundance.”

P. 81. “ Husbandry is the vital stream of
 “ commerce; it circulates through every part;
 “ it is the medium that tempers the whole;
 “ the artizan must be fed, and labour is va-
 “ lued by the liberal, or parsimonious pro-
 “ ductions of the earth; when cultivation is
 “ neglected, trade stagnates, and is only kept
 “ in motion by our own vanities; the consump-
 “ tion of other countries must be supplied
 “ from a more reasonable market. Plenty
 “ helps the staple trade of this country, in
 “ another view; when provisions are cheap,
 “ the poor are enabled to lay by some part of
 “ their wages for the comfortable purpose of
 “ cloathing themselves and families. Osten-
 “ tation rises with abundance. Wretched-
 “ ness is the companion of scarcity.

S E C T I O N III.

THE PRESENT STATE OF BRITAIN, WITH RESPECT TO AGRICULTURE.

IT may be thought a strange thing to assert, that, with respect to agriculture, Britain, even at this day, is in a very poor state of improvement. Yet, from undoubted facts, it is not only certain that this is the case, but that it is in a worse situation in this respect, than it formerly was.

The first proof which I shall adduce of this is, that the farmers, in every part of the country, are daily failing. Superficial observers may perhaps suppose, that such failures are owing merely to the extravagancy, folly, or misfortunes of the unhappy individuals. That luxury and dissipation are too prevalent in the country, as well as in cities, we readily own; and that the mismanagement of farmers is one cause, we shall quickly

ly

ly prove. But when bankruptcies universally prevail among farmers, the causes must also be universal. These causes are indeed but too obvious. To every person acquainted with the present state of the country, I appeal, for the truth of the following assertions.

By the impolitic conduct of some landlords, the rents of unimproved ground are raised much above their value. By a policy equally absurd, others depopulate the country, by letting farms greatly too large; and by granting no leases but what are far too short, their tenants are absolutely prevented from making any real improvements. The farmers also, by following an improper mode of cultivation, greatly heighten their own distress. In many farms, we find the best soil laid down in grass, and seldom broke up for corns; while the part that is sown with grain is much exhausted with constant cropping. To the above causes we must ascribe the insolvency of farmers, and the consequent decrease of the produce of Britain.

What we have here advanced will be considerably illustrated by the following spirited

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remarks

remarks of Mr Donaldson; (vid. Letters, p. 93.) which afford a just, however melancholy picture of the present state of farming in England.

“ To maintain luxury, and gratify avarice,
 “ rents were advanced to a most enormous
 “ degree; farmers, to keep pace with their
 “ landlords, advanced the price of the land’s
 “ produce in an unreasonable proportion.
 “ In this unpropitious change of affairs, in-
 “ dustry became the dupe of opulence; for
 “ the few who ruled the markets were the
 “ only gainers by the imposition. The nee-
 “ dy farmer, who has no greater interest than
 “ in doing justice to his farm, is obliged to
 “ send his goods to market, as his family
 “ must be maintained from day to day; his
 “ penury cannot resist any prices that may be
 “ offered him; his corn must be threshed
 “ out, when he has money to hire labourers
 “ for that necessary service; and his land re-
 “ mains untilled, until temporary assistance
 “ can be purchased, for which extravagant
 “ wages are exacted. Thus raising his crops
 “ at the greatest expence, and selling them at
 “ the lowest prices, he is unprepared to resist
 “ an

“ an additional tax on his labour ; he sinks
 “ under the oppressive weight of an advanced
 “ rent ; he is in arrears with his landlord,
 “ who being impatient under the difficulty
 “ of getting his money, removes the unhap-
 “ py pauper from his farm ; and, without
 “ allowing himself to feel for his distress,
 “ drives the victim from his home, and con-
 “ signs his wife and children to languish in
 “ a workhouse ! From this dishonest treat-
 “ ment, dishonesty is not sufficiently un-
 “ derstood in the idea of a house-breaker ;
 “ for he is infinitely more ignominious,
 “ who, by destroying the industrious hus-
 “ bandman, robs the public of his service ;
 “ and can, with deliberate barbarity, de-
 “ prive humanity of those features which
 “ give a character to the nation ! I repeat it
 “ again, from this dishonest treatment, the
 “ family, who but lately was of service to
 “ the public, is now become a burden to it ;
 “ his few acres are given to a wretch, who
 “ had too many before, because he will be
 “ more regular in his annual payments.

“ Thus rents are raised, provisions advan-
 “ ced, and the wages of labour augmented,
 “ to

“ to the injury of the commonwealth, with-
 “ out any real or substantial benefit to the
 “ landlord, the tenant, or the labourer! If
 “ the landlord receives more money, he is
 “ not the richer, as he has involuntarily laid
 “ the above tax upon himself; for, if he has
 “ a genius for calculation, he will find his
 “ prodigality is rated higher than he has
 “ provided for in his additional revenue. Be-
 “ sides, as we are generally disposed to value
 “ our importance upon the sum we annually
 “ receive, an augmentation of income will
 “ be apt to make us play a bolder game at
 “ the hazard table! multiply the number of
 “ our mistresses! increase our plagues, in the
 “ increase of servants! and surfeit ourselves
 “ upon the addition of twenty more covers
 “ every day upon our table. Or, in the o-
 “ ther extreme, avarice takes from the value
 “ of his hoarded treasure, and dispatches so-
 “ licitude and suspicion, to invite anxiety to
 “ be the chief guest in their miserable party.
 “ The tenant is under the same infatuation;
 “ his mind expands with his fortune, and
 “ he is visited by passions that competency
 “ was a stranger to; or he buries the useless
 “ savings, wrung from every enjoyment of
 “ life.

“ life. And the labourer works less, and
 “ lives more intemperately.”

A further proof, that agriculture is declining is, that some years ago Britain exported corns to the amount of six or 700,000*l.* annually; while now we are obliged to import grain to the amount of three or 400,000*l.* and some years a million and a half, which makes a difference of more than a million a year to the nation; some years two.

Let any person in the least degree acquainted with the present state of Britain with respect to agriculture, only consider what he himself knows to be the case; viz. the great difference betwixt the improvements in some parts of the country, and others of a similar soil; both having the same means of improvement by lime, marle, dung, &c. and, in many places, fields lying contiguous to one another; the one producing large crops of corn and grafs, the other such scanty crops of corns, that they will not pay for seed and labour; the one farmer growing rich, the other very poor; the very small proportion that the improved part of the country bears to that which is not improved; the very large tracts of waste land in every part of the country capable

pable of being made to produce good crops of corn and grass, yet suffered to lie barren, even near the metropolis of London itself, where dung is to be purchased cheaper than in any other part of Britain, and in very large quantities. Though these are facts obvious to the inspection of every one, yet many people differ in their opinions concerning their causes, as well as in the proper methods of applying a remedy.

If we may believe some estimates that have been published of the number of people employed in manufactures of different kinds, the proportion is by far too great for the number of inhabitants.

By an account of this kind lately published in the newspapers, it would appear, that above five millions of people are employed in manufactures, &c. And though we cannot pretend to vouch for the exactness of this estimate, yet it may be looked upon as a fact pretty well authenticated, that more than three-fourths of the inhabitants of Great Britain live in cities or towns, or are now employed in the various British manufactures, commerce, fisheries, &c. But if this be the true state of the case, the number left to till the
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the ground must be undoubtedly too small. Yet the estimated produce of all the trade, manufactures, fisheries, &c. amounts scarce to one half of that from agriculture.

In the account alluded to, this produce is calculated at fifty-one millions sterling; although there is ground to believe, that this calculation is too little: But the produce of the soil must certainly be much greater, as may easily be demonstrated in the following manner:

Let us suppose, that the number of inhabitants in Great Britain amount, according to the common calculation, to eight or ten millions; all these must ultimately be subsisted and clothed by the produce of the soil, excepting some little assistance from the fisheries, in most cases too trifling to deserve any notice. Let us next suppose, that the expence of maintaining each inhabitant of Great Britain amounts to £. 15 per annum; and we shall find the whole amount to the prodigious sum of 120 or 150 millions.

An objection may no doubt arise, that this calculation is rated by far too high; as it is well known, that whole families make a shift to subsist upon less than the sum here allotted

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to a single person; but if we consider at the same time, the great number of horses, oxen, cows, asses, sheep, swine, &c. that must likewise be supported by the produce of the soil, which is all included in the *L. 15*, we shall certainly find the estimate sufficiently moderate. For all carriage and race horses cost *L. 20*, or upwards, per annum. Farm horses, *L. 10*, milk cows, *L. 5*. The expence of hounds and other dogs is very considerable. The maintenance of sheep, swine, and all the smaller kind of cattle must also be included in the calculation.

Taking the whole of this into consideration, we may fairly conclude, That two thirds of the produce of the soil is expended on the brute creation; and consequently, there remains only *L. 5* per annum for the support of each human creature. And, if we add, as before observed, that three-fourths of the inhabitants of Britain live in cities and towns, which is more expensive than a country life: Considering, I say, the whole of this, the average of *L. 15*, for every human creature must be sufficiently moderate; and consequently, the produce of Britain, estimating

inating the inhabitants at eight or ten millions, cannot be less than 120 or 150 millions.

Besides all this, the manufactured produce of the British soil, exported to other countries, is very considerable, and cannot be easily estimated; so that some have reckoned the whole produce of our island to be no less than 200 millions.

At any rate, we see, that the natural produce of our soil, according even to a very moderate computation, far exceeds the most exaggerated estimation of the produce and profit of our commerce, fisheries, and manufactures.

Hence, again, it is obvious, how great an object it ought to be with government to encourage the improvement of our own country as much as possible, in preference to these secondary objects, which never can give real wealth or stability to a nation.

Indeed, the proper way of encouraging manufactures is by giving encouragement to agriculture; for thus, colonies are raised among ourselves for the consumpt of them; an internal commerce is instituted, which,
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with all the advantages of that to foreign countries, is entirely free from sea-risk, or the dangers arising from unhealthy climates; and therefore ought, as far as it can be pushed, to be preferred to the other.

Mr Knox informs us, in his Tour through Scotland, 1787, "That the goods manufactured in England, and sent to this country, amount to no less than two millions sterling annually; and if it was improved according to the plans proposed, the quantity would be more than doubled." He also says, in p. 169, "That, in 1697, the general amount of exports was found to be 3,525,906, of which was sent to Scotland annually, upon an average of years between 1696 and the union of the two kingdoms, to the value of *L.* 63,345. Between the year 1707 and the commencement of the last war, the exports to Scotland had gradually risen to *L.* 2,000,000. From these calculations it appears, that the exports to Scotland, in the course of 80 years, have increased thirty fold."

That the produce of Britain should now be on the decline, conveys rather a melancholy idea; considering how severe a shock our commerce

commerce has lately received, and how much we are in danger of being rivalled by the other European nations.

That we have not yet arrived at that perfection to which the art of agriculture can easily be brought, is however evident, because there are not two counties, nay scarce two farms in England or Scotland, let them be ever so similar in soil and other external circumstances, which are cultivated in the same manner: And where any art whatever is not conducted by an uniform plan, it is evidently far from being yet arrived at any degree of perfection.

But the worst is, what hath been already hinted at, that the produce of Britain, within these few years, has certainly diminished, notwithstanding the many schemes and fancied improvements that have been undertaken with a view to increase it.

That the produce has diminished, even in one of the most highly improved counties in England; and that this diminution is owing to pursuing a very improper mode of cultivation, is fully evidenced by Mr Marshall, in
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his "Rural Economy of Norfolk," who observes, p. 84. and again p. 86.

"Minute 49. January 10. How strong and
 "lasting is the current of custom! The Nor-
 "folk farmers, while corn sold high, were
 "assiduous to cultivate every inch the plough
 "could reach: Old marl-pits were levelled,
 "nooks and corners grubbed and broken up,
 "and even bogs were converted into arable
 "land. Grass land, of course, became
 "wholly out of fashion, and totally neglect-
 "ed. And now, when corn is low, the same
 "practice still prevails. Scraps of arable
 "land are still purchased at more labour
 "than they are sometimes worth; while the
 "meadows are suffered to remain a disgrace
 "to the country, notwithstanding they would
 "pay trebly for improvement."

P. 86. "Minute 51. January 13. What a
 "disgrace, and what a field for improvement
 "are the meadows of this county! The
 "farmers here hire marshes and grazing
 "grounds at the distance of twenty or thirty
 "miles, and give high prices; when, at
 "the same time, many farmers might, with
 "a common share of attention and manage-
 "ment

“ ment, have them at a much cheaper rate
 “ within the limits of their own farms.

“ But custom and prejudice are doughty
 “ champions to deal with. Whilst a Nor-
 “ folk farmer is bestowing more cost upon
 “ his arable land than, at the present prices
 “ of corn, he can ever regain from it, he
 “ is “ doing rarely well by his land ;” but
 “ the moment the foot of improvement steps
 “ on to his grafs lands, be it even to open a
 “ few gripes to let off the surface-water, the
 “ eyes of the country are upon him ; for he
 “ is “ buying his meadows.” Were he to
 “ carry a load of muck from his par-yard on
 “ to his meadow land, a statute of lunacy
 “ would be the probable consequence.

“ Prejudice, however, is not the only thing
 “ against the improvement of the Norfolk
 “ meadows. A want of knowledge in the
 “ art of draining, is a sister-cause ; for, of
 “ the few who attempt to drain their mea-
 “ dows, scarcely any are acquainted with the
 “ method of performing it properly. They
 “ make their drains much too small, too nu-
 “ merous, and cut them in improper direc-
 “ tions ; nor do they ever go to a proper
 “ depth

“ depth to do the work effectually: For,
 “ should they chance to dip to a bed of gra-
 “ vel they have done wonders, and there
 “ they stop; for their spades and “ mud-
 “ crooms” can go no farther.”

The state of Norfolk is miserable indeed. If the farmers continue this practice of having so much land in corn, and neglecting to sow grafs, the country must, in a few years, be unavoidably ruined.

And if Norfolk, one of the most improved counties in England, is failing in its produce, what must be the situation of less improved counties?

Another more conclusive argument, that the produce of Britain is decreased, is, the diminution, or rather total abolition of exportation of corn, and the substitution of importation in its place.

But that which carries along with it the greatest conviction is, the increased price of provisions, at the same time that the farmers, so far from being enriched, are apparently much poorer than before. In some parts of the country, indeed, where they are carrying on improvements in a proper manner, the farmers still continue to make rich;
 yet

yet it is evident, that the generality of these in the country are rather on the decline ; and wherever the farmers are on the decline, the produce of the soil must necessarily decline also.

To all this may be added, that the country in general is depopulating very rapidly, by reason of the noblemen and gentlemen flocking into cities, and neglecting to improve their estates, to which many of them, within these few years, have paid great attention. This was, indeed, a very rational and agreeable amusement : But now, trusting the most of their business to factors, many of whom are very ignorant of country affairs, they amuse themselves with the fashionable diversions of the times, especially gambling ; which engrosses the greatest part of their attention, so that they have no time to spare for the good of their country, or even their own interest, which must ultimately be connected with it. Instead of this, it is too common for them to depopulate the country, by setting too large farms, and sheep-walks ; so that many families, whose progenitors have lived some hundreds of years in one place,

place, are obliged, either to go to great cities, or to leave the kingdom altogether.

Every man has his hobby-horse, to which every other thing must yield: But it is a great happiness when mens minds take a turn to study their own interest, and the good of their country at the same time. It is a good motto, and always to be kept in mind:

Non nobis solum nati sumus.

Which is translated: "Man is not born for himself."

S E C T I O N IV.

Why Farmers are not enriched in proportion to the increased Price of Provisions.

IN searching for the causes why farmers are not enriched, in proportion to the increased price of provisions, we shall be at little loss to fix on some of those methods which modern farmers have looked upon to be improvements.

It is too much the custom, particularly in agriculture, for people to look only to what will produce immediate profit and advantage; without attending to the certain and obvious consequences in future crops. Hence, in some places, too much is laid out in corn-crops, and too little in grass, because from thence the farmer thinks he derives immediate advantage. In other places, the ground is almost all laid out in grass, because there they imagine that grass farms turn to the
K greatest

greatest profit. In others, again, the soil is wasted by the continual use of lime and marl in great quantities, because these substances are found to produce great crops for a few years; and it is vainly hoped that the ground can continue to do so perpetually, without being sown with grass. Lime and marl are excellent for improvement, when followed with dung, and thrown into grass; but, by constant cropping, exhaust the soil so much, that it will bear but scanty crops of either corn or grass. This shews the necessity of half corn and half grass.

When customs of this kind are arrived at any considerable height, the natural consequence must be, that the ground being unable to produce a sufficient crop, the farmer cannot pay his rent; and this added to the avidity of some landholders in raising their rents to the utmost, produces numerous failures in different parts of the country. These failures, again, prevent the ground from being properly improved; and thus the malady, once begun, necessarily increases, and every year the farm must decline.

It is evident, indeed, that no farm can be improved without expending a considerable
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sum of money at first, and also incurring an annual expence to keep it in that order: And unless a farmer has a command of money, no improvement can be made.

It must also be remarked, that no farm can be kept in order without a part of grass; and without money to buy cattle, the farmer cannot reap any benefit. Along with this, however, we must take notice, that possibly many farmers may trust too much to servants; the consequences of which are sufficiently obvious.

Among the causes of the scarcity of money among farmers, we must not forget to enumerate the enormous load of national debt. By the accumulation of this, the greater part of the money in the kingdom has been deposited in the hands of government; and the high interest given by those in power, superior to what is allowed to be received from any private person, still encourages the monied men to deposit their cash in the hands of government, rather than in those of farmers, or any private persons. Thus the farmers being deprived of their usual resources, necessary for keeping their credit in some cases, squeezed in too many instances, by
some

some avaricious landlords, and being likewise allowed too short tacks, become at last unable to pay their rents.

The general cry at present is, that farming is a losing game; so that few people of property now chuse to embark in it, and fewer chuse to risk their money by lending it to a farmer.

And perhaps, in some cases, by giving into the general vice of the country, too expensive a mode of living, it is impossible but many failures must happen; so that things proceeding in this manner for some time, the produce of the country in general must be affected in the most grievous and alarming manner.

Some farmers often hurt themselves, partly from ignorance and self-conceit, by not having a proper rotation of crops of corn and grass: Sometimes trying experiments that turn out to their disadvantage; many hurting themselves during the last three or four years of the lease, by overcropping, and thus ruin the soil; so that it will perhaps take ten years to bring it into the same condition it was before. This is injuring the landlord, and the nation in general; and doing no good
to

to the farmer, and only tends to indulge a little resentment, in order to hurt the incoming tenants.

The following quotation from Marshall's Rural Economy, may tend to illustrate the preceding observations.

P. 102. " Minute 58. January 29. In a conversation to-day with two of the first farmers in the county, a comparison between the present times, and those from fifteen to twenty years ago, became the subject.

" The price of barley was then, from five shillings to seven shillings a coomb; of wheat, from ten shillings to fourteen shillings; and beef three shillings and sixpence a stone. Now, barley is eight shillings, wheat twenty-two shillings, and beef four shillings, or four shillings and sixpence: Yet, in those days, farmers had plenty of money, and actually increased in riches; whereas, now, they are moneyless, and are every year sinking in poverty.

" To explain this paradox seemed difficult; the price of day-labour is somewhat decreased; servants wages the same now as then; house-keeping somewhat more expensive

“ penfive as to the price of its particular ar-
 “ ticles, but, upon the whole, it is not more
 “ fo ; for farmers, principal farmers, now
 “ keep lefs company than they did in thofe
 “ times. One of them obferved, that he
 “ pays the fame price for a coat, and the
 “ fame for a fhirt, he did formerly ; and as
 “ to market, and other perfonal expences, he
 “ is clear, that among capital farmers, they
 “ are lefs now than they were then. The
 “ poors-rate, it is true, falls heavy at prefent ;
 “ but he fays, that he pays only fourteen
 “ pounds now, for what he then paid ten
 “ pounds ; this, therefore, is not of material
 “ confequence : And this excellent husband-
 “ man, fenfible and well-informed as he is,
 “ feemed willing to affign the caufe to fome
 “ inexplicable hidden mystery.

“ At length, however, he produced an
 “ idea, which goes a great way towards ex-
 “ plaining the apparent riches of former, and
 “ the apparent poverty of the prefent times.

“ In every corner there are monied men.
 “ Formerly they diffufed their riches through
 “ the neighbourhood they lived in. It was
 “ no uncommon circumftance for a farmer
 “ even to be afked to take money ; whereas
 “ now,

“ now, through a want of private credit, and
 “ monied faith between man and man, and
 “ still more to the present high rate of inte-
 “ rest to be made on government-security,
 “ the monies which were dispersed in the
 “ country among farmers and tradesmen are
 “ now all called in.

“ This explains very fully the apparent
 “ riches of former times, and the apparent
 “ poverty of the present ; but it does not ex-
 “ plain why farmers formerly grew rich, but
 “ now grow poor.

“ The late rise of rents at once fully deve-
 “ loped the whole mystery. For although
 “ the usurer’s money might assist the farmer
 “ in purchasing stock, &c. to an advantage;
 “ yet this advantage was in great measure
 “ cancelled by the interest which he had an-
 “ nually to pay for it; whereas the money
 “ arising from the comparative lowness of
 “ rent, required neither interest nor even
 “ principal to be repaid.

“ Thus, supposing farms to be raised thir-
 “ ty per cent. within the last fifteen or twen-
 “ ty years; and supposing, that among
 “ middling farmers, the rise in the poors-
 “ rates, and the extra expence of house-
 “ keeping,

“ keeping, is adequate to the advance of
 “ produce; the farmer, who just now makes
 “ ends meet on a farm of one hundred and
 “ thirty pounds a year, had formerly a sur-
 “ plus of thirty pounds left in his pocket to
 “ buy stock, &c. at the best market.

“ This, even the second year of his lease,
 “ he found of great advantage; but the third
 “ year, the thirty became sixty; the fourth,
 “ ninety, or perhaps one hundred pounds:
 “ For the interest, or a proper management
 “ of the money, had increased his stock; so
 “ that by interest upon interest, or by other
 “ advantages made of the money, a careful
 “ industrious, fortunate man found himself,
 “ at the end of his twenty-one year’s lease,
 “ to be worth eight hundred or one thou-
 “ sand pounds; and consequently got, very
 “ deservedly, the name of being a rich far-
 “ mer.

“ But the case of the man who now takes
 “ a farm of a hundred and thirty pounds a
 “ year, is very different.

“ Let us suppose him to have a capital just
 “ sufficient to stock it, and help him through
 “ the extra expences of the first year.

“ His crops turn out tolerably, and hav-
 “ ing

“ ing common good luck with live stock, the
 “ neat produce of his farm, just clears its
 “ expences, buys him a new coat, and pays
 “ his landlord : But this done, he finds him-
 “ self without a fixpence left in his pocket
 “ for manure, or to go to a cheap market
 “ with.

“ This however is not all. In the course
 “ of the year he loses a cow, perhaps a horse.
 “ What is to be done? He is penniless, and
 “ cannot borrow a shilling in the whole
 “ country. Why, he must either do with-
 “ out, to the great prejudice of his farm, or
 “ sell some other part of his stock to replace
 “ them with.

“ The next year, his wheat, or his turnip
 “ crop fails him. He has not a shilling be-
 “ fore-hand to carry him over the difficulty;
 “ he consequently becomes in arrear with
 “ his landlord; his spirits are broken; his
 “ land not only wants manure, but even la-
 “ bour and teathe; for he is glad to sell his
 “ bullocks before Christmas, to keep his
 “ landlord in temper. The consequence
 “ need not be traced.

“ Thus it appears, that the poverty of
 “ present farmers, more particularly of
 “ middling

“ middling and small farmers, results, in
 “ some measure, from an advance in the ex-
 “ pences of house-keeping, and an advance
 “ in the parish rates ; but principally, from
 “ the present scarcity of money, and from
 “ the late rise of rents.”

These reasons may be very just : But another cause must also be assigned for the present poverty of the farmers. The produce of Norfolk is on the decline. We have already cited Mr Marshall himself, as an evidence of this ; and have proved, that the diminution of the produce is owing to their following an improper mode of cultivation.

It may also be added, That lands newly taken from sheep-walks, and new marled, which was the case in some parts of Norfolk twenty years ago, will, for a few years at first, produce more than they will do afterwards ; especially if not sown with grass seeds, and allowed to lie for some years. Light soils, such as the most of this county is, may be much hurt, if not entirely ruined, by being kept constantly in corn.

I am also clearly of opinion, that turnips, if not eaten where they grow, are an exhausting crop. Now, as great quantities of turnips

nips are sown there, and very little grafs, the country must gradually be ruined. And if its improvement should hereafter be attempted, it will be more difficult and expensive to bring it into good order than it was at first. My opinion on this subject is confirmed by Mr Batchelor. Vide Marshall,

P. 273. " Minute 118. Mr Batchelor of
 " Bradstone, (a sensible intelligent farmer,
 " at whose house I slept), says, that twenty
 " or thirty years ago, he never could get
 " stock enough for his turnips. He has fi-
 " nished forty or fifty bullocks in a year;
 " now he does not know how to buy few e-
 " nough, and does not finish more than
 " twenty or thirty: The roots do not come
 " to any size, and have no " tack" or proof
 " in them."

Mr Marshall also observes, vol. 1. p. 7. That some gentlemen now will grant only a seven year's lease; which must prevent any new improvement, and consequently, ruin the soil, and diminish the produce.

Besides these causes already enumerated, there are, however, others by which agriculture is either directly or indirectly injured. It is not, at first view, easy to conceive how
 much

much the increase of cities and great towns affects farming; but this evidently leaves the country in a manner totally destitute of gentlemen: Hence the servants wages, at least in Scotland, is increased double of what they were thirty years past; and the price of every article the farmer has to purchase is also increased; the country is deprived of that share of the circulation of cash which it ought to have; and the evil is particularly increased by that intolerable rage for building, which has so long prevailed. Thus the cash is made chiefly to circulate among people useless in a great measure to agriculture; for great quantities of money are sent into foreign countries for wood and iron, which are estimated by builders to be near two-thirds of the expence of a house. Or if the landholder should not give into the common madness of the times, by building a large house, he will deposit his money in the hands of a trader, manufacturer, or any where; rather than in those of a farmer; and other persons of inferior rank never fail to manifest the same dispositions.

Another cause why farmers do not grow rich, is owing to some taking large farms
too

too dear, in an unimproved state, and for which they have not a sufficient capital to manure and improve.

By these means they are ever pinched for money, and constantly hurried with the ploughing, not having sufficient strength of cattle to labour the farm in the proper season. This, for the most part, makes the time of sowing very late, and the proper season is often missed: Of course, the time of reaping becomes late also. Hence they often lose a great part of the crop; as, by being so late, it is frequently shaken, and broken with the winds, and hurt by early frosts.

It is in general the case with most farmers in Scotland, and some parts of England, that they sow too late in the season. It would be much for their interest to sow early, whenever the season will permit, and likewise to sow all early corns wherever the soil is rich.

It would be much for the interest of many farmers, that their farms were only the one half number of acres; or at least, that they would only sow the one half of their farm: For they would find it more for their profit to have one acre properly ploughed, and sown
in

in season, and sufficiently manured, than three or four acres in the way they often take.

Whenever a farmer is in such a situation, as that his farm masters him, being obliged to plough at all seasons wet and dry, in order to sow what he intends, he must be sure to lose. When the ground is wet, it would be for his interest that his men and horses were idle. For wet ploughing and sowing, even where the ground is rich and in good order, hurts it very much; and some places will not yield half the crop of the ground ploughed dry. This is not adverted to by the generality of farmers as it ought to be. Wherever wet ploughing and late sowing is practised, it may justly be said to be one cause why they do not make rich, which is too much the case with most farmers. Every year's experience shews this.

S E C T I O N V.

What is the reason that provisions are so high, and seem to be every year increasing in price, notwithstanding so many great improvements said to be made in agriculture in Britain?

ONE very great cause of the dearth of provisions is importation; nor can cheapness be expected while such a practice is continued.

The farm produces in proportion to the expence laid out for improvements, manure, &c. But if the means of improvement be taken away from the farmer, by sending the money out of our own country into others, how can he improve?

Exportation must always be a principal cause of cheapness, because it brings in large sums to the farmer, which enable him to purchase sufficient quantities of manure, and likewise

likewise to keep a large stock of cattle, not only for labour, but for fattening.

The Turks at one time prohibited exportation; the consequence of which was, that a famine took place a few years after, in which many thousands perished.

Add to this, that when corns are imported, the freight, the merchant's profit, and land carriage, often amount to more than the original value of the commodity.

The great advantages resulting from the exportation of grain have long been known. Government formerly endeavoured to encourage it; and while the execution of the plan was not obstructed by the folly of those chiefly concerned, the consequences were, that the nation enjoyed plenty of provisions, and at a low price. But unhappily, the avarice of the farmers, merchants, and landholders, with some other concurring circumstances, frustrated the intentions of government. I cannot explain this matter better, than is done by Mr Donaldson. Vide Letters, p. 86.

“ Whoever suggested giving a bounty on
 “ the exportation of corn, was a true friend
 “ to his country. But I am afraid most of
 “ those

“ those who concurred in the motion, had
 “ not the same patriotic spirit. They did
 “ not behold it in that extensive, generous
 “ view, which opened upon the mind of the
 “ person who proposed it. I mention my
 “ apprehension with more confidence, since
 “ that measure, so obviously calculated for
 “ the public good, proved in the end injuri-
 “ ous to it. The first agitation of this poli-
 “ tical catholicon, gave a jog to the ruling
 “ powers of agriculture, and cultivation be-
 “ gan to move with alacrity; vast abund-
 “ ance of all kinds of grain flowed in upon
 “ the markets; malt was exported to Hol-
 “ land in prodigious quantities; English
 “ wheat drove famine from every country;
 “ and notwithstanding the drain was opened,
 “ still the face of plenty was seen smiling in
 “ every corner of the kingdom. Our neigh-
 “ bours the French, having so ample a mar-
 “ ket to be supplied from, threw every atten-
 “ tion upon the vine-yards and manufacto-
 “ ries; and had public virtue flourished in
 “ England, we should, to this day, have
 “ been the corn-factors and clothiers of Eu-
 “ rope; while France, not feeling the throbs

“ of necessity, would have dozed on in the
 “ same lifeless pursuits. We have let go the
 “ opportunity, and I am afraid we shall find
 “ this axiom true: It is easier to prevent a
 “ mischief than repair it. This was too
 “ great a blessing for an Englishman to be
 “ satisfied long with. The farmer, tempted
 “ by avarice, advanced the price of grain
 “ above the ratio of the demands for the dif-
 “ ferent sorts of it; the factor, unwilling
 “ that industry should run away with all the
 “ advantage the times so favourably offered,
 “ set a profit upon the farmer’s advance;
 “ these people growing so suddenly into
 “ wealth, alarmed the jealousy of the land-
 “ holders; and they, to be upon a par with
 “ both, augmented their rents. This was
 “ the first shock. When soon after, the
 “ commissaries, contractors, and paymas-
 “ ters, from the North and West, together
 “ with the mighty plunderers of the East,
 “ gushing into England with a confluence of
 “ wealth, compleated the ruin of this salu-
 “ tary scheme.”

Another cause of the increasing price of
 provisions, is the vast numbers of monopo-
 polies

polies of all kinds of provisions. A multitude of people make it their only business to buy up provisions; so that many articles may be said, without much exaggeration, to be sold twenty times over before the consumers can buy them; and, unhappily, the number of people thus employed seems still to increase.

In the article of butcher meat, for instance, how many are employed in going from market to market, or fair to fair, buying in one market or fair, and selling in another; taking sometimes a profit of twenty shillings on a cow or small ox: And thus the price at last is raised so high to the farmer who fattens the cattle, that he frequently loses all his grass, or, in other words, has nothing to pay his grass rent: Whereas, were the persons who rear the cattle to sell them again immediately to the grazier, the profit would be divided betwixt the rearer of cattle, the feeder, and consumer; but now it very often happens, that the rearer and feeder of cattle have no profit worth while, but rather loss, and the intermediate dealers run away with all the profit, at the same time that the price is raised very high to the consumer.

Were

Were none allowed to deal in cattle but those who had either grass, or other provender to fatten them with, the profit would be divided betwixt the rearer, feeder, and consumer.

When cattle are selling high, how many thousands are employed in this *couping*, or dealing in cattle? And how often do we see a farmer's servant, as soon as he has been able to save twenty pounds, set up for himself, and commence dealer in cattle, going from fair to fair in quest of gain? This may very properly be called the school of vice. Here they learn to lie, curse and swear, drink, cheat, &c. Some new laws would perhaps be requisite, in order to keep these people within due bounds; or, if the present laws against forestalling and regrating were strictly put in execution, perhaps they might be found sufficient.

How many are there who make a monopoly of some kinds of fish; and rather than sell them at a small profit at home, send them to London? To keep up the market, throw them into the river Thames, when the price is low? But it is evident, that wherever fish
are

are caught, the inhabitants ought first to be served at a reasonable rate, before any exportation takes place.

Whenever there is the smallest appearance of a scarcity of corn, large quantities are bought, and kept up until the price rises. Too many every where make it a principal part of their business, to retail corns grinded into meal: But were the farmer only to sell his corns in the market, the price would be cheaper to the consumer, and the farmer would likewise, for the most part, be a greater gainer, by having the price of the market without any deduction, except the expences of felling.

How often is advantage taken of the farmer's necessity, when obliged to sell for ready money, at the same time that this does not reduce the price to the consumer? But if all articles were sold in a public market, either the farmer, or the consumer has the advantage.

Butter and cheese are other articles of monopoly, and often come through many hands before they reach the consumer; as well as all kinds of poultry, eggs not excepted.

The

The baker's profits on loaf-bread are limited by act of parliament; and why may not the butcher's, and that of those who either buy or import corns to be made into meal? How often do we see those who import corns, in time of scarcity, buy up in one part of the country what they ship off to another; by which means the price is sometimes raised very high. Nay, sometimes those very corns, or others of the same kind, are returned at an advanced price to the place from whence they were originally shipped; and thus an artificial dearth is raised, as was seen in the year 1756. At that time, those who dealt in meal in the North of Scotland, refused 15s. per boll, for that of the crop of 1756; yet a great part of that very meal was afterwards sold in 1757, for 5s. per boll; some of it so much damaged by keeping, and the oatmeal mixed with bear, that they were obliged to throw it on the dunghill.

This shews, that whenever the corn crop is greater than the consumpt, it is beyond the power of any set of people, whether gentlemen, merchants, or farmers, to combine together in such a manner as to raise the price

price of grain too high, above one year. But whenever the corn crop is so scanty, as to be able only to supply the present demand, then the merchant, by shipping it from one port to another, may raise the price very high; and the more so, when a very large quantity is bought up until the prices rise: And thus a number of rich merchants, by combining together, may cause an artificial dearth for some time.

Another reason of the increased price of provisions is, The great increase of money, particularly paper currency.

Besides the money in the hands of noblemen, gentlemen, merchants, and manufacturers, the bank and bankers of England, and those of Scotland, deal annually to an immense sum, producing an artificial circulation, greatly above the real wealth of the inhabitants. This money is mostly given to merchants and manufacturers; a very small part being laid out on improvement of farms, which of itself is enough to raise the price of provisions. The effect of this fictitious wealth is, that luxury has arrived at a very high pitch, and all ranks of people live in a more expensive manner than formerly.

The

The fashionable custom of noblemen, gentlemen, merchants, and even tradesmen having so much of the best ground in Britain laid out for pleasure, in grass and shrubbery, also contributes to raise the price of provisions.

This neither brings profit to themselves, nor any advantage to the nation; but instead of that, is considerably expensive in keeping it clean. The quantity of ground laid out this way in Britain is very considerable; most of which in former years was wont to produce good crops of corn: And this, with the number of acres laid down in grass, and never broke up, must of course very much diminish the produce of the nation.

The Romans were very frugal of their soil at first, when a single acre was found sufficient to maintain a whole family. But when Rome came to its grandeur, luxury increased, and great numbers came also to have their villas and pleasure grounds; and this obliged them to fetch their provisions from different quarters of the globe, which in the end occasioned their ruin. Any person may see, that when provisions are brought from foreign countries, the expence must be very
great

great, and the mother country will be neglected, and of course go to ruin.

Another cause of the dearth of provisions may be, the want of a regular rotation of crops of corn and grass, with a fallow.

Thus many farms are constantly on the decline, by continual cropping with corn without grass. In other places, too much grass, and too little corn, has the same effect of diminishing the due quantity of national produce.

The attempts of many to improve new soil, and giving it over before it is half finished, do the same; though this last may be owing in some measure to want of money, knowledge, or patience.

To all which we may add, the many failures of farmers in different places, owing to the land being too high rented in its unimproved state, as well as other causes. And we may lay it down as an indisputable maxim, That when a farmer fails, the produce of the farm is as certainly at that time on the decline.

The very great increase of cities and large towns, as it may be considered as one of the principal causes of the decline of agriculture,

so it undoubtedly is a very great cause of the increase in the price of provisions.

Let us consider only how many idle horses, dogs, cats, rats, &c. &c. are maintained in consequence of the augmentation of these cities; at the same time, that horses in cities are maintained at three times the expence of those employed in cultivating the ground in the country: And it may be truly said, that within these few years, the consumpt of corn and hay for horses, has increased twenty times what it was formerly. This is certainly a great encouragement to farming; but is mentioned here only as one of the causes of the dearness of provisions.

The general fact, that a great proportion of land is employed in raising the food of horses, is obvious to every one. Yet few, perhaps, would suppose, that the maintenance of a horse is four times as great as that of a man.

The following account, which I received some years ago from a nobleman's steward in Scotland, will throw considerable light on this subject. The whole of the bread and beer used in this nobleman's family, was baked and brewed in the house. Forty bolls
of

of wheat and forty bolls of malt served the whole family a year. But the reader will perhaps be astonished to learn, as I confess I was, at first hearing it, that the family horses, and those of visitors, consumed above three hundred bolls of oats per annum. Nor did the nobleman keep a large stud. The persons of the family who ate daily in the house were more numerous than the horses; besides which, a considerable number of workmen and poor people were daily supplied with bread and drink.

In reflecting afterwards upon the above relation, I was fully convinced of its truth; for it may easily be proved, that all carriage horses cost their owners as much as would maintain four ploughmen at least, according to the manner in which labouring people live in Scotland. Each horse will eat a peck of oats per day, besides hay. Now, I gave my ploughmen two pecks of meal per week, and a Scots pint of milk each day, or six pence a week. Nor was this an insufficient allowance: For although the men had nothing to live on but the meal and milk, and perhaps did not eat a pound of flesh or fish in a year, yet they looked well, and were fully capable
of

of performing their labour. Nay, they commonly saved a part of their meal, which they fold.

Again, allowing four feeds per day to a horse, the amount in a year is twenty-two bolls, thirteen pecks. This is the whole produce of four acres of good ground, at five and a half bolls, or four quarters for each acre; and which is much more than the average of any county.

To this must be added, at least one stone of hay per day, for each horse; which is the product of two acres, at one hundred and eighty-two stone, or one ton and three-fourths for each acre, and which is about the general average of hay crops in good seasons.

I have known my plow-horses eat two stone of hay, and two feeds of oats per day; so that, in fact, the keeping of farm horses, when fed with corn and hay, is as expensive as that of carriage horses.

From the preceding calculation it appears, that to support a carriage horse, the produce of six acres of good ground is required. This extent of land, even by the common mode of cultivation, will maintain four men; but if laboured with the spade would support twelve,

Now,

Now, as the population of any country can only increase in proportion to the means of subsistence which it possesses, it evidently appears, that to multiply the breed of horses, is to destroy the human race; and, that whoever keeps an unnecessary horse, is sacrificing four of his own species upon the altar of vanity.

The vast quantities of grain used in distillation cannot but be thought to affect the price of provisions very considerably.

The quantity of grain distilled in Scotland in 1787, is asserted to have been almost equal to the whole that was produced in the country; and as it may be justly said, that one third of all the barley in Britain is distilled, we cannot avoid perceiving how much the price of every kind of provision must thereby be augmented: especially, when to this is added, the very advanced price of ploughing, both with regard to men and cattle; the oxen being every where laid aside, and horses, much more expensive animals, used in their stead. It is likewise obvious, that the custom of disusing oxen for the plough must have a considerable effect in augmenting the price of butchers meat.

That

That the price of butcher meat is considerably advanced, both by the cause just now mentioned, and by the unnecessary increase of carriage and riding horses, is supported by the following observations of Mr Donaldson. Vid. Letters, p. 143.

“ It has been a puzzling proposition to
 “ many, why the price of butcher’s meat
 “ should advance with the price of bread.
 “ For, say they, if the high price of bread
 “ proceeds from a less quantity of corn being
 “ sown, butchers meat would necessarily fall,
 “ from the arable land being laid down with
 “ feeds for the maintenance of cattle. But
 “ when they consider the unthrifty breed of
 “ horses, so necessary to furnish the multi-
 “ plicity of post chaises, the mischievous in-
 “ crease of stage coaches, the extravagant
 “ number of private ones, the vanity of
 “ young men of fortune, who must have
 “ their stud, the impudence of young men of
 “ no fortune, who will have their gelding, to-
 “ gether with demands from abroad, the dif-
 “ ficulty of resolving the cause must vanish;
 “ as they clearly see, that the pastures which
 “ formerly fed such herds of beasts, and
 “ flocks of sheep, are now appropriated for
 “ the

“ the run of brood mares, and colts; and
“ that the quantity of oats so necessary to
“ supply the consumption of this monstrous
“ increase of horses, interferes with the
“ growth of other grain allotted for the con-
“ sumption of men.

“ Substituting horses for steers in plough-
“ ing and waining, is a material loss to the
“ public in the article of meat; for it is well
“ known, oxen spread, and increase conside-
“ rably in weight, from labour; besides,
“ they get into flesh with more ease, and less
“ expence, by feeding kinder.”

Idleness is a principal reason, why the
prices of provisions are every year increasing.

A slothful man is brother to the waster.

Man is naturally active and restless; and
when he is not usefully employed, he rarely
avoids the doing of hurt to himself, or mis-
chief to others.

Idleness teems with vice, and brings forth
distress and misery, which are the unavoid-
able and certain effects of vice; whereas
wealth and numbers, the chief strength and
happiness of a nation, are increased by in-
dustry.

Idle subjects are poor and indigent, and
must

must be maintained at the expence of others, either by a base and servile dependence, or by theft, robbery, or begging.

It is easy to perceive, what effects idleness produces in the minds of persons of all ranks; but the happiness of individuals, as well as that of a nation, depends upon a diligent application to business.

Persons of all ranks employ too much time on expensive pleasures, or fruitless and unprofitable diversions. The management of private affairs is neglected; and through heedless inattention, and want of oeconomy, many persons of easy fortunes are brought into difficulties, and reduced to low condition.

The increasing number of public diversions and amusements not only waste much time, but the expence attending them is very great; so that numbers neglect their own interest by throwing away that money which ought to maintain their families, to encourage a profligate and dissipated set of men, that are hurtful to society, and who corrupt the morals of youth.

In all public diversions which call out a considerable number of people, such as horse-

races,

faces, &c. the loss sustained to the public may be perhaps several thousand pounds each day. Now, although nature furnishes us abundantly with materials, yet our own industry and labour is required to fit them for our use; and whoever labours not for his own bread, must eat the bread of others, and thereby unjustly invades his neighbour's property.

In fine, idleness prevents great men from adverting to their own interest, trusting the management of their concerns to others; whereby their annual expences are greatly increased, their estates neglected, and little improvements made; which if they personally attended to, might in a short time, be so improved, as to produce above double the present crops. Whereas many estates, instead of being improved, are neglected, and suffered to go to ruin; every year turning worse and worse.

The lower class of people never fail to imitate the example of their superiors. By contracting a habit of idleness, they not only spend treble the sum which they would do, (perhaps as much in one day as they can earn in ten), when employed in some useful business,

ness, particularly in agriculture; but the loss which the public sustains must be very great, as it tends so much to increase the price of provisions.

The inhabitants of any country, when profitably employed, are its greatest strength and wealth; but when idle, its greatest weakness and cause of poverty.

Whenever the ground is neglected to be properly laboured, not producing a sufficiency to supply the demand of the inhabitants, the prices of provisions, of course, must rise; whereas, were the generality of farmers to double their diligence, or employ a greater number of hands, the prices would soon be reduced.

It is owing to indolence and inactivity, that many farms are, in place of being improved, left to go to ruin. The same indolent spirit in many farmers, prevents them from improving their waste grounds.

Idleness of all ranks of persons in every profession, is a great hurt to the public in general. The labour of mankind may be compared to a treasure daily taken out of the bowels of the earth; and, when neglected, every

every day's labour is lost, and cannot be recalled.

Most of the particulars stated in the fourth section, and given as reasons why the farmers do not make rich, may, with equal propriety, be adduced as reasons why the prices of provisions are constantly on the increase, And, that the reader may be the more fully enabled to keep this in his eye, we shall here recapitulate, in few words, the general causes already assigned for both; and these shall now be arranged, though in a manner somewhat different from the order in which they occur in the essays, according to the importance of the causes themselves, and as they may be thought to have more or less influence in producing the general effect.

1. Importation, and consequently no exportation.

2. The want of a regular system of corn and grass, with a fallow.

3. The rents of the farms being too high in their unimproved state.

4. Too short tacks or leases, which prevent any improvement being made on the farm.

5. The general run of farmers having too much

much land for their stock, and too much in tillage.

6. The universal scarcity of money among farmers, and their want of credit, which prevents them from making the necessary improvements.

7. The universal disuse of oxen in ploughing, and the introducing of horses in their stead.

8. The improper use of lime and marl, by taking too many crops before sowing into grass, which exhausts the soil, in many places to a *caput mortuum*.

9. Plowing when the farm is wet, which raises but a poor crop, although the soil be rich.

10. The general practice of farmers sowing too late in the season, which makes a late harvest, of course precarious, and often bad crops.

11. The great number of monopolies of all kinds of provisions.

12. The great increase of money, particularly paper currency, and the vast sums brought home by those who make fortunes in the East and West Indies.

13. The

13. The vast quantities of grain used in distillation.

14. The very great increase of cities and large towns.

15. The great number of farmers failing in most parts of the country.

16. Lastly, Idleness is a principal cause that the price of provisions is every year increasing,

From a consideration of all these particulars, it must be evident how much it is the interest of the inhabitants of Great Britain, not only to improve those grounds which are already cultivated, but likewise to cultivate those which are now lying waste.

The crops for several years past have been but indifferent, owing to the bad seasons. If we were better ourselves, the seasons would be better also. It is the farmer's business to use every lawful mean to improve his farm; but after all he can do, it depends entirely upon the pleasure of the Almighty Sovereign of the universe in favouring us with fruitful seasons; as,

“ Except

- " Except the Lord do build the house,
 " The builders lose their pain ;
" Except the Lord the city keep,
 " The watchmen watch in vain.

S E C T I O N VI.

What are the most probable means of reducing the price of provisions, so as to serve all traders and manufacturers at a much cheaper rate than at present, and likewise to be able to export great quantities annually?

FROM the foregoing view of the state of British agriculture, it is impossible to doubt, that the produce of this island, whatever we may estimate it at present, might, in less than forty years, be encreased to more than ten times its present value.

Let any person, in the least conversant with the present state of the country, consider how very small a part is improved in proportion to what is capable of being so, and he must instantly assent to the following proposition, which, in the course of conversation, I have often asserted, viz. That the produce of Britain

tain might easily be increased to the value of 1000 millions annually.

This assertion has been thought altogether incredible, and beyond bounds extravagant. Nevertheless, when I have asked, how much the proportion of the ground in Britain really improved bore to that which was capable of improvement? it has been as constantly acknowledged, that the proportion of the former was not one to 100 of the latter. This, however, is granting me ten times more than I ask; but, at the same time, it shews, how much people are convinced in their own minds of the truth of what is already published to the world in the *Essays on National Improvements*.

Nor can it in the least be doubted, that whoever considers the means pointed out in those essays, will find them fully adequate to the end proposed. But it is too much the case with mankind, to overlook those things which are easy and within their reach, for others more difficult, or perhaps impossible to be attained.

According to the calculations we make of the British produce in its present state, the
value

value of the improvements will be more or more or less. If we suppose it only 100 millions annually, the value must be 1000 millions, when thus encreased; or, if we suppose it 200 millions at present, it is easy to see, that 2000 millions a-year must soon arise from the methods of improvement proposed.

The immensity of the sum is no argument against the possibility of raising it. For when we endeavour to augment the produce of the earth, it is no wonder that we should be astonished at the bounty with which our labour is rewarded by the Author of nature.

Supposing then, the produce of Britain at present to be only one hundred millions, and the consequent improvements to be a thousand; is not this an object of great national concern, now when providence has favoured us with peace? And ought we not then to exert ourselves, every one in his station, to promote this great end? which, if once accomplished, would not only exceed all the profits arising from trade, manufactures, and fisheries, as well as all the improvements that could be reasonably supposed to be made in them; but, instead of hurting these favourite

P

pursuits

pursuits of the nation, would tend greatly to encrease them?

With a great number of people importation is a favourite object; but whoever these are, we do not hesitate in pronouncing them to be enemies to their country. What necessity is there for importation at all, excepting in extraordinary cases? If Britain had her dependence entirely on importation, supposing a famine or scarcity to arise in the neighbouring kingdoms, and it happens to be so this very year, 1787; or which is often the case, our fleets to be detained by contrary winds, perhaps a month or two, or a great part of them shipwrecked; or, in time of war, when grain could with difficulty be brought home, what a deplorable situation must the nation be in. The very freight and the land carriage to different parts of the kingdom, and the merchants profits, would undoubtedly be equal, in many places, to the original cost of the corns.

Why may not our own country be improved to such a degree, as to supersede any occasion for importing the necessaries of life? So far is this from being a difficult matter, that it might evidently be accomplished with
the

the greatest ease. Not only might importation be rendered unnecessary, but great quantities might be exported to other countries.

Let government, or private individuals, take only the 500,000 pounds annually expended on the importation of grain, and lay out that sum for manure, and for improving the soil, the point would be gained in a year or two. How ridiculous is it then in government to give so many hundred thousand pounds for the improvement of foreign colonies, nay, for the improvements in agriculture in foreign countries which we refuse to bestow on our own?

Every one will agree, that cheap provisions is much for the interest of manufacturers and traders. But it is certain, that the price of provisions can never be reduced by importation: Nay, by this means, we not only buy corn at a much dearer rate than it could be raised in our own country, but along with it, are in danger of importing diseases; which was particularly the case in 1782, when more than a million of pounds were given for corns imported. This million and near a half, as was said, together with the L. 600,000 formerly drawn for corns exported,

ed, made the difference of above two millions to Britain ; much of which was said to be of such a bad quality, that those who used it fell into lingering diseases. Such also was the wretched state of the country at that time, that had not peace been concluded, a famine must have ensued, and a great number in all probability would have perished with hunger.

Let us consider, then, what would have been the consequence of employing this sum in a proper manner for the improvement of the ground. We must, then, in ordinary seasons have had a very considerable quantity to export, and, in all probability, the bad crop of 1782 would scarce have been felt. Nor would this have been hurting manufactures in the least. The manufacturers are hurting themselves by encouraging importation ; for it is taking away the very means of improvement, as we know the ground produces in proportion to the manure laid on. But the obvious consequences of the increasing price of provisions, if not remedied in time, must be, that our manufacturers will not be able to sell their goods on the
same

same terms with those of other nations; and hence the trade must be turned out of its natural channel: And when once this happens to be the case, it will undoubtedly, like the course of a river, be a matter of no little difficulty to turn it back again, or perhaps it may never return again to its old course.

The following is a very remarkable instance of trade shifting from one nation to another. Vide Interest of Scotland considered, p. 77.

“ The wool of all the growths of Europe
 “ was, for many ages, bought up and ma-
 “ nufactured by the inhabitants of the Ne-
 “ therlands, by whom Europe was served
 “ with woollen goods. The woollen trade
 “ was first set on foot in England in the
 “ reign of Edward III. but it made small
 “ progress until the time of Philip II. of
 “ Spain, whose yoke became very heavy and
 “ severe. While his subjects groaned under
 “ oppression and tyranny, England had the
 “ happiness to be governed by the wisest ad-
 “ ministration ever nation was blest with.
 “ Numbers of wealthy merchants and ma-
 “ nufacturers fled to England; and it is
 “ computed,

“ computed, that 100,000 families came o-
 “ ver and settled in it at that time. Here
 “ they were kindly received and encourag-
 “ ed. The trade of Europe shifted its abode
 “ with the dealers; and the woolen manu-
 “ facture of England was by these means,
 “ and the aid of public encouragement, car-
 “ ried on, and soon brought to perfection.
 “ They now manufacture not only their own
 “ wool, but also that of Spain, and the best
 “ growths of other countries, and may, in
 “ a great measure, be justly called the mas-
 “ ters of the woolen trade. The Nether-
 “ landers were masters of the linen as well
 “ as the woolen trade; and during these ci-
 “ vil wars, several of their linen manufac-
 “ turers also settled in Britain: And in the
 “ old burghs, the weavers still go under the
 “ denomination of *Brabanders*, from the mas-
 “ ters who taught them the art.”

The best, indeed, the only method of re-
 ducing the price of provisions, is by establish-
 ing an uniform and universal system of agri-
 culture, and giving encouragement to the
 farmer.

The farmer cannot raise large crops, un-
 less

less he has a command of money to improve his land. But if, instead of furnishing him with this so necessary article, every method is taken to distress him, by the landlord raising his rent in the unimproved state of his lands, as well as by the consumer, the consequence must very soon be, that the crop will be constantly on the decline ; and every succeeding year will be worse than the former ; and hence, provisions, instead of being reduced, will still increase in price.

It is, indeed, a certain fact, that when a farmer is not making rich by his farm, nor going on with any improvements ; when he becomes daily more and more straitened ; the farm commonly turns worse every year, even though we should take as the example the best farm in the country.

If it be constantly kept in corn crops, without a sufficient quantity of manure, and a due proportion laid out in grass, it will, in a few years become very poor ; whereas, on the contrary, by a proper rotation of crops of corn and grass, with a fallow, the soil would be enriching every year, and the produce increased.

There

There are, besides, many millions of acres lying waste in commons, muirs, mosses, and morasses, all of which might be improved, and rendered capable of producing either corns or grafs, or both, by methods properly adapted to the nature of each. Nor is the quantity of ground at all inconsiderable that might be gained from the sea, or by banking in large rivers, and draining lochs. Very considerable quantities of the best soil in the kingdom are also at present lying in grafs, seldom or never broke up; and which we cannot but suppose would produce very large crops by proper culture and management. The quantity of the best soil daily thrown into grafs in this manner considerably exceeds what is taken in from the waste grounds, which must, in the same proportion, diminish the corn crops.

Were a number of small villages erected upon every estate, agreeable to the plan proposed of feus, or long leases, every tenant building his own house, (Vide, Plan of villages at the end of this work), it would partly contribute to reduce the price of provisions, and lessen the number of horses. For
one

one man, by adhering to this plan of a regular rotation of crops, having the one half, or two thirds in grass, could labour with the spade ten or fifteen acres each year, and would only need to hire a horse to harrow, carry home the crop, and drive out the dung, The produce would be much more after the spade than after the plough, and cheaper: For when a farmer has only ten or twenty acres cultivated in the present method, the expence for men and horses will almost equal the value of the whole produce; so that those who have only a few acres, are kept constantly poor, and the farm also.

Many of the small farmers are in a worse situation than the day labourers: Whereas, if the villages were properly planned out at first, each house having two and a half acres at least, some five or ten, the feuars might live comfortably, and have many articles, the produce of the farm-garden, to sell.

It is commonly observed, that small tenants sell more poultry and eggs than great farmers.

It may be said, in proportion as the number of villages multiply, the price of provisions

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sions would decrease, and population increase. Indeed, the number cannot be too many, if upon a proper plan.

It would be for the interest of many gentlemen, that half or the whole of their estates were fewed out, or let upon long leases, according to Lord Gardenstone's plan, for one hundred years, and renewed at the expiration of that term, upon paying two years rent.

It is amazing what effect this would have upon mens minds ; how much their industry would be quickened when they reflected that all their improvements would continue with their families for ages.

There is no scheme that ever was yet invented, which will tend to reduce the price of provisions so rapidly, as giving a small portion to every person, nearly in equal proportion to their stock.

This is demonstrated from the practice of the Romans. When their commonwealth was first erected, they enacted a law that no person should have above one acre. Sometime afterwards, that every one should have two acres ; a number of years after, four
acres ;

acres; and at length, seven acres to every citizen without distinction.

Cincinnatus, although so distinguished a character as to be chosen dictator had only seven; and when Rome was in its greatest grandeur, no person was allowed to purchase above five hundred jugera.

It is very remarkable, that about Cato's time, and 150 years after, the wheat was sold only from three shillings and sixpence to ten shillings per quarter.

In the first ages of the empire, the lands were all cultivated by the spade; and many of their generals cultivated their farms with their own hands. It is said, afterwards, the slaves cultivated their lands, and of that kind too that had been stigmatized with marks of infamy for their crimes.

To adopt the above-mentioned scheme of villages, would only be to imitate the antient practice of the Romans; which they found, from the experience of many ages, to tend greatly to the advantage of the commonwealth, and would at this day be equally beneficial to us.

By comparing the crop raised upon each acre, after being laboured with the spade,
with

with the crops produced after the plough culture, would at once prove which was most for the general interest of the nation and individuals; as it is proposed, the same rotation of crops should take place after the spade as after the plough.

Many new discoveries might be made, by making different trials in the drill way, which would employ a whole family, young and old, boys and girls; and this would teach them the rudiments of farming. The seed which would be saved by the drilling, and the profits arising from the extraordinary produce, would do more than pay all the expence of labour.

The price of provisions would be much reduced, if many large farms were divided into small ones.

There ought to be a great number of small farms of two horse or oxen ploughs, few of them less than forty or fifty acres, and those which were less to be laboured with the spade. And perhaps few should be allowed more than three or four ploughs.

Many gentlemen that possess large tracts of land, would find it to be their interest to give the one half of it for nothing to any person,
who

who would engage to improve the other half. They would still be great gainers; for one acre properly improved would be equal in value to ten in its natural state.

These observations evidently prove that the nation in general is essentially injured, if any man has more land in his possession than he can either labour properly himself, or get others to improve.

As a proof of the probability that agriculture might receive considerable improvement, if the above plan of villages were adopted, by the experiments of the feuars, I shall add the following extract from Mr Marshall. The practice of dibbling, an improvement of considerable importance in husbandry, appears to have been invented by a cottager. I think, indeed, the Norfolk scheme is somewhat defective: But of this I shall speak in a future page.

P. 35. " Minute 23. September 12. Mr
 " William Barnard of Bradfield, who was
 " born (and resided until about three years
 " go) at Great Ellingham, near Attleborough,
 " gives the following account of the rise and
 " practice of the dibbling of wheat.

" The dibbling of pease, he says, has been

" a

“ a custom in that part of Norfolk, time im-
 “ memorial; but the practice has not been ex-
 “ tended to wheat above eighteen or twenty
 “ years; nor has been in any degree general
 “ for more than ten years.

“ The practice of dibbling wheat proba-
 “ bly arose in this manner. At Deepham,
 “ an adjoining parish to Ellingham, lived
 “ one James Stone, a labouring man, who
 “ was, in that neighbourhood, a noted dib-
 “ bler of pease, and who cultivated for him-
 “ self a few acres, which he rented with his
 “ cottage. He had three children, who were
 “ as expert at “dropping,” as the father was
 “ at “dabbing;” and having some acre or
 “ two of clover-lay, which came in course
 “ for wheat, he conceived the idea of dib-
 “ bling in the seed; probably thinking, that
 “ he should thereby keep his children from
 “ idleness, and save them, at the same time,
 “ an unexpected supply of bread.

“ He accordingly set about putting his
 “ scheme in execution, and presently brought
 “ his neighbours about him. Some of them
 “ smiled, and others laughed at his experi-
 “ ment. He, nevertheless, proceeded with
 “ his little crops, and finished his patch.

“ The

“ The land being in good condition, and
 “ the work being done in a masterly manner,
 “ the plants came up so strong and beautiful
 “ as to draw the eyes not only of his fellow-
 “ parishioners, but of the whole neighbour-
 “ hood.

“ Mr Barnard well recollects the circum-
 “ stance, for he passed by the close (which
 “ lay by the side of a public road) every day
 “ in his way to and from school; and says,
 “ that he has frequently seen the neighbour-
 “ ing farmers, in their way to market, light
 “ at the gate, and go into the piece, to view
 “ the crop, which was now become popular.

“ At harvest the crop proved extraordina-
 “ rily good; and the dibbling of wheat has,
 “ from that time, been more or less practised
 “ in this circle of the county: The only one
 “ in which the practice is, even yet, become
 “ general among farmers.

“ Enquiring of Mr B. the proportion
 “ which dibbled wheat in that county bears
 “ to the wheat sown broad-cast, he says,
 “ there is as much dibbled as there can be
 “ hands got to put it in; and apprehends
 “ that one half of the wheat about Wynd-
 “ ham and Attleborough is dibbled in; add-
 “ ing.

“ ing, that when wheat is dear, the work
 “ people are engaged some months before-
 “ hand, and frequently when they are paid
 “ off for dibbling peas in March, they are
 “ engaged for the wheat-feed time.

“ Succession. A clover-lay once plowed is
 “ what is generally made use of for dibbling;
 “ it has however been tried with a conside-
 “ rable share of success, on fallow-ground.

“ Manure. The common practice is to
 “ spread the dung, or other manure, pre-
 “ sently before the ground be plowed. Some
 “ lay it on after the seed is in, by way of
 “ top-dressing. But Mr B. is of opinion,
 “ that setting on the manure in July, and
 “ letting it wash into the soil before plowing,
 “ is the most eligible way of manuring for
 “ dibbled wheat.

“ Soil process. If the soil be light, and
 “ the weather dry, the plowman keeps pace
 “ with the dibblers; the holes will not other-
 “ wise stand, the sand running in, and filling
 “ them up. The furrow, provincially, *flags*,
 “ should be cut about ten inches wide, and
 “ be turned over flat and even; and to make
 “ them ly still smoother and firmer, they are
 “ rolled pretty hard before dibbling.

“ The

“ The dibbles made use of in this operation, are of iron. The acting part is an egg-shaped knob of iron or steel, somewhat larger than a pigeon’s egg ; the smaller end forms the point of the dibble, whilst from the larger rises a string of iron, about half an inch square, and two feet and a half long. The head of it is received into a cross piece of wood, (resembling the crutch of a spade or shovel) which forms the handle.

“ The dibbler makes use of two of these tools, one in each hand ; and, bending over them, walks backward upon the flags, making two rows of holes in each. The rows are usually made about four inches apart, and the distance in the rows from two and a half to three inches ; namely, four holes in each length of the foot of the dibbler.

“ The great art in making the holes lies in leaving them smooth and firm on the sides, so that the loose mould do not run in to fill them up before the seeds are deposited.

“ This is done by a circular motion of the hand and wrist, which makes a semi-revolution

“ lution every stroke; the circular motion
 “ beginning as the bit enters, and continues
 “ until it is clearly disengaged from the
 “ mould. The dibbles must come out clean,
 “ and wear bright, or the operation is not
 “ perfect.

“ Another difficulty in dibbling is to make
 “ the holes at equal distances; more especially,
 “ to keep the two rows straight and
 “ parallel with each other: For the dibbles
 “ being two distinct instruments, it requires
 “ some practice to guide them with precision,
 “ so as to pierce the flag in the exact
 “ point required. To remedy this, couples
 “ have been invented to keep the dibbles at
 “ a given distance; but this renders the instrument
 “ complex, and prevents the learner from ever
 “ being able to use them singly.
 “ A man must be awkward indeed, if he does
 “ not in a few days, without this incumbrance,
 “ make himself a tolerable master of
 “ dibbling.

“ A middling workman will make two
 “ motions or four holes in a second.

“ One dibbler employs three droppers;
 “ therefore one man and three children are
 “ called a set. Each dibbler takes three flags,
 “ which

“ which he performs upon by stages thus :
 “ He first takes an outside flag, and having
 “ gone some yards upon that, he returns, not
 “ upon the next flag, but upon the other
 “ outside flag of the three, and then finishes
 “ his stage by taking the middle one. This
 “ is done to keep his three droppers fully
 “ employed, and at the same time to prevent
 “ his filling up the holes with his feet before
 “ the seeds are deposited. Were he to carry
 “ but one flag with him, the droppers would
 “ have to pass each other repeatedly, and
 “ have three times the ground to walk over ;
 “ whereas, by the above contrivance, they
 “ are always uniformly progressive, and each
 “ child finishes its own flag.

“ The droppers keep up with their dibbler,
 “ putting two or three grains of wheat in
 “ each hole, (but of pease only one). The
 “ girls carry the seed in their aprons, the
 “ boys in their hats, or other contrivance.
 “ Out of those they take about half a hand-
 “ ful, and deliver the seed into the holes
 “ through an aperture made between the first
 “ and second fingers. Much time and pa-
 “ tience is necessary to teach a child to per-
 “ form

“ form this petty business with propriety and
 “ dispatch.

“ The present price of dibbling a free light
 “ soil is nine shillings an acre, and beer. It
 “ formerly was half a guinea. If the soil be
 “ stiff or stony, it is now worth more than
 “ that money. The dibbler is a sort of mas-
 “ ter of his set; for if he has not children of
 “ his own, he hires his droppers, giving
 “ them sixpence a-day each if expert hands,
 “ or three pence a-day if learners: two of
 “ them being employed on one flag, each
 “ taking one row of holes; so that he pays
 “ for dropping, three pence a-day for each
 “ row of holes. An expert dibbler will *hole*
 “ half an acre a-day, which, at nine shillings,
 “ is four and sixpence, out of which he pays
 “ one shilling and sixpence to his droppers.
 “ But one third of an acre is reckoned a fair-
 “ day's work; which at nine shillings an
 “ acre, is three shillings; out of which pay-
 “ ing one shilling and sixpence, he has one
 “ shilling and sixpence left for his own day's
 “ work.

“ Quantity of feed. One bushel to six
 “ pecks an acre; and if the flags crack much
 “ in plowing, some throw on half a peck, or

“ a

“ a peck an acre, broad-cast, before rolling.
 “ ing.

“ Covering the feed. This is usually done
 “ by going twice in a place with a bush-har-
 “ row, made by drawing thorns into a gate
 “ or a large hurdle. Either of these, how-
 “ ever, Mr B. says, and with reason, makes
 “ too large an implement: For in so large a
 “ space as this covers at once, there will be
 “ protuberances which it will lay hold of too
 “ much, and probably pull up, and hollows
 “ which it will wholly miss. He has usually
 “ preferred a waggon-ladder, which does not
 “ cover more than four or five fags at once;
 “ and to finish this business more completely,
 “ he always carries a sort of broom in his
 “ own hand, when overlooking the work
 “ people, in order to cover more effectually
 “ any part which may be partially missed.

“ The advantages held out. There is a
 “ saving of about a bushel and a half of seed;
 “ which, when wheat is six shillings or up-
 “ wards, is alone equivalent to the extra ex-
 “ pence of dibbling.

“ The rolling and treading is esteemed
 “ highly serviceable to the light lands of this
 “ country.

“ The

“ The edges of the flags being intimately
 “ united by the rolling and trampling, and
 “ the remaining fissures being filled up by
 “ the harrow, the grasses are thereby thought
 “ to be kept under ; and should seed-weeds
 “ appear in the spring, the hoe has
 “ free admission between double row and
 “ double row to extirpate them ; an operation,
 “ however, which I understand seldom
 “ takes place.

“ The seed being wholly buried in the body
 “ of the flag, there is no “ under-corn ;”
 “ the plants are uniformly vigorous, the
 “ straw, collectively, is consequently stouter,
 “ and the grain more even, than that which
 “ is usually produced from sowing the seed
 “ broad-cast over the rough flag. For, in
 “ this case, part of the seed falls through between
 “ the flags, and being there too deeply
 “ buried by the harrows, the young plants
 “ are longer in reaching the surface than are
 “ those from the seed, which happens to fall
 “ in a more favourable situation ; and which
 “ thereby gain an ascendancy they never
 “ lose. Hence a number of underling plants,
 “ and hence the small shrivelled grains, which
 “ render

“ render the sample unfightly, and unsale-
 “ able.

“ Another good effect remains to be no-
 “ ticed, the employment of the poor: And
 “ whether we view this in a moral, a politi-
 “ cal, or a private point of view, it is equally
 “ desirable. For the poor’s rates of a coun-
 “ try village fall principally on the farmer;
 “ and if he does not employ the poor, he
 “ must support them in idleness, more espe-
 “ cially children. Mr B. says, that in the
 “ circle above-mentioned, wheat seed-time
 “ is considered, by the poor man, as a second
 “ harvest.”

To do justice to dibbled wheat, it ought to be dibbled in straight lines, so as the hoe may pass between the rows. A hoe made of a triangular form, and somewhat rising in the middle, would not only cut the weeds or grass, but, at the same time, throw the earth to the roots of the wheat, which would make it spread off the root.

Laying three chalders of hot powdered lime on each acre, with the dung, would help to rot the grass, and make the soil free and tender; but dung alone encourages the
 growth

growth of the grafs. It would be better to lay on the dung for a peafe crop, and a wheat crop to fucceed; the ground to be plowed, harrowed, and rolled before drilling: Or, plowing the grafs ground in dry weather, fome weeks before fowing or drilling, might help to kill the grafs. It is to be fupposed, that dibbled wheat would anfwer better upon fallow than upon grafs.

What is faid in National Improvements, p. 386, concerning the manner of drilling, would anfwer equally well with dibbling, and perhaps better, and much cheaper. What Mr Marfhall fays about dibbling, proves that the mode of drilling here alluded to, may be reduced to practice with every fpecies of grain.

It is evident, that were the proper rotation of crops to be obferved, and the wafte grounds to be brought in, the produce of this ifland muft not only be increafed in fuch a manner, as amply to fupply the prefent number of inhabitants at a very cheap rate, but likewife to afford immense quantities for exportation.

When Britain was fo improved as to have
large

large quantities of corn to export, we might then attempt to raise as much flax and hemp as the nation needed. Nor would the effecting of this happy change be attended with great difficulty, were all ranks of men heartily to concur in pursuing the proper means for its accomplishment.

The greatest obstacle, however, lies with the people themselves. It must be owned to be a difficult matter to cause a whole nation to adopt one scheme of rotation of crops; but the greatest difficulty would be, to convince the farmers, who are, in general, wedded to their own old customs, that they are in the wrong. And, indeed, so great is this difficulty, that I apprehend it could scarcely be overcome without the interference of government.

Would the British government adopt a regular plan, capable of being successfully reduced to practice throughout the whole nation, such as has been already mentioned, and to give premiums to the farmers who raised the greatest crops; would the noblemen and gentlemen adopt the same, not only recommending it to their tenants, but likewise raising subscriptions to encourage them; and if

a number of the principal farmers in each county were to enter into it also, it would undoubtedly influence the generality to follow their example; especially as the benefits arising from such a scheme must very soon appear.

That it is the primary interest of Britain to give encouragement to improvements in agriculture, we hope will now appear clearly evident to every disinterested person, who will only take the trouble to consider what is the present produce of Great Britain, and how much that produce might be increased, if only a part of the best soils, now lying waste, were improved; and what great improvements could be made upon those farms said to be improved, by having a regular rotation of crops of corn and grass; taking care neither to have too much in the one, nor too much in the other.

The mere article of saving seed would astonish every one, were it to be put in practice as recommended in the National Improvements; besides, that by this very saving, the annual produce would be considerably increased.

How

How much the whole product of Britain might, on this plan, be augmented, we must leave to be determined by every one's judgement or calculation.

It is universally acknowledged, that there is not one acre in an hundred improved as it ought to be, of the ground capable of improvement in Britain. This is manifested by the vast number of different schemes of managing almost every farm in each county or shire. Now it is certain, that a great number of these methods used at present are very hurtful to the farmer, the landlord, and the nation in general. But the great difficulty lies in convincing a number of ignorant and conceited farmers that they are wrong, and that it would be greatly for their interests to alter their present modes of cropping: Nor, indeed, would it be much less difficult to convince the landlords, that they are hurting themselves, the farmers, and the nation in general, by the methods they take in letting their farms. But if once a regular plan was fixed upon, and begun to be put in practice, the farmers would soon see it for their interest to continue the scheme, and probably,

bly, the progress might be exceedingly rapid.

A national system in agriculture, so far from hurting either the farmer, the landlord, or the nation in general, will tend greatly to the interest of the whole.

If a national system were once fixed upon, it would prevent the farmer from hurting himself, and turn out greatly for the interest of the landlord and the nation. The farmer would be daily learning, by seeing the great crops that were produced over the whole nation, by following this plan.

Too great a number of acres in corns, in a course of years, ruins the soil. Too great a number of acres in grass hurts population, and tends to make provisions dear.

The farm, after having been a certain number of years in grass, would not only produce great crops of corn, the corns would produce very great quantities of dung, and the dung would produce rich crops of grass; so that the very same acre that was in pasture would produce double, or three times the quantity of grass; that is, would maintain three times the number of cattle with the
corn,

corn, straw, and grafs together. The greater number of cattle, the greater quantity of dung, and the more dung, the more corns. So that it may be averred as a certain fact, that every farm will produce three or four times the quantity of corns and grafs, by having a regular rotation of crops, which the same farm will produce by having it wholly in corns, or wholly in grafs, in the course of twenty years; or, in other words, the profits would be three or four times greater, by having a regular rotation of corns and grafs.

From this we may draw two conclusions.

1st, The farmer who keeps his farm wholly in grafs, after a certain number of years, is hurting himself, and the nation at large, by withholding the great crops of corns the farm would produce.

2dly, That farmer is hurting himself and the public, who has his farm wholly in corn crops; for, in a course of years, the soil is tired or exhausted, consequently, the crops every year declining; besides, the expence of labouring is double for seed, tillage, and manure: Whereas, if he had the one half in
grafs,

grafs, he would labour it for one third of the expence, and have more corns upon the one half, than upon the whole, when all is in tillage.

The advantages accruing to the farmer by following the plans propofed, viz. of having only the one half of the farm in tillage, and the other half (in fome places two-thirds) in grafs, are manifold. First, It divides the labour, fo that the work is never crowded, or hurried, having one-tenth part in fallow for wheat done in autumn, one-tenth for oats broke up from grafs five or more years old, plowed in autumn; one for peafe or beans, potatoes or turnips, to be dunged in the winter or fpring; and one for barley without dung. By following this plan the work is never hurried; at the fame time, men and horfes are employed every month in the year.

2dly, There is another great advantage: All the farm would be in fuch good order, and fo rich, not dunging above a tenth part every year, that all the corns could be fown much earlier than in the ordinary way. When the foil is rich and clean, it will admit
of

of being very early sown, when the season will permit. This makes an early harvest, which is, for the most part, the best, and subject to less risk of being hurt by high winds and frosts.

The third advantage of early sowing is, that the wheat being all from fallow, could be plowed in with a fur two or three inches deep, which would in some measure prevent the frosts and smut from hurting the wheat.

The grain that is early sown is, for the most part, far superior in quality to the same grain sown late. The reason is obvious; the early has more of the sun, when in his greatest heat, in the time of ripening. The English wheat and barley are esteemed of a much better quality than the Scots, for the above reason of being earlier sown and cut down. The English wheat and barley some years sell 15 or 20 per cent. dearer than the Scots, which proves them to be of a superior quality. The barley, by this plan can be sown in the month of March, which would make the quality of the grain better than when sown late.

The last advantage is, That when the soil
is

is rich and clean, both less seed and manure will serve, and produce a better crop, than when the ground is dirty and full of weeds, although it gets more seed and manure.

When the soil is rich, it can be sown with the early Essex, or Dutch oats, which do not answer upon poor ground. The Dutch oats often produce, when sown upon good ground, double of what the common oats do upon the same ground, and take less seed.

It is particularly to be observed, that most of the farmers in Scotland, who have made the greatest fortunes upon small farms, the largest not exceeding 300 acres, have practised a steady and regular rotation of crops of corn and grass, with a fallow. More instances can be given of these making money, than either those whose rotation was wholly corns or wholly grass, each having the same number of acres.

Supposing the national system to be one half in grass, and one half in corns and fallow, or (in some places far from manure or sea ports) two thirds in grass, and one third in corns and fallow.

In order to make this system become general, the government should give premiums

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in every county or shire, *L.* 5 each acre, for the best crop of wheat not exceeding ten acres, and so on for every other crop mentioned in the system. And in order to raise a fund for these premiums, every farmer that had more than the one half of his farm in corns, to pay sixpence for each acre to government, and sixpence for each acre he had in grass above two-thirds; sixpence each acre of all waste grounds capable of improvement, that were neither improved nor planted: the sum raised in this way to be wholly allotted for premiums to those who raised the best crops in following the national system. The premiums to continue for twenty years at least.

This national system would naturally increase both the quantities of corn and grass, if once it came to be generally practised; the produce would be ten times what it is at present, and no farmer hurt.

No doubt many may object to this tax upon land, thinking it designed to hurt the farmers: But the contrary is what I intend by this proposal; namely, to be a great service to the farmer, the landlord, and the nation in general.

T

If

If it be a fact, as has been alledged, that the greater part of the farmers, by the way they manage their farms, are not only hurting themselves, but greatly injuring the public; many of them will not be convinced that they are wrong, being so wedded to their old schemes. Now, it is only proposed that government should give large premiums to those who raised the greatest crops by following the national plan; and those who did not chuse to follow this plan, might be allowed to follow their own, upon paying sixpence per acre, in order to raise a large sum to be given in premiums, only to let every farmer see, how very large crops the soil can be made to produce in ordinary seasons, when under proper culture. And as it is proposed, that an annual register should be kept, mentioning the greatest crop each district of the whole nation produced, and published every year in the newspapers, this would shew, at one view, where the largest crops were raised; then the farmer would judge for himself, if it was for his interest to adopt the national plan.

It would be every farmer's interest to contribute to such a scheme, whether he was
bound

bound or not. It cannot, indeed, be expected, that this plan can be accomplished without the interference of the legislature. Many would not join, although it should be for their interest ; but an act of parliament would easily establish the scheme.

Suppose a farmer had 200 acres, which, according to this plan, should be one half in grafs and the other in corns ; if he thought it was more for his interest to have only 80 acres in grafs, in that case he would have only to pay 10 s. each year, and so on in proportion to his, and every other farm.

No farmer that had 200 acres could say it would be hard for him to pay 10 s. when this very money was given for experiments whereby he himself might reap perhaps every year ten times the sum he paid, or considerably more ; for this scheme would be the means of diffusing universal knowledge throughout the whole nation, and would prove, in a few years, what has been said before, that it would be much for the interest of the farmer and the nation at large, to have a regular rotation of corns, grafs crops, and fallow.

After pondering much upon what might be

be the most effectual and rapid means to have as much as possible one national system, I could think of no scheme that would answer the end so much as this, and make such rapid progress.

Only let any person, before he draw a conclusion, consider what the good effects would be, if such a plan was adopted, and lay in the balance any supposed hardships the farmer would suffer.

It will give me great pleasure to see a better plan adopted, either by government, or by noblemen, gentlemen, and farmers uniting in one. I do not mean to be tenacious as to this plan, but only to give hints that others may improve upon them.

It has been objected, that it is not constitutional to tax the farmer's labour. I do not see any force in this objection. Is not the produce of the land taxed, in the land and malt taxes, in the duties upon leather, soap, candles, starch, beer, spirits, &c. &c.? What injustice then is there, in taxing a farmer; and especially, when this tax is to promote his own interest?

If the farmer is doing evident hurt to himself and the nation, it is doing him and the
nation

nation a great service, to convince him he is wrong.

The author does not mean, from what is said in all this reasoning, in the smallest degree to discourage trade and manufactures; on the contrary, he wishes them all manner of success, and rejoices to see them increase. He only attempts to shew, that agriculture is the primary interest of Britain, and the more that it is encouraged, the more our trade and manufactures increase, and may be the means of bringing in a great and permanent revenue to Britain. What he has endeavoured to prove is, that encouragement should be given to agriculture in preference to trade and manufactures; or, at least, the encouragement ought to be equal. Indeed, they are so nearly connected, that they ought never to be viewed separately; for, as the one increases so does the other. Agriculture is the foundation on which trade and manufactures ought to build; and to how great height it might be raised upon such a solid foundation, it is hard to determine. Agriculture may be compared to the water-wheel, which sets all the other wheels in motion.

It is a great mistake in many people to imagine,

imagine, that trade and manufactures might be successfully carried on, though agriculture should be neglected, and Britain remain in its present unimproved state.

Surely, commerce and manufactures cannot be carried on so advantageously, as they might, if the country was better improved. England is supposed to produce above ten times the quantity of corns that Scotland does ; and, of consequence, manufactures are there carried on to a much greater extent.

Arguments, however, are unnecessary in the present case; for it is obvious to every one, that were agriculture brought to that height of improvement for which we contend, trade must be greatly increased, even by the exportation of its surplus; and population would be greatly increased by the reduction of the price of provisions.

The author may here be allowed to express his satisfaction, that the essays, intitled "National Improvements," so often referred to in the preceding pages, have met with general approbation. In these he endeavoured to prove, what is before said, that by following the directions he has laid down, the produce of Britain would be increased to ten times
what

what it is at present, in the course of forty years.

Many eminent practical farmers have acknowledged, that the perusal of this book has been of more advantage to them in the last crop, than ten times the price of it. But the greatest recommendation of all is, that of the farmers in the carse of Gowrie, one of the best improved soils in Scotland, which is similar to the plan of husbandry laid down in this book; and was adopted by them about sixteen years ago.

These farmers acknowledge, that by altering their scheme of husbandry, they have as much profit in one year, as they had in five before. A striking proof of their success is, that they have, within these seven or eight years, bought estates to the amount of between sixty and 70,000 l. sterling.

A remarkable instance of the richness of the lands in the carse of Gowrie, is, that Lord Kinnaird, the proprietor of the farm of Inchtute, being about 300 acres, rented at 13s. 6d. per acre, purchased from his tenant Mr Thomas Hunter, the remaining five years of his lease for L. 3000 sterling, which his Lordship has let at L. 2 : 15 s. per acre for nineteen

ten years. This purchase was made by the above noble Lord in 1787.

The approbation of so many intelligent practical farmers in every part of Scotland, gives the author infinitely greater satisfaction than any praises which Reviewers can bestow upon his work. And as to their censures, he professes to despise them. Their opinions, for the most part, proceed either from ignorance or prejudice: Nor, indeed, do they think it below their dignity to publish sentiments that are not their own; nay, without having even read the subject on which they pretend to treat.

Since writing the preceding pages, I have conversed with many gentlemen and farmers: Some of them are of opinion, that dividing the whole of Britain into districts of about twelve miles long, and four broad, the improved parts by themselves, and unimproved parts by themselves, every farmer paying a small taxation every year for each acre of his farm, in order to raise a sum to be given as premiums to those who raise the greatest crops upon ten acres, agreeable to the plan proposed for a national system. This
money

money to be distributed in the district in which it is raised, and to be applied to no other purpose than the above premiums. And whatever the sum was that the farmer paid for each acre, the proprietor of the lands to pay the same for each acre upon his estate. This would be a good scheme for every proprietor to follow over all his estate, although not patronised by government. This is only raising premiums to be given to the best farmers in every estate, which would encourage improvements, and soon teach the most ignorant, that it was better to improve one acre properly, than three or four in the ordinary way.

And in order to make the prizes as equal as possible, so that farmers of different stations might each of them receive several premiums, it is proposed, that there should be three different classes of prizes, the first *L.* 50, for ten acres, for the best crop of wheat after summer fallow, and the next year the same sum for a green crop, and so on.

The second class, *L.* 25, for the best crop upon five acres.

The third class, *L.* 10, for the best crop upon two acres.

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Each

Each of the classes to have six premiums every year.

The first, for the best crop of wheat, after a summer fallow.

The second, best green crop after wheat.

The third, best barley with grass seeds.

The fourth, best hay crop.

The fifth, best pasture.

The sixth, best crop of oats after being five years in grass.

These premiums to continue ten or twenty years at least.

Some of the farmers might be entitled to the whole, or for as many of their crops as were judged best: But no farmer to receive more than one prize for each grain, that is, six prizes in whole, during the first ten years; but the second ten years, to have a right to compete as before.

This would be a more certain way of gaining than the lottery; for every farmer would be rewarded according to his merit, ingenuity, and industry: And as some farmers might gain, in the space of ten years, the six prizes, which would be *L.* 300 for the first, *L.* 150 for the second, and *L.* 60 for the third class,

no farmer could reasonably complain of his annual taxation, when he is thus rewarded according to his merit; for he, and every farmer has a chance of gaining one or more of these premiums who has only an hundred acres, and pays, we shall say, two pence halfpenny for each acre, which is a guinea annually; and this for ten years is only ten guineas for the highest class, and for this he has a chance of gaining *L.* 300, and almost a certainty of gaining more than one prize, if he is industrious, although he does no more than follow the example of those that gained the prizes before him.

In the course of ten years, there would be sixty prizes of *L.* 50 each, which would make *L.* 300 annually; sixty of *L.* 25 each, *L.* 150; sixty of *L.* 10 each, *L.* 60, in each district; so that the rich farmer, who has a large extent of ground, and the poor one who has but a small portion, have each a chance to gain some of these premiums, if they pay attention to those that gained the prizes before them.

But although the farmer should gain no prize at all, yet he would be a greater gainer
than

than the annual taxation, by learning from the example of others in the neighbourhood, where an annual register of each year's produce should be kept, and to be open to the inspection of every farmer. The proprietor of every estate would gain ten times more than his annual taxation; in some parts upwards of an hundred fold, by getting his whole estate improved in the highest order.

Besides, any gentleman that inclined, might have a chance for some of the premiums, by labouring a part of his estate himself.

As it is to be understood, that no farmer could gain more than one prize for each grain, that is, six prizes in whole, this would make the greater part of the farmers almost certain of one prize at least in ten years.

Each district of the improved part of the country, twelve miles long and four broad, would raise an annual sum of above £. 550, which would pay the three classes of premiums.

If the whole of Britain was divided into districts, according to their natural situations, some larger, some less, this would make the improvements very rapid, and no person
would

would be a sufferer by the taxation ; as both gentlemen, proprietors, and farmers in each district, could easily see, that the whole of that money was solely applied for encouraging improvements in agriculture, and to no other purpose. And as this scheme would increase the whole produce of Britain, and consequently reduce the price of provisions, therefore the inhabitants of large cities and towns ought likewise to contribute a proportion, as well as the nobility, gentlemen, and farmers in the country.

Suppose a gentleman had a thousand acres of land, in but indifferent order, his own taxation would only be ten guineas annually. By this scheme, in the course of forty years, his rents would be more than doubled, and the whole improved in great order, and would still be improving so long as the scheme continued ; and to this may be added his chance of gaining premiums himself. No gentleman need hesitate to pay one guinea for every hundred acres, when he would reap so much advantage. Six and twenty gentlemen, having a thousand acres each, the farmers paying the same, would raise five hundred

hundred and forty guineas, which is the sum wanted for prizes.

It must be observed, that it will take five years before the whole scheme of premiums can take place, as is proposed in this plan; therefore the premiums will vary for the first five years. After that period they are always the same.

The order they will take is as follows; as there are three hundred pounds to be divided every year, which admit of three premiums for each article for five years; viz. one of L. 50; one of L. 30, and one of L. 20, which in whole is L. 100.

First year, for the best crop of wheat of ten acres, after summer fallow, the highest prize L. 50, the second L. 30, and the third L. 20, in whole L. 100; and so on, the same sum for every article, which will be shown by the following tables.

PREMIUMS

This scheme is no more than doubling the value of the prizes for the first five years ; after which period they have only L. 50 each. But if gentlemen and farmers thought proper to continue the plan, three prizes for each article, it would only require the taxation to be doubled on the sixth and the succeeding years. By this means it would increase the number of prizes three to one. Five pence each acre, in place of twopence halfpenny, would answer the purpose.

The gentlemen and farmers might adopt either of these schemes they thought proper themselves. But the having of three prizes for each article, during the first five years, would be of great service to introduce the scheme, although not continued.

In order still to make the scheme more universally useful, so that it might be adopted by the lowest class of mankind, there ought to be in every district three classes of prizes for the spade culture, in the same order, and for the same articles as those for the plough culture. They need not at first be upon a large scale, as it is only proposed to show the difference between the plough and spade, and to
introduce

introduce the drilling and dibbling in the best manner.

It is proposed that there should be three different classes of premiums.

The first L. 10 for two acres, for the best crop of wheat, laboured with the spade, drilled, or dibbled; and the next year, the same sum for a green crop, and so on, as in the former scheme.

The second class L. 5, for one acre for the best crop of wheat.

The third class 50 shillings, for half an acre, and so on; each of the classes to have six premiums every year, as is particularly expressed in the former scheme.

Another advantage the spade culture would have, is, that it would promote the increase of villages, and also augment population. This would require a sum of 100 guineas every year for each district. One halfpenny per acre additional tax would raise this sum.

Perhaps, in some parts of the highlands, it might be thought better to have no premiums at first, but for the spade culture. The value of the prizes would be in proportion to the value of the sum raised in each district.

Were a model of a bill for establishing this
scheme

scheme printed, with a full explanation of what is intended by it, and sent to every parish in the kingdom for their consideration, the sense of the nation would be easily taken upon the subject. And although they should disapprove of this plan, yet some other might be suggested, which might obtain universal approbation, and become beneficial to the nation at large.

It may be objected, that it would be very difficult to determine which farmer had the best crop of each kind of grain and grass.

In answer to this, I only wish we had the proper funds for the premiums. Every district could contrive how to fix on proper methods, to determine which of all the farmers in that district was intitled to the prizes in each class.

Supposing there were twelve persons fixed upon to be judges, that is, one person for every mile in length of the district, each living a mile distant from the other; they could not only view the crops when growing, at different stages, and make their observations thereupon, but likewise, after the corn was cut down, might take the number of stacks or sheaves in each field.

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The judges ought to recommend to the farmers to make their sheaves of an equal bind; and before the grain in each field was carried home to the barn, or corn-yard, it might be proved by taking the five and twentieth stook, or sheaf, and threshing it out; this would give the contents of the whole. Or, the contents of each field might be carried to the corn-yard in the usual way, and covered up, till it was all ready for threshing; then to be proved as above, by taking the five and twentieth sheaf, and threshing it out.

Thus two or three men might see one field proved in three or four hours time. So that by following this method, they could prove a number of fields in one day. And, if it were thought proper, it could be proved both from the field, and after lying some weeks or months in the barn-yard. And after all, the farmer to whom each field belonged, should keep an account of the whole produce of that field, after being threshed out.

The hay crop to be stacked up in the same field where it grew, to be measured after lying for some time, and likewise an account kept of the number of stones delivered. Or, the
hay

hay on each field could be weighed before stacked, or put into a rick.

It would naturally occur to the judges, to take proper methods for ascertaining which was the best crop, both of corns and grafs.

It may be very difficult to ascertain which is the most valuable field for pasture ; but the surest way would be to weigh all the cattle before they went into each field, and to be certain that they have neither got meat nor water for twelve hours before weighed ; and to weigh them after the whole pasture was consumed, at the latter end of the season, provided they stood twelve hours without meat and drink, before they were taken out of the field.

The last years pasture, before the ground was broke up for oats, would be the most equal way for ascertaining which field was of greatest value.

By subtracting the weight of the lean cattle when they went into the field, from the weight of the same cattle when they went out, would show the increase of weight of the cattle in each field.

To know the best methods to improve pasture

ture grounds are as necessary as to know how to increase the produce of corns. There is no method in improving pasture grounds would answer better than watering, where the water can be made to stand dead upon it, in autumn and spring, after the cattle are taken off; and even where that cannot be obtained, collecting the water in the winter time, that comes from the lands that are ploughed, and making that water run upon the field that is either in pasture, or hay, would enrich it very much; as the rain water that comes from a field that is in tillage, when full of lime and dung, is richer than the water that comes from a spring.

Care should be taken, not to let the water run too long in one part of the field; but altering it, till it go over the whole, and returning the same way back, shifting it from place to place: So that, in almost every situation, grass grounds can be enriched very much by waters laid on, either from rivers, rivulets, or springs, or rain water, perhaps conducted a considerable distance from plowed fields.

Suppose rain water from plowed fields was
conducted

conducted a mile distant, which could be done for twenty-five shillings. A tract, a foot deep and a foot wide, would advantage the grass fields considerably more than all the expence. Hot lime laid upon the ground in the month of July, immediately after the first cutting of hay, would double the value of the pasture.

Another objection may be started, viz. That it would be very difficult, when dividing the country into districts, to get all the farms of equally good soil; and, of course, the good farms at present high rented would obtain almost the whole of the premiums.

There is not so much force in this objection as may appear at first view. The very end of dividing the whole country into districts is to endeavour, as much as possible, to bring the whole district into one course of cropping, which, in time, when persevered in, would bring the whole very near on a level as to produce.

It is to be particularly observed, that in many parts of the country, the soil of the outfield is equally good, when improved, with those farms which are already highly improved.

improved. Many soils, barren at present, when properly summer fallowed, drained, and then limed and dunged, will produce crops equally good with the best improved farms, sometimes much better. But it must be owned, that poor land requires a greater quantity of both lime and dung than the rich land which has been long in tillage. But to make poor land rich is answering the very end of the premiums.

If any farmer gains the premium, he can very well afford to lay out L. 4, or L. 5, extraordinary upon each acre, as the profit is not confined to one crop, but many succeeding ones. What is to hinder the farmer, if he chuses, first to trench ten acres with the spade or plough, and then to summer-fallow, after which, to give it a large quantity of lime and dung.

By the scheme proposed, the first crop is to be after a summer-fallow, which will bring every soil more upon a par; only some soils require a larger quantity of manure than others: But the manure operates at first more powerfully upon new ground than old.

I had the experience of this myself. I

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summer-

summer-fallowed one year six acres of out-field in pasture grass. The whole would not have maintained a cow for the summer time. I dunged it extraordinarily well upon the fallow, and sowed it with $4\frac{1}{4}$ bolls of wheat, which is about two quarters. There was not a field in Britain that had a better appearance; but unfortunately it was too luxuriant, and the great rains in July laid it quite flat, and it never rose again untill it was cut with the sickle. The straw was almost rotted. But notwithstanding this disaster, it produced 60 bolls of good wheat, besides a great quantity of small. I am certain, that if that field had not been laid flat by the rains, these six acres would have produced above 100 bolls of wheat; which is as much as perhaps the best field in Britain would have done, being between seven and eight quarters per acre.

I have also known muir ground, where the soil was really poor; and which being improved according to the plan repeatedly mentioned in this work, the whole expence was amply repaid by the first three or four crops, although it amounted to L. 20 per acre.

Upon the whole, therefore, with respect

to produce, the difference of soil is not of so much consequence as the mode of cultivation. The principal disadvantage of a poor soil is, that it requires a greater expence to be laid out at first. And if this is done, it will continue to produce crops equally good with those obtained from soils of far superior quality. Only, proper attention must be paid, that it is not afterwards injured by over-cropping, as it is sooner exhausted than a good soil.

It is not, therefore, here pleaded, that a poor soil is as beneficial to the tenant as a rich one, unless the rent of the former is proportionably lower; but only, that if a proper mode of cultivation is adopted, the crops on each will be nearly equal in goodness; and that, consequently, in determining to whom a premium should be given, the difference of soil scarcely needs to be considered.

The author wishes he had greater abilities to demonstrate how much it would be for the interest of the nation, and every individual to give more encouragement to improvements in agriculture. He has found himself much at a loss for sufficient powers of language

language to exprefs, and abilities to arrange his ideas in fuch a manner, as might convince and ftir up perfons of all ranks to unite together, in order to promote the ends propofed. He can only fay, he has wrote nothing but what he firmly believes to be truth, and which might eafily be reduced to practice. He has no interefted fcheme in view; but is perfuaded, that what he has propofed is for the general good.

If thefe hints fhould be the means of making people confider what is the primary intereft of Britain; or lead them to reduce to practice what is propofed; or ftir up perfons of greater abilities to adopt this, or any other plan that may turn out for the good of the nation, it will give him great pleafure.

OBSERVATIONS
ON THE
STATE AND SITUATION
OF SOME PARTS IN THE
WEST OF SCOTLAND,
WITH RESPECT TO AGRICULTURE.

With some Hints for the improvement of
these Places.

In a Journey from GLASGOW to AYR.

INTRODUCTION.

IT has been a frequent complaint against writers on agriculture, that they were too little acquainted with real business; that from hence their theories were often without foundation, and many of their proposed improvements absolutely impracticable.

In order to obviate as much as possible
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any objections of this nature, which may be brought against the preceding Essay, we have, in the following pages, endeavoured to apply the general principles for which we contend, to the present state, and possible improvement of two extensive districts, the situation and soil of which are extremely different from each other.

From this application, it is hoped, the intelligent reader will be convinced, that an uniform and universal system of agriculture is a rational plan; and that we are by no means too sanguine with respect to the advantage which, we assert, may be derived from it.

OBSERVATIONS,

1782
OBSERVATIONS, &c.

GLASGOW, Paisley, and the adjacent country, is perhaps more populous than any other part of Scotland, for the same extent of ground; owing to the manufacturers being very numerous: And, for this reason, the price of provisions is generally higher there than in other parts of the country.

To supply that part of the country, great quantities of corns are imported yearly from England and Ireland, and the north and east of Scotland. Some years large quantities are imported from Holland and the Baltic.

This, in a great measure, may be owing to so small a portion of the country being properly improved, and too great a proportion in grass, which is seldom or never broke up for corns; the large quantities of waste ground capable of being improved; in many places the grass but very poor, not being enriched

enriched with lime and dung before sown with grafs, so that, when broke up for corns, it produces but small crops ; the money that ought to be given to the farmer to improve his farm, and purchase manure, is sent away to other countries to buy corns.

So long as they continue to encourage importation, they will never have corns so cheap as other parts of the country.

In the latter end of 1786, and the beginning of 1787, there were above an hundred thousand pounds sent to Ireland for corns and meal imported to the west of Scotland. This sum would circulate amongst the manufacturers in Ireland ; and if they continued to import from thence, would enable the Irish manufacturers to undersell the Scots in the article of linen cloth, which they are doing in some measure already. Scotland, before the Revolution, served Ireland with great quantities of linen ; but since that period, while the linen trade was neglected, Ireland has introduced the manufacture of linen, and brought it to so great a length, by encouragement from the public, that they not only serve themselves, but export linens to England to four times the value that Scotland
does ;

does ; and even great quantities of linen are sent from Ireland to Scotland.

The Irish parliament hath given great encouragement to the improvements in agriculture, and the manufacture of linen, and is still continuing to do so, much more than is given in all Britain. The following extract from the Interest of Scotland, p. 25, fully shows this.

“ The parliament of Ireland give great
 “ funds for the improvement of their linen
 “ manufacture. No defect is sooner disco-
 “ vered, that can be supplied by encourage-
 “ ment, than it is done. The trustees in Ire-
 “ land gave at one time 10,000 check reels,
 “ which were all made, and sent, and distri-
 “ buted to the spinners in different places of
 “ the country, at the public charge. They
 “ also at several times have made great num-
 “ bers of good looms, completely mounted,
 “ of the best kind, and given them gratis to
 “ the best weavers. They are likewise care-
 “ ful to remove, by public laws, every thing
 “ that has the least appearance of a discour-
 “ ragement to the linen trade.”

If the people in the west of Scotland were to lay out the same sums yearly that they do

for

for importation, on the improvement of the country in general, to purchase manure, with a regular rotation of crops of corn and grafs, with a fallow, there would soon be great alteration in the price of corns, &c.

It is evident, that farms produce crops in proportion to what is laid out for improvement, by incloſing, draining, ſummer-fallow and manure. In many parts flooding with water will anſwer the ſame end as dung, when in grafs, and the ground well-drained before the water is let on, to ſtand for a ſhort time at different ſeaſons.

If the greateſt part of the manufacturers were in country villages, every family having a large garden laboured with the ſpade, and part in clover, it would be of conſiderable ſervice, and help to reduce the price of proviſions, and tend much to the health of the manufacturer. Suppose the ground was but indifferent, they would ſoon improve it with the ſpade.

When manufacturers were ſlack, as is ſometimes the caſe, the maſter not having employment for the one half of his hands, they would partly find employment in the garden; and, when at any time out of work,
the

the produce of the garden would help to maintain them ; so that they could never be in a great strait, if they had a large garden well stocked with all kinds of roots, greens, &c. If thus the manufacturers were settled all over the country, they would be less subject to mobbing, when disjoined from one another.

I am informed, that many of the weavers in Germany and Ireland work at the plough a part of the day, and weave their cloth at night. Many of the Prussian soldiers are weavers, and when not employed as soldiers, return to the loom.

See National Improvements for a plan of a garden upon a new construction, p. 270.

Many persons who have tried labouring corn-fields with the spade, inform me they have found it cheaper than the plough, considering the great crops produced after the spade ; so that they have had two bolls per acre more than after the plough.

If at any time manufacturers cannot get work, it would be better for them to be employed in labouring corn-fields with the spade than being idle.

I am informed, there have been very considerable

siderable sums laid out for the improvement of estates in Ayrshire; but by not following out the improvements in a proper manner, many gentlemen have suffered very much, not being allowed time to reap the benefits of their improvement.

Whenever any person, whether gentleman or farmer, engages in improvements upon a large scale, perhaps both above his stock and experience, if he does not persevere in these improvements, he must be sure to lose very considerably.

It takes many years before great improvements will pay themselves; and, if not persevered in, the whole money laid out is, in some measure lost. But if the plan be properly laid down and persevered in, the farmer may be assured he will be paid both for stock and interest with profit. This is the cause that many lose by giving over their farm at the very time that they ought most to exert themselves. Many a man is ruined for want of friends to support him in this critical time: It is like a person going through a river, whenever he goes beyond his depth, if not supported, he will be carried down the stream.

When

When riding through Ayrshire from Paisley to Kilmarnock, to the towns of Ayr and Irvine, and back to Kilmarnock and Tarbolton, returning again to Paisley by Irvine and Beith, I made a few observations.

First, I never saw a county or shire in Scotland where there was so little muir or waste ground; the greater part being either inclosed, had been in tillage, or was in grass.

Secondly, The roads for the most part very good, being chiefly turnpike, except from Paisley to Stuarion, and from Irvine to Beith, which are in some parts very bad.

Thirdly, Although the most of the farms are inclosed with ditch and hedge, yet very few of them are fencible, the thorns being planted in the face of the ditch, very much stunted in the growth; many of them fogged or covered with moss, which is a sure sign that the hedge is going back in the growth. There is no way of helping these hedges, but by cutting them over close to the ground, making up a small facing upon the outside as high as the thorns, and one foot broad at the top; and as the thorns grow, to throw in more earth about the roots. This will give a new growth, and help to keep in the moisture

ture in summer, and drain the water from the roots in winter. Water standing in winter in the ditches, ruins the hedges altogether. But the most effectual way to make these fences good, is by facing up the ditches with stone three feet and a half high from the bottom of the ditch, which ought to be made a little deeper and wider before the stones are built; the mould taken out of the ditch, and thrown upon the top; then to plant the thorns upon the top about two feet from the edge of the stones. This, with digging for some years after being planted, will very soon make a good fence, and it will continue so, both to hold out and in.

I saw very few good fences in the whole county. Dr M'Readie of Peiston had the best, and a few others whose names I did not know.

It is somewhat surprizing to see almost a whole county at so much expence for inclosing, and yet suffering it to go to ruin for want of taking proper care. Unless hedges are looked carefully after for the first five or six years after being planted, they might as well not be planted.

The fourth observation is, That a great many

many of the ridges, particularly near Kilmarnock, are by far too high raised, which makes the furrows very poor, and hurts the field very much when in grass.

A field of ridges eighteen feet broad, with a moderate rise, when the water furrows are all kept clean, will answer better both for corns and grass, and produce greater crops than by having the ridges so very high: For when high, they can never reverse the ridges, by making the crowns the furrows, and the furrows the crowns, unless they bury the whole manure, and bring up a new soil entirely; so that they may as well bring in a field from muir or waste ground, as to attempt to alter the ridges suddenly. Whereas, when the ridges are of a moderate rise, they can be altered without any damage to the soil. The great matter is, to keep the water furrows clear both in summer and winter; and then, although very great rains fall, the damage will not be great.

The fifth observation is, I observed them in the month of January laying on lime upon these high ridges, when in grass, all wet, and in clods.

By this method they lose a great part of
the

the virtue of the lime, which, when so much wet, has not the same virtue as when dry. The frost in that season must hurt the lime very much; besides, a great part, by having the ridges so very high, is washed away by the great rains. Whereas, were the lime put on in the month of July quite hot, after the first cutting of hay, the first shower would make it sink into the roots of the grass; so that one acre would be worth three in pasture, and would continue good pasture for many years. The hotter the lime is put upon the fallow, so much the better: For two bolls laid on hot will have as much effect as three or four bolls when wet and out of season.

I saw no summer-fallow in Ayrshire but one field, and even that was neglected to be water-furrowed. It was ruined by water standing upon it. In a country such as Ayrshire, where so much rain falls, the fallow, after every day's plowing, ought to be water-furrowed in the evening.

Sixth observation. I was much surprized to see such small corn-yards in such a fine country, and where there is so much grass
and

and lime. I was informed by Mr Foulis at Irvine, that there are not one thousand bolls of wheat produced in all the shire of Ayr. Whereas, were they to take proper methods of cropping, having a regular rotation, with a fallow, in a few years Ayrshire might perhaps produce fifty thousand bolls or more yearly, and other corns in proportion.

To conclude. I must own there are few counties in Scotland, where such rapid improvements could be made as in Ayrshire, as they have so much inclosed, and in grafs, with great plenty of lime and coal near at hand, and good roads. In the course of ten years the produce might be six times what it is at present, if the whole county were to adopt an universal and regular course of cropping. Suppose the whole county were to begin and break up a tenth part of all their grafs grounds each year, and sow with oats or lint, the old grafs grounds would produce very great crops.

The said Mr Foulis in Irvine told me, that a few years ago some of Lord Eglinton's parks in old grafs were set for plowing at nine pounds per acre for each year; and the

persons that took them were gainers, although they were at the expence of the whole labour and feed.

The very produce of oats annually, if generally adopted, would be more than all the present produce of the different grains in the whole county; which would render importation from Ireland, or elsewhere, unnecessary.

The same field the second year, summer-fallowed, limed, and sown with wheat, would produce an equal number of bolls of wheat that the preceding year produced of oats, and perhaps a third more, if seed time and harvest were favourable.

I know some farmers will have three objections to this year's summer-fallow:

First, That so much rain falls in this part of the country, that it prevents the good effects of fallow.

The second is, That the second year would produce, if sown with oats, a better crop than the first year.

The third is, That it is a great hurt to break up old grass, which is richer pasture than new grass.

As to the first objection, There is no doubt but

but wherever great rains fall, it puts a stop to the plowing for some time; for ground ought never to be plowed when wet.

There are two ways that, in some measure, might prevent the damage done by great rains.

The first is, By having the fallow early over, and the ground sown before the rain sets in. It is commonly known in that country what month the rain sets in, and how long it commonly continues.

The second method is, To endeavour to prevent the damage. It is certainly better to have all the fallow-plowing over early, and always to have the water-furrows clear, even in dry weather, so that the rain may not surprise the farmer. If the rain comes on when thus prepared, before sown, the farmer's business is to wait with patience until the rain is over, and sow the wheat, although late or early in the spring, when the season is favourable, without plowing again. Be sure, by all means, not to allow any water to stand in the furrow. Let the water-tracts be opened with a spade at the end of each furrow, if it cannot be done with the plough.

If

If a field be well plowed and ridged, so as to prevent the water from standing, it will receive a great quantity of rain, without being so much hurt as one would imagine.

The answer to the second objection is, That a second crop of oats impoverishes or exhausts the soil, more than a crop of wheat after fallow; of course, the field is not in that order for the succeeding crops as after a fallow; besides, a good crop of wheat, in general, is equal in value to two crops of oats. The farmers in the carse of Gowrie, who pay from thirty to fifty-five shillings each acre for rent, find it much for their interest to summer-fallow a sixth part of their farms every year, after taking only one crop of oats from clover. Some of them have told me, they commonly have the sixteenth return from the seed sown after this fallow.

There is another great argument for sowing wheat in a country subject to much rain, that it is the first grain commonly cut down, when early sown, and requires to stand but a few days in the field after being cut down, before it is carried to the barn-yard. Nay, I have known wheat, when very ripe, cut
down

down the one day, and carried to the barn-yard the next. The wheat crop will not exhaust the land, if followed with a green crop.

It is not the wheat crop that ruins the land, so much as the injudicious method of taking two white crops in succession; then, indeed, the soil will be very much exhausted, and will take many years, and much expence, to bring it into the same order that it was before. This is a fault which many who reckon themselves good farmers fall into.

In answer to the third objection, By breaking up old grass, you obtain a treasure for little expence; which enables the farmer to improve the most barren parts of his farm, affording him large sums of money to purchase manure, and to defray the expences for men, cattle, &c. At the same time, the large quantities of straw, when managed properly make large dunghills; this raises great crops of corn in other fields.

It is a very bad scheme, when old grass is set for three white crops, two of oats and one of barley, allowing all the straw to be carried off the farm. This exhausts the farm very,
much;

much; and the grafs will not be fo good as it was when broke up, perhaps for twenty years, when not dunged before being laid down with grafs feeds. Whereas, by following the method now propofed, of not taking two white crops running, without a fallow or green crop intervening, and dunging to the green crop, the fame field that was broke up from old grafs is laid down as rich, if not richer than it was at firft; fo that, in a few years the pafture will be as good as ever, if not better, and the hay crops extraordinary good.

Thus this very field, befides the large fums of money got for the different crops, will maintain double the number of cattle it did before. And if you take into this account the profits arifing from the dung the ftraw makes, which improves other fields, it may be averred as a fact, that it maintains more than ten times the number of cattle it did before, and the field not exhausted. The following extract from Marfhall's Rural Economy, p. 132, will fhew this.

“ Minute 73. February 10. It feems to be
 “ a received idea among the Norfolk farmers,
 “ mers,

“ mers, that the straw which is eaten by
 “ cattle, is in a manner wasted as to manure.
 “ Mr S. I remember, as an argument in fa-
 “ four of his plan of fattening pigs loose in
 “ the open yard, said, What a rare parcel of
 “ muck they make, compared with what
 “ neat beasts would have made from the
 “ same straw? A parcel of lean hungry
 “ stock, says he, come into a yard, and eat
 “ up all the straw. See there lies a bundle
 “ of straw as big as a man can carry.

“ Mr B. the other day, intimated the same
 “ idea. However, on putting the question,
 “ he acknowledged, that a little dung and a
 “ little trodden straw do well together.

“ In the north of England, the farmers
 “ make their cattle eat almost every blade of
 “ their straw, so that they have scarcely any
 “ left to litter their stalls with. Give a York-
 “ shire and a Norfolk farmer equal quanti-
 “ ties of straw, the Yorkshireman would
 “ keep more cattle, and carry out his dung
 “ at a less expence; whilst the Norfolkman
 “ would make more muck. But quere,
 “ Whether is the manure better or worse?
 “ and quere, Which of the two, upon the
 “ whole, is the better management?

“ Much,

“ Much, perhaps, may depend on the
 “ quality of the soil to be manured. A large
 “ quantity of long dung would, perhaps, for
 “ stiff cold land be better than a smaller
 “ quantity of short. But perhaps, for a
 “ loamy soil, short dung is the best.”

To avoid two extremes, I would recommend one half of the straw to be eaten, and the other used for litter.

From all this it may be observed, that those who keep old grass too long are hurting themselves, and hindering that great increase of produce, which would prevent importation.

Let any intelligent farmer make a calculation of the profits upon the different crops in a moderate way, he will soon see, that the old grass, broke up for five years, will produce more profit during the five years in tillage, and one or two in hay, than is generally made upon four farms of the same extent of ground wholly in tillage; yea, in many places, than upon ten farms, for the same number of years.

But to return. The method of cropping proposed is, the fourth year after wheat, a green crop of beans, or mixture of peas, in
 some

some places a part of turnips or potatoes; the whole dung made upon the farm laid upon either of these crops; the whole summer dung plowed in in autumn; the dung made in the winter and spring also plowed in, whenever the season answers. The beans and pease to be sown as early as the season will permit; only, be sure not to plow or sow wet. Plant likewise the potatoes early; put the rank dung above them, which will prevent the frost from hurting them. The less the dung is rotted, either for the potatoes, beans, pease, or turnip, so much the better. The rank dung rotting in the ground with these green crops, meliorates and enriches the soil very much, and renders it in fine order for barley and grass feeds the following year; particularly if the ground is cold and wet.

There is this advantage in laying on the dung to these crops, that the barley can be sown early in the spring, when the season answers, which makes an early harvest; the grain is better in quality; having the heat of the sun in its strength when ripening, and runs less risk from the great rains.

There is another advantage arising from laying on the dung to these crops, that it is

B b

better

better intermixed with the foil, which answers better for the grafs feeds, than when the dung is laid on for the barley. Likewise not having to dung for the barley, you can be more certain of embracing a good season of sowing whenever it offers, whether early or late. Some years the time being consumed in driving out dung for the barley, the proper season of sowing is lost, which both hurts the barley crop, and grafs feeds sown.

These crops, when dunged and properly drest, the season being favourable, are often of more value than a wheat crop. I have known sixteen bolls of clean beans upon each acre, by following the above method. I had upon an average, fifty bolls of potatoes upon each acre, every boll weighing forty stone Dutch weight, which is above six hundred weight English; and I have raised some years eighty bolls.

The fifth year, I would propose barley and grafs feeds, as the foil, by the above method of cropping is both well pulverised, and rich with lime and dung. The barley crop, if the season is favourable may be expected to be very great, as neither the lime or dung is exhausted; being only the third year since
 limed

timed to the fallow, and the second after being dunged: So that it may with propriety be said, this field is in the highest culture for raising a very large crop of hay for one year, and good pasture for four years after; which in whole is ten years. And we should then proceed to repeat the same course as before, the first year oats, and so on.

If what is proposed was reduced to practice, the corn crops would not only be very considerably increased to what they are at present, but the crop of hay and pasture would be increased in proportion; and by these means considerable quantities of muir and waste ground could be brought in at a small expence.

What is here said, with respect to improvements in Ayrshire, will answer in part for most of the counties or shires in Britain.

I have not had an opportunity to see a county or shire in Scotland so much adapted for making such a rapid improvement of increase in produce as Ayrshire, as said before, having so much inclosed and in grass, great plenty of lime and coals to be purchased at a cheap rate, good roads, and the soil benefited by lime.

Yet

Yet the improvements in Ayrshire at present are very far from being compleat. They may be said to be only blocked out, in order to pave the way for a more compleat system. And, unless they alter the present method of cropping, they will be in danger of losing a great part of the expence already incurred; and the farms will be little better than when they began to attempt improvements, if not in a worse condition.

I am certain, if the whole shire were to adopt the plan proposed, of breaking up a tenth part of all the grafs new and old every year for ten years to come, and only take the four crops mentioned, and the second year in fallow, the value of the whole produce of corns and grafs, in ten years, would be six times what it is at present, and the soil every year richer, as long as the schemes proposed were continued.

What proves this, and puts it beyond all doubt, is the practice in the Carse of Gowrie. The farmers there, since they altered their course of cropping, own, that they make as much profit in one year, as they did before in five. They now divide their farms into six equal parts, first fallow, then wheat, third
year,

year, beans and pease mixed ; fourth, barley sown with red clover ; fifth, clover or hay ; sixth year, oats ; then fallow, and so on as before.

The best farms have, when the season is favourable, above ten bolls each acre upon the whole farm, of all these four average crops. This at the average price of the four grains, at sixteen shillings per boll, is eight pounds each acre. I knew one farmer have 70 acres in hay, of which he had about 500 stones upon each acre, 22 lb. English to the stone, about 5 ton weight each acre. This was the greatest crop of hay I ever knew, either in England or Scotland upon such a large field. Having that quantity upon one acre or two laboured with the spade, is not so much when extraordinarily dunged. The fallow with lime and dung raises uncommonly great crops of clover. The second cutting the same year is often greater than the first.

In whatever country there is as much grass and lime near at hand, as in Ayrshire, at a cheap rate, the advantages will be similar. Every soil does not answer equally well with lime ; some light soils answer better with
marl,

marl. But every soil will answer with a part in fallow, in corns, and in grafs.

Every farmer, in every situation, wherever the ground is arable, adopting these schemes, will find them turn out greatly for his advantage; although not with equal success, as every situation is not equally favourable, nor every soil equally rich.

When at Dr M'Redie's house at Pearston, I was expressing my sentiments on the usefulness of whins as food for cattle; having a nourishing, warming, healthful quality above most vegetables in present use for the food of cattle, from the quantity of bitumen in their composition. I have often thought, before conversing with the Doctor, that they might be useful for mankind, but durst not venture to affirm this from want of experience. I was agreeably surpris'd when the Doctor told me, that he often recommends them to poor people in consumptions, &c, His method is first bruising and pouring boiling water upon them, letting them stand for some hours; then pouring off the water, and mixing the juice with warm sweet milk. This has had wonderful effects in curing ma-

ny of his patients. I have been induced to mention this, because it is a fact not generally known; and perhaps the publishing it may be beneficial to mankind.

Many advantages would accrue to the west of Scotland if these plans were adopted. In Glasgow, Paisley, and the neighbouring towns, considerable manufactories are now established of cottons, lawns, and cambrics, which require finer yarn than can be spun from British flax. This trade might be established upon a solid footing, if part of the raw materials could be produced in this country as good, and cheaper than what are now purchased from France or Flanders. The trade might by this means be increased, and the manufacturers would be able to sell their goods upon equal terms with foreigners, if not lower.

The women of that country now spin very fine linen yarn. It would therefore be of very great importance to the whole of Britain, that they could get into the proper methods of raising fine flax.

The schemes mentioned will answer in every part of Britain; yet there are some situations

ations and soils more adapted to the raising of fine flax than others. In every place where there are large quantities of old pasture grass, we may be almost certain of raising a weighty crop of fine flax.

The most eligible method is to summer-fallow it, and then sow with flax; or one crop of oats may be first taken, leaving a long stubble, which should be plowed down immediately after the oats is cut down. Part might be plowed before they are carried off the field. This would, in part, serve for dung. It should then be summer-fallowed before sown with flax. Old grass would not require any dung, being for the most part very rich. If any dung was given, it should be only a top dressing, with either lint-feed or rape, dust, salt, foot, pigeon, sheep, or goat dung, wood, or good peat ashes, harrowed in with the crop when sown.

All dry grass ground would be greatly improved by flooding with water every year in autumn and spring. This would not only increase the quantity and quality of grass, but would be an excellent preparation for a flax crop, which would both increase the weight,

weight, and make it much finer. The summer fallow ought to be plowed five or six times in the summer, and but very little harrowed. The seed fur given in the autumn should be well water-furrowed. This will keep in the moisture better than plowing in the spring, and be much more certain of a good crop: For in some years the drought sets in after the spring plowing, which ruins the crop. The seed should be sown as early as the season will permit.

It may be objected, that the ground being so rich, the flax will be in danger of lodging and rotting, especially in the west country, where they have so much rain.

In answer to this I would observe, That whenever this happens to be the case, the proper remedy is to pull the flax, if there be no appearance of fair weather, and spread it regularly upon the ground where it grows, but rather thick, and turn it every day. If the rain continues, it will be well watered in a few weeks, more regularly and better than if it had been put into the water, and the flax whiter. If, indeed, I was certain of the rain continuing, I would never chuse to water

lint any other way. It is both softer and stronger than that which is put into the water; is less expence and risk; equally good for both spinning and weaving, and much easier bleached.

But if the seed be sown early in the spring, it will be ready for pulling before the rain sets in. The ground not being plowed in the spring, will also give the lint a firmer hold in the ground, and therefore will not be so apt to lodge. Eight pecks of seed will be sufficient for each acre. If the season is favourable, an extraordinary crop may be expected, more so than if the fallow had been after any other crop.

If the proprietor chooses to summer-fallow the first year, the ground will be rather richer than after oats. The first fur should be not above two and a half inches deep, which rots the grass sooner than when deep plowed, and requires less harrowing to reduce it.

A crop of flax dressed in this manner may be equal in value to two or three crops of good wheat.

This is another inducement to summer-fallow; for, if the farmer loses the wheat season by rain, he may be certain of getting
the

the flax season, if he gives the seed fur before winter, not having to plow in the spring, but only to embrace the time whenever the season offers best for sowing.

I am of opinion, that very great quantities of lint are destroyed at the lint mills; the stroke of the cutchin is too violent, which cuts off great part of the lint. If flax was rich, and properly watered, I would approve both of rollers and beaters going by water. First roll the lint, and then beat it with the stamp, then clean it with the hand, catch, and stock. The Dutch have no lint mills, yet their flax is very clean.

When lint is good, and well-watered, it is very easy cleaned; but when hungry, and ill watered, it is very difficult. This leads us to observe the cause that the most part of the lint in Scotland is so bad in quality, and very difficult both to clean and bleach. This is owing to the poverty of the lint, being for the most part sown upon poor ground, and not properly prepared. Lint requires to be sown in the very richest soils, and after proper culture. When sown upon good ground and clean, no crop pays better; but when sown upon poor ground and dirty, no crop

is less profitable; for the expence is often more than the whole value of the crop.

As there is so much grass all around Glasgow, Hamilton, Mairns, Dunlop, &c. if the gentlemen and farmers there, and in the different shires, would break up all their old grass, they would not only have much more grass and corns than at present, but very large quantities of flax of the best kind, by following the plan proposed; and not only in that part of the country, but over all Britain, wherever the situation is similar. And this so far from hurting any part of the country, would greatly improve the whole; as one acre sown after this manner would produce as much fine flax as four or six will do, in the ordinary way of sowing and dressing.

The flax of the growth in the west fells, in the Glasgow market, from fourteen shillings to one pound ten shillings per stone, each stone 22 lb. English, according to the fineness. I have had myself forty stones upon each acre. But ground dressed in the manner proposed may reasonably be supposed to produce a weighty crop in ordinary seasons, and with more certainty, and less expence for weeding, not being so liable to be affected

ed with the dry weather, nor so much hurt by the rains as the flax sown in the ordinary way.

An acre of flax, when sown after old grafs, and summer-fallowed, dunged with a top dressing, in ordinary seasons would be in value from L. 30, to L. 50, some years more. Forty stones of lint would be, at thirty shillings, L. 60, the expence for seed and labour to be deducted. Whereas, the average value of lint in general sown at present in this country will not amount to L. 8; although in some places, when sown after grafs, the value will be L. 30. Yet the great quantity which is sown upon poor ground, and full of weeds, reduces the average value.

Indeed, the only way to render flax a profitable article, both to the farmer and the manufacturer, is to follow the Dutch manner of establishing flax boors, who purchase the flax from the farmer at so much per acre when growing, and the buyer is at the whole expence of manufacturing, from pulling till dressed into flax. The boor would give according to the value of the flax when growing; and having no other employment but to attend upon the crop, when pulling, watering,

tering, grafting, and dressing, would take care that all these operations were conducted in the best manner. At the same time, the farmer would be a gainer, having no risk to run after the flax was sold. His great care would be to raise the weightiest crops, when he would always be sure of a purchaser, which would not hinder his other operations upon his farm.

How often do we see a fine crop of flax lost entirely by not being pulled in proper time; lying too long in the water, till half rotted, or rotted upon the grass; and after all, the one half of what remains destroyed at the lint mill?

It would be highly advantageous to the whole country, and manufacturers, that a number of skillful persons were settled in every part of the country, where much lint is sown. Some ought to be brought from Flanders, and should be allowed salaries for some years, in order to instruct others.

The following extract, taken from the Interest of Scotland considered, printed in the year 1733, wrote by the late Provost Lindsay of Edinburgh, will tend to elucidate what is before said.

“ Our

“ Our present way of managing home-
 “ grown flax is so bad, that it were better
 “ for our linen-manufacture, if we raised
 “ none at all: For every fault, every failure
 “ in the flax, is an error in the first concoc-
 “ tion, not to be cured afterwards by any
 “ skill or labour. Yarn spun of unripe flax
 “ will never make good cloth; and where it
 “ is mixed with other yarn, the cloth is dis-
 “ liked. Flax spoiled or discoloured in the
 “ watering, cannot be brought to that full
 “ white required in fine cloth, unless the
 “ cloth be so much thinned and emptied,
 “ that it is good for nothing; and where it
 “ is mixed with good yarn, the cloth can ne-
 “ ver be of the same colour. Unless we are
 “ at pains to reform our way of managing
 “ our lint, we had better purchase it entirely
 “ from the Baltic, Holland and Flanders.
 “ But as we have been long in the practice
 “ of raising of flax, we must go on; and if
 “ we can be at a little more trouble, and some
 “ small expence, we shall reap from the
 “ same ground a third part at least more flax
 “ than we do at present, and that too 30 per
 “ cent. better in its quality. I shall therefore
 “ give a short account of the method prac-

“ used

“ tised by the Flanders flax-dresser, who was
 “ some time ago brought over by the trustees
 “ upon public encouragement, to teach us
 “ their way of preparing their ground, sow-
 “ ing of flax-seed, raising, pulling, watering,
 “ and dressing their flax, and compare it
 “ with our own.

“ The best soil for fine flax is the tender
 “ and yellow black mould, or any light soil
 “ mixt with loam and a little sand, that will
 “ not bind with any sudden drought. The
 “ lower the ground lies, and the flatter it is,
 “ the better, providing it be dry enough to
 “ be sown in the proper season. It should
 “ be fallowed, at least two winters and a
 “ summer. The first plowing should be as
 “ deep as the soil will admit of, and thereaf-
 “ ter plowed with an ebb furrow, so often as
 “ the appearance of weeds makes it necessa-
 “ ry. In October or November, before the
 “ ground is to be sown, it ought to be well
 “ dunged, and as well dressed at sowing as
 “ garden mould ; and two bushels of good
 “ seed is sufficient to sow one acre of ground
 “ thus prepared. We sow commonly four
 “ bushels, and sometimes a hogthead on one
 “ acre, because our ground is not prepared

“ as

“ as it ought to be. The effect of this is, if
 “ our seed be good, all comes up, and half
 “ of it is undergrowth; this unripe lint is
 “ rotten in the watering, before the rest is
 “ ready, and the whole is spoiled by it.

“ In ground thus prepared, the weeds are
 “ so very few, that one hand will clean as
 “ much lint ground of weeds in a day, as
 “ eight can do in our present way; and this
 “ is a considerable article of expence saved.

“ When his flax is fully ripe, and not till
 “ then, he pulls it; and if any unripe stalks
 “ appear, he carefully separates them from
 “ the rest, and waters them by themselves.
 “ When his lint is pulled, he ties it up in
 “ small bundles or sheaves, no bigger than
 “ one can grasp about with his two hands,
 “ and ties them loosely with a few stalks of
 “ itself, a little below the seed, and then sets
 “ them up on end, two and two, like stooks
 “ of corn, in the air and sun, until it be
 “ well dried; and then strips the seed-boll
 “ from it as we do. He then ties two and
 “ two of his sheaves together, the seed end
 “ of the one always to the root-end of the
 “ other.

“ Wherever he can find flat lying ground,

D d “ under

“ under level to any running water, there
 “ he digs his ponds for watering his lint, so
 “ large as the ground will allow, and near to
 “ three feet in depth. When his ponds are
 “ filled from the rivulet with water, he puts
 “ in his lint until the pond is full, but does
 “ not sink it. The reason why he ties the feed-
 “ end of one sheaf to the root-end of the o-
 “ ther is, that the roots being heavier would
 “ sink in the water, and the feed-end would
 “ be entirely out of the water; but when
 “ thus balanced, the lint being much of the
 “ same specific gravity with the water, it is
 “ just immersed, and no more, and never
 “ comes near the ground or the mud. He
 “ turns it in the water every day, and if the
 “ weather is very hot, twice a day. He tries
 “ when it is enough watered, by breaking a
 “ few stalks; and if the boon breaks freely,
 “ and parts easily with the flax, then he takes
 “ it out, and carries it to a clear running
 “ stream, and washes it very well from all
 “ its filth and nastiness, and then spreads
 “ it upon grafs (very thin) as we do. If the
 “ water appear to be very much discoloured
 “ in the pond, before his lint is sufficiently
 “ made,

“ made, he lets off the water, washes his
 “ lint, and then fills his pond from the run-
 “ ning brook, and puts it in again until it be
 “ enough done. When his first parcel is laid
 “ on the grass, he puts another in the same
 “ pond, and continues so to water his lint
 “ so long as the season is warm enough. He
 “ turns his lint on the grass once a-day, and
 “ keeps it on the grass as long as the dews
 “ fall, which give the lint a fine colour,
 “ without hurting it, and makes the yarn
 “ spun of it wash and empty easily without
 “ wasting or weakening it; and the cloth
 “ made of it comes soon to a fine colour,
 “ without being thinned in the least.

“ So much of his lint as he intends for his
 “ best seed, he builds up in a stack like corn,
 “ after it is thoroughly win, with the bolls
 “ on it, and strips it at sowing time; and in
 “ the month of May thereafter, puts it into
 “ the water, and follows the same method
 “ with that watered in the autumn. So
 “ much of his lint as remains on his hand
 “ undressed after the middle of March, when
 “ the dews begin to fall, he lays out again
 “ upon the grass for a good colour, and al-
 “ ways

“ ways takes up his lint from the grafs in
 “ dry weather, and about mid-day.

“ N. B. Care must be taken in rainy wea-
 “ ther, that the lint receive no damage, by
 “ rotting on the grafs; but gentle showers
 “ are as good as dew.

“ Our present way is, to sow our lint on
 “ any ground, which puts us to a great ex-
 “ pence to weed it. We sow it thick, (as we
 “ must do in ordinary ground), whereby
 “ one half of it is ripe before the other is
 “ ready: By this means, the unripe seed be-
 “ ing mixt with the full ripe, spoils the
 “ whole; and the unripe lint is rotten in the
 “ water, before the other is ready.

“ In the West, where the finest spinning
 “ is, the people are rivetted in a most pern-
 “ cious conceit, that unripe lint makes the
 “ finest flax; and therefore pull all their lint,
 “ when the blossom falls. This kind of lint
 “ heckles away almost to nothing; and is,
 “ indeed, in appearance very fine. But then
 “ it has no substance, and the yarn spun of
 “ it is always weak and ouzy. It wastes
 “ much in the washing, and cloth made of it
 “ grows as thin as a cob-web in the bleach-
 “ ing,

“ ing, before it can be brought to a full colour.”

After all that has been said concerning the raising of flax, it must be owned, that it is an exhausting crop, more especially if the seed is allowed to ripen before pulled. Even clover, if the seed is allowed to ripen, is an exhausting crop. Therefore flax ought never to be sown, but upon ground that is very rich, and properly prepared by a summer-fallow, and followed with dung to a green crop, as is proposed in the plan.

The ground plowed immediately after the flax is pulled, or the lint crop sown with clover, any of these methods will prevent the bad effects of a flax crop.

The best crops of clover ever I had were sown with the lint crop. It must likewise be observed, that when it is pulled green, it is not near so hurtful. Whenever the seed is formed is the proper time for pulling, if you want fine flax. To leave it in the ground until it is too dry, is equally pernicious with the contrary extreme of pulling it in the bloom.

Virgil says, “ A crop of lint, or oats, or
“ poppy,

“ poppy, impoverishes the soil. However,
 “ these crops are less severe, when the land
 “ is fallowed before and after them; and
 “ when the farmer is not ashamed to lay
 “ plenty of rich dung upon the land, if natu-
 “ rally poor; and nasty ashes upon the land,
 “ if worn out with cropping.”

Whenever any farmer has an inclination to save lint-seed for sowing the following year, the most proper method for raising good seed is, to sow the lint, after the summer-fallow, in drills, the lines nine inches or a foot distant, which will allow the lint to be hand-howed. This will make it grow stronger, and branch out considerably at the head; and likewise make the lintseed bolls larger; consequently the lint-seed will be very good.

The lint is not so apt to lodge when sowed in drills, as when sown broad-cast. The stalk is considerably firmer and grosser, which enables it to stand the stress of the weather better. Two pecks of lintseed will be sufficient to sow an acre in drills.

I have sowed it with the drill barrow that sows the beans; all the alteration I made was a new roller put upon the axle-tree, made on purpose

purpose to allow the lint seed only to drop. It can be made to sow thicker or thinner at pleasure, by altering the brush, either lifting it up or down.

One man can sow three acres each day with this barrow. And if sowed in the manner proposed with the drill machine, (vide National Improvements), by a man and horse, can do more than double.

When sown with the drill-barrow, the man would need three poles or garden lines to direct him to sow the drills straight. The ground should be completely harrowed before sowing, and only rolled after being sowed, as the harrow would be apt to take the seed out of the line of the drills.

The advantages of sowing lint in this manner would be, that the farmer could always depend, in ordinary seasons, on having good seed, equal, if not superior to any that comes from abroad.

The best method would be to dry the lint in the stooks, with the seed upon it, and to stack it up all winter, and thresh it out in the spring; then to water the flax in the summer, which would make strong coarse lint,

lint, such as that which comes from Riga. The farmer often loses his crop of lint by waiting for the ripening of the seed; by which means the lint is not only considerably hurt, but makes it so late of pulling, that it often interferes with the corn harvest, and is frequently neglected through the hurry of other business. And as the water becomes colder at the end of the season, it is not so fit for the purpose as when the weather is warmer. By this scheme, there would be more seed, and better, upon one acre, than two or three acres sown in the broad-cast.

If this came to be universally practised, it would only be necessary to change the seed. That which grew upon strong or damp soils should be sowed upon light and dry soils. The seed that grew upon light and dry soils should be sowed upon strong and moist soils. The greater the distance between the place of growth, and that of sowing, the better.

By following this practice, the seed would continue good for many years; which would, in a great measure, prevent the necessity of bringing so much seed from abroad. The Dutch are raising the price of lintseed every year, which is a discouragement to the sowing

ing of flax. I remember when the Dutch lintseed was from eighteen to twenty-four guilders per hogthead, and was reckoned very high when it came to four and twenty guilders per hogthead; and now they have got it up to forty two guilders, and we cannot say how far they may raise it in this progressive way.

Riga lintseed is better for propagating the lint seed than the Dutch; for it answers better the second year than the first. The Dutch always make it a rule to sow the Riga themselves, and send the produce of their own seed to Britain and Ireland.

O B S E R V A T I O N S
ON THE
S T A T E A N D S I T U A T I O N
OF SOME PARTS IN THE
N O R T H O F S C O T L A N D,
WITH RESPECT TO AGRICULTURE.

With some Hints for the Improvement of
these Places.

In a Journey from Edinburgh to Fort William,
and from thence to Fort Augustus and Ruth-
ven of Badenoch.

THE UNIVERSITY OF CHICAGO

 

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CHICAGO, ILL. 60637

OBSERVATIONS, &c.

BEING appointed by Captain Henry Rudyerd chief engineer for Scotland, by order of his Grace the Duke of Richmond, Master-general of the honourable Board of Ordnance, to value some lands belonging to his Grace the Duke of Gordon at Fort William, which the Board proposed to purchase; in my journey, I made a few cursory observations on the soil and nature of the country, with a view to the improvements that might be made upon it; and which I here present the reader, as being of opinion, that they may tend to the advancement of that most useful of all arts, agriculture. Though, I must own them to be neither so full nor so accurate as I could have wished, having no better opportunity of examining most of the grounds, than by viewing them as I passed along the road.

It

It is my ordinary amusement, when riding through the country, to consider what improvements could be made in this or that part of it. And, even supposing I may be often wrong in my conjectures, yet, if any one accustom himself in this way, he may frequently throw out hints that may be useful both to the proprietor and the public.

Therefore it is hoped, the reader will forgive any ideas that are not so proper. All that can be said is, that they are well intended both for the good of proprietors and the public in general.

In the beginning of October, I set out from Edinburgh to Stirling. Although there are many farms much improved upon this road, yet there is a great want of uniformity of cropping and inclosing.

Few fences are made as they ought to be, with sunk fence faced with stones, and a thorn hedge planted upon the top, which I esteem to be best of all. Only a few farmers having a regular rotation of corn and grass crops, with a fallow; some having too much grass, others too little.

Although this has the name of an improved country,

country, yet much might be done to better purpose, by draining and inclosing, with a regular scheme of cropping; having neither too much nor too little in grafs and in fallow; a number of small villages, each house having only a large garden of two and a half acres, less or more; part in clover, to be laboured with the spade, and stripes of planting in many parts; which would tend to warm the ground when in grafs, and prevent the winds from shaking the corns so much as they often do when exposed.

From Stirling to Down, the country is in the ordinary way of cropping, the most part rather late this season.

Blair Drummond, the son of the late Lord Kaimes, is doing great things, in order to carry off, by means of water, a large moss, consisting of many hundred acres, commonly called Flanders Moss, said to be owing to a Roman legion who cut down the wood that was then growing there.

It is evident, that it was once all wood; for there have been axes found deep in the moss, and in many places, bridges made of wood laid across, to pass from one place to another

another above the clay, as well as large trees, which indeed are to be found in every moss. All below is a very fine strong clay: And, in order to run away the moss, Blair Drummond has erected a large water-wheel upon Teith river, ten feet broad, and betwixt thirty and forty feet high, with buckets in the inside of the rim of the wheel, that discharges forty tuns of water in one minute, into a wooden cistern at the top; from which wooden pipes eighteen inches in diameter conduct the water about fifteen hundred yards, where it runs into a canal, which conducts it to different parts of the moss, to carry it away. The expence of the wheel and pipes was above two thousand pounds. The pipes are all made of foreign wood three inches thick, bound with iron hoops within a few yards of one another. The moss is of a light springy nature, a great part being no more than long grass fallen down and rotting. I never was upon the moss to see it, but should think that part of it might be trenched in with and below the clay, which would tend to keep the clay open.

Any man that can clean a part of the moss
has

has so many years free of rent, if I rightly remember, it is eight years free, and so much an acre every year after for rent. There is a number of families settled there, who go under the name of the moss lairds.

There is rather too much of the inclosures at Blair Drummond in grass, which is not so much for the interest of the proprietor, as Lord Kaimes says in his Gentleman Farmer, p. 148.

The moss that is cast ashore by the tides on the sides of the river Forth, would answer very well to be mixt with dung, as it is impregnated with salt water, or might be put upon pasture ground by itself.

From Down to Callender has the appearance of a light dry soil, very much adapted for grass; which would produce very weighty crops of hay when under proper management, if inclosed, as formerly proposed, with a sunk fence, and thorns upon the top, which would make a most beautiful country. The thorns would answer very well upon this soil.

I was much surpris'd to see such poor crops upon such good land in appearance, as the season was favourable for this kind of

F f soil.

foil. The reason of these poor crops I supposed to be, that the land was exhausted by constant cropping in corns, without regular rotation of corn and grafs, and improperly manured.

If the one half of this country was in sown grafs, the produce would be double to what it is at present; which would save both seed and labour for the land at present in corns.

This part of the country would answer surprisngly well with the spade culture in large gardens, as proposed. All kind of trees would thrive very well here, fruit trees not excepted.

From Callender to Lochearnhead, on both sides of the loch of Lubnich, five miles in length, mostly all grafs. Very few houses. The ground on both sides of the loch lies warm and dry. The foil on the north side in appearance very good, fit to carry good crops of corns and grafs; would pay very well for the expence of labouring with the spade. And, as this glen is warm and well sheltered from most winds, a number of houses might be built, having only two and a half acres for a garden, to be laboured wholly with the spade, with a part every year.

year sown with red clover. A few stripes of planting would both beautify and add to the natural warmth of the place. Fruit trees would answer very well. It is naturally pleasant with the loch in the middle of the glen. A number of houses feued out with gardens would add much to its beauty, as well as to the profit of the proprietor.

I shall here remark once for all, that the richest soil is often to be found at the bottom of hills. You will scarce find it otherwise in any place; and if so, here is the place for labouring with the spade to profit.

I am informed, that there is an appearance of lead mines upon the south side of the loch, in Mr M'Nab of M'Nab's ground. Wherever these signs are, it is not a bad method to make several cuts across the face of the hill, and let the waters run in them, which will soon make them deep; by this means they may be often discovered at little expence.

This glen has the appearance of a good soil, that a great many parts of it will pay for the expence of labouring with the spade. And as there is lime at a little distance, if limed and sown with grass seeds, after taking two

or

or three crops, would make extraordinary good pasture. And when thus digging with the spade, some mines might accidentally be found out.

The expence of the spade culture upon a sloping bank may be done for the one half of digging upon level ground ; and some particular parts might be planted with fruit trees before they were sown into grass.

As there is a great number of places at the foot of many hills, the situation of which is much the same as this, lying warm and dry, the soil good and sheltered from most winds, they may be improved in the above manner.

I was informed, that one of the proprietors proposes to drain a part of the loch, which will do considerably more than pay the expence.

From Lochearnhead to Tyndrum there is a large quantity of fine meadow ground lying on each side of the water of Dochart, from Loch-Tay to Tyndrum ; a great part of which stands in much need of being drained. The river first straightened as much as possible, than deepened, beginning at Killearn, and working as far up as Tyndrum. A great
part

part of Loch Dochart might be drained by deepening the river. After this was done, or rather in doing of which, the whole banks upon each side of the river Dochart might be sloped with a gentle declivity, and covered over with green turf or swaird; the earth taken from the water-side, and carried forty or fifty feet back, which would help to form a sloping bank to prevent the water running upon the meadow.

The best way for constructing this bank is, first to mark out the breadth and height of the banks and ditch you propose to make; then pare all the turff off; this lay to one side, to be put upon the bank when finished; then throw up a ditch in the inside, from the water, as large as you want to raise the bank, to prevent the water from overflowing, which ditch in the inside will help to drain the meadows at the same time; the bank round upon the top, and sloped on both sides. Then cover the whole bank neatly over with the turf, beat it down with the back of the spade, slope the ditch in the inside, and sow it with grass seed. This will prevent the meadow from being covered with sand, which is often
the

the case in time of flood. This bank may be made for two shillings the six yards, supposing it to be ten or twelve feet broad at bottom, and five feet high, or perhaps cheaper. The height and breadth of the bank depends upon the height that the water rises at the highest flood; the level of which should be taken before the banks are made.

These meadows, when large, ought to be divided by a bank running across the breadth of the field, made in the same manner as the other, by a ditch thrown out in the under side, divided into ten or twenty acres.

At the foot of each inclosure, next the water, place a flood-gate or sluice to draw up and down at pleasure; by which means little sand would come in. At every time the inclosure was overflowed, a fine rich mould would be left upon the surface, and enrich it very much, and every year be increasing in richness.

If this was done properly, there are few spots in Scotland that would produce better crops of hay or pasture. The meadows being naturally of a good soil, and the water of a very enriching quality, after being a number of years

years in grafs, it would furprife every one to fee what great crops of corns they would produce; and lint in particular could be flooded when three or four inches long, which would benefit the crop amazingly.

The advantages arifing from this embankment would be twenty times above the expence.

Every place by river fides in the like fituation might be greatly improved by thefe means, wherever the fituation of the ground would allow to bank out the water and let it overflow at pleafure in time of floods. Though the ground was ever fo poor, even nothing but gravel or fand, yet in a courfe of years it would become a rich foil; as every flood leaves a fediment upon the furface. What are all your rich carfe clays but mud or fediment fettled in former ages in this way?

There is a very great difference between this and water running every flood over a meadow, when it only leaves fand or gravel. If in tillage, it carries away the foil; if in grafs, it hurts the pafture; the fine mould going all down the river. But wherever a field is banked, fo as to keep the water from running, and left open at the foot, then the
water

water stands dead ; the fine mould runs up, but not sand, and settles upon the surface, which, in a course of years, makes it a very rich soil.

In some situations it would be worth the proprietors consideration to run a dam across the river at the foot of a large flat field, made up of loose stones, in order to raise the water to make it run back. Or, perhaps, it might be cheaper to cut a small canal a good way above, to conduct the water to the underpart of a large flat piece of ground, which could be let in and out at pleasure. This would answer very well in time of great drought. It is only rare situations will admit of this.

There is an amazing quantity of fine ground ruined by river-fides being neglected, which, if attended to, might be made the richest in Britain, and dunged for nothing, being water-fed, by following the above plan.

It is wrong to bank out the water, and not allow it to come in at the foot at pleasure.

Wherever you have a command of muddy water to overflow the whole field, there is no
need

need for any dung ; this being sufficient of itself to make a very poor field rich.

There are places without number in many parts of the hills, where the water could not only be made very useful for the face of the hills, but likewise conducted across to water the plains, to be let on and off at pleasure.

The advantages arising from making the proper use of water, when properly conducted in every situation, are almost incredible. These hints may suffice at present: Only, let every person consider what improvements can be made by water upon his own grounds.

From Tyndrum to King's-house, and down Glencoe. This very long tract of great and awful mountains, lying all contiguous to one another, yet disjoined by glens, appear like so many mole-heaps lying all close to one another, of different heights and largeness ; with very few or no houses alongst the road, which makes it look dismal and awful.

In viewing these very great hills, I was more and more convinced of the truth of what I said in National Improvements, viz. That all the mountains and hills were thrown up by earthquakes, by means of fire and

water meeting together in the bowels of the earth.

It is probable it was at the universal deluge, when the whole world was convulsed, and the internal parts of it separated in such a manner, that not only earthquakes, raised by fire and water in the bowels of the earth, have an easy communication from one quarter of it to another, but likewise vapours arising both from fire and water.

This may be one reason, and I think a strong one, why the inhabitants since the flood do not live so long as those before it, that the whole world being convulsed, left gulfs and many great cavities in the earth, being all rent, which contract and contain many hurtful and noxious vapours; and these emitted through the crevices into the air make it very unwholesome for the inhabitants: And these sulphureous vapours often raise tempests in the air.

This appears very plain, for the largest and highest of these hills are all shattered and full of rents from top to bottom, the stones being disjoined from one another; and the higher the hills, the more shattered and open they are.

I never was so sensible of any thing of this kind as in the present journey, going over the Black Mount, (which is well named, the faces of the rocks there look awful and black, as if they had been covered with smoke.) Being before a great rain, which was only coming on, I was very sensible of a strong, disagreeable, sulphureous smell in the air, which I imagined proceeded from these black rocks not far distant.

Whoever contemplates with attention the present appearance of the globe, will be unavoidably allured to the conclusion, that the surface of the earth must have undergone a very considerable change; and he will allow it probable, that this change has taken place in consequence of internal fires, producing partial earthquakes, at various periods, and more especially at the deluge, when an universal convulsion took place.

We may be allowed to suppose, that the whole earth is full of considerable chasms; and that those parts which were formerly the surface, are now buried below, and that which was below is now uppermost.

When the whole world was convulsed by earthquakes, as the bottom of the sea was
nearest

nearest the centre, this being the weakest part of the globe, would of necessity give way first; and, of course, whatever substance was at the bottom would form the summits of the mountains which were then raised. And that this conversion of the bed of the ocean into the summits of mountains has actually taken place, is abundantly proved by the relicts of marine animals, which have been found on mountains of the greatest height.

It is certain, that there is a subterraneous fire in every portion of the globe; and that it is owing to the goodness of God, it does not break forth and consume the whole; which the divine records assure us will one day happen, perhaps sooner than the generality of mankind imagine.

Some object, that fire cannot burn without air, which is a fact. But when it is considered, that the whole globe is full of rents, more particularly its rocky parts, a very small quantity of air will make a fire burn moderately, and continue many ages without going into flame. The more any fire is confined, so much is the degree of heat increased. Our ideas of the degrees of heat in subterraneous fires are at best but very imperfect.

All

All that we can do, is to judge by the effects we see. These indeed are very great. Every kind of substance is calcined by the subterraneous fire.

It is supposed, that all metals are formed by the vapours arising therefrom, which tinge the mineral waters. These, wherever they run, convert the earth into the different metals, often mixed together in the state they are found in the bowels of the earth.

What makes it probable, that all minerals are formed by the vapours arising from the internal fire, is, that as often as you melt any metal, its weight is diminished; and, if the fire is continued for any length of time, the greatest part will evaporate. You may collect some metallic calces at the top of the furnace, although very high, where much metal is melted.

Since writing the foregoing treatise, I have read Dr Hutton's Theory of the Earth. Several of the Doctor's arguments prove what is here alledged, and likewise what is said in National Improvements, pages 1st, 2d, 4th, 5th, 6th, 17th, and 18th. His reasoning is, in general, ingenious; but I cannot admit the following conclusion which he draws;

“ But

“ But if the succession of worlds is established in the system of nature, it is in vain to look for any thing higher in the origin of the earth. The result, therefore, of our present inquiry is, That we find no vestige of a beginning, no prospect of an end.”

From this conclusion I beg leave to dissent. For it is expressly declared by divine Wisdom which cannot err, That the world was created by the almighty power of God in six days. The scriptures also assert, that this earth will be wholly destroyed by fire.

Many of the Doctor's arguments, though employed by him for a different purpose, may be brought with equal propriety to prove that there has been an universal deluge, and that the whole world was convulsed at that period. And indeed, this fact throws great light on his theory.

He often mentions the collection of materials from sea and land animals, as in p. 80. “ At a gross computation, there may perhaps be a fourth part of our solid land, which is composed from the matter that had belonged to these animals.”

From the creation of the world to the deluge, about 1650 years elapsed; during which period,

period, it is reasonable to suppose, that very great quantities of materials were collected in the bottom of the sea. This is agreeable to what the Doctor says, p. 13. “ The general
 “ amount of our reasoning is this, That nine
 “ tenths perhaps, or ninety-nine hundredths
 “ of this earth, so far as we see, have been
 “ formed by natural operations of the globe,
 “ in collecting loose materials, and deposit-
 “ ing them at the bottom of the sea ; conso-
 “ lidating those collections in various de-
 “ grees ; and either elevating those consoli-
 “ dated masses above the level on which they
 “ were formed, or lowering the level of that
 “ sea.”

Page 17. “ The strata, formed at the bot-
 “ tom of the sea, are to be considered as ha-
 “ ving been consolidated either by aqueous
 “ solution and crystallisation, or by the effect
 “ of heat and fusion.”

P. 54. “ We now desire to know, how far
 “ those internal operations of the globe, by
 “ which solidity and stability are procured to
 “ the beds of loose materials, may have been
 “ also employed in raising up a continent of
 “ land, to remain above the surface of the sea.

“ There

“ There is nothing so proper for the erection of land above the level of the ocean as an expansive power of an infinite force, applied directly under materials in the bottom of the sea, under a mass that is proper for the formation of land when thus erected.”

The following circumstances may reasonably be supposed to have taken place, both before and after the universal deluge, all of which, we apprehend, are implied in the Doctor's theory, although not expressed in this manner.

First, That before the deluge, the various parts of the earth were consolidated, either by aqueous solution and chrySTALLISATION, or by means of heat and fusion; which, in a course of years, would make very considerable alterations upon the internal structure of the earth.

Secondly, When the flood overflowed the whole earth, and the fountains of the great deep were broke open, the fire and water meeting together, would occasion an universal convulsion of nature. At which time, all the materials which were at the bottom of the

the sea were thrown up, and the mountains and hills were formed.

As we are informed by the scripture records, " That all the high hills that were under the whole heavens were covered with water," we may conclude, that the convulsion was universal. The effects of which are evidently seen over the whole universe to this day. And although we had no authentic record of the deluge, there is not a more natural way of accounting for the present situation of the globe.

The following extracts will, in part, support these observations.

Theory of the Earth, page 58. " We are now to conclude, that the land on which we dwell had been elevated from a lower situation, by the same agent which had been employed in consolidating the strata, in giving them stability, and preparing them for the purpose of the living world. This agent is matter extracted from extreme heat, and expanded with amazing force. If this has been the case, it will be reasonable to expect, that some of the expanded matter might be found condensed

H h

" in

“ in the bodies which have been heated by
 “ that igneous vapour ; and that matter fo-
 “ reign to the strata may have been thus in-
 “ troduced into the fractures and separations
 “ of those indurated masses.”

Page 57. “ The strata of the globe are ac-
 “ tually found in every possible position. For
 “ from horizontal they are frequently found
 “ vertical ; from continuous, they are bro-
 “ ken and separated in every possible direc-
 “ tion ; and from a plane, they are bent and
 “ doubled. It is impossible that they could
 “ have originally been formed by the known
 “ laws of nature, in their present state and
 “ position ; and the power that has been ne-
 “ cessarily required for their change, has not
 “ been inferior to that which might have
 “ been required for their elevation from the
 “ place in which they had been formed.”

Page 55. “ It is a truth unquestionable,
 “ that what had been originally at the bottom
 “ of the sea, is at present the highest of our
 “ land.”

Page 76. “ Thus we have sufficient reason
 “ to believe, that, in knowing the construc-
 “ tion of the land in Europe, we know the
 “ constitution.

“ constitution of the land in every part of the
 “ globe.”

These, and other observations to the same purport, which occur in the Doctor's treatise, prove, that the materials at the bottom of the sea were first consolidated, and were afterwards thrown up by the expansive power of heat. There is no period at which an universal convulsion could take place so probably as at the deluge. From this account we may easily conceive, how the great revolutions have taken place upon the surface of the earth, without supposing that there was another world before this, or that another shall succeed it.

There is very little improvement can be made on this long tract of mountains, but to study the natural situations. See National Improvements, page 169. The most that can be done is by means of very large inclosures; understocking; draining all morass grounds in every part of the hill; turning the water across the face of it, to run zig-zag, which would not only destroy the heath, but likewise bring up a green sward; liming some of the best spots, in order to destroy the
 heath

heath and increase pasture; paring and burning some parts; spreading the ashes, and sowing grass without a crop, to increase the pasture; erecting some houses with large gardens, in the warm dry situations. Where the soil is good, about two and a half acres to every house, to be laboured only with the spade. A number of these houses might be built in the glens or vallies, where there is good shelter.

There is certainly a great number of mines in these hills, either of lead or copper. The great matter is how to find them out. Viewing the water tracks after thunder showers, or very heavy rains, may sometimes be the means to find them out. Cutting water-tracks across the face of the hills may sometimes make discoveries. Wherever there is spar, which is a hard variegated substance, there are mines not far off. This may sometimes lead persons to trace where the vein of ore is. But the mines are most frequently found out by accident. It is said, when there is much snow upon the ground, wherever the mines are the snow melts first.

Although these hills are very dismal and
barren

barren to look at, yet the pasture, in the very poorest parts may be much improved, by some of these methods; and planting would tend much to warm the ground.

I was surpris'd to see so little planting in this part of the country, where it would thrive so well, having so much rain. Sowing the seed of different trees upon the face of the barren bare rocks might in time turn to a wood.

A good thorn hedge is better shelter from the wind than a stone fence, as it divides the blast; whereas, the wind striking against a stone wall rebounds and comes over with violence on the other side. So, great plantations of wood, would afford more warmth and shelter to a whole country-side, than the bare hills. There are a great many lochs among these hills, which might be easily drained, or, at least, partly drained; whereby great quantities of good land might be gained, either for hay or pasture. If in a low situation, would produce great crops of corn for two years; and then it might be sown with grass.

In short, the most barren hill, or muir, might be much improved by inclosing, drain-
ing

ing first, then watering, planting for shelter, giving the whole, or best parts, a top-dressing, either with hot lime, marl, moss, peat ashes, or the stuff taken from the morass grounds. After this, to shut up the field for twelve months, not letting a beast pasture upon it. Never after overstocked.

The improvements that can be made upon many hills, these in particular, by means of draining and watering in times of drought, and other seasons, are almost incredible, and can be done at a small expence, having so many different ways to set on and off the water. The height being so great could lead on the water to a great distance, and then to run along the hill zig-zag; always taking care not to let the water run rapidly, nor too long in one place, but shifting it from one place to another, and led on to where there was a plain; and even there, only to let it in at the foot of the field, so as to let the water run back over the whole at pleasure. This is only taking the advantage of the natural situation of every place, whether for pasture, hay, or corn.

For this reason, there are more improvements

ments can be made, by means of water upon the hills, than in the low country, the sides of many rivers excepted.

I was very sorry to be informed, that in this part of the country, and Argyleshire, they were depopulating the farms much, by throwing the most of them into large sheep walks. The sheep are very good in their place, but the best improvements may be overdone.

It is certainly very wrong in the proprietors to depopulate the country, they ought rather to make it their study to devise such schemes as might make each of their tenants live more comfortably, and at the same time increase their number. This they might do by erecting a great number of small villages, in every corner of the country most adapted for them; either the proprietors building the houses themselves, or feuing out two and a half acres for each house, to be laboured only with the spade, which would encourage manufacturers to settle there. The manufacturers would encourage agriculture, by taking the produce from the farmer, and the farmer would encourage manufacturers to settle wherever

wherever they can have plenty of provisions at a cheap rate.

Lint would answer very well, even better than corn in this country, having so much rain; but it would need to be pulled in ten days after the bloom is off, not waiting for the seed ripening; which would make the flax crop much finer, and run less risk from the great rains which fall here.

I do aver, that the same farm which is wholly in pasture, in many situations will maintain more than double the number of sheep or cattle, by having the half or third of what is presently in pasture in corn crops, having a regular rotation of corn and sown grass; never having of what is in tillage above the third or one half at most in corns; other parts in sown grass, for hay and pasture.

By having so little in corn, it would be manured extraordinarily, more so wherever there is lime, marl, sea shells, sea wreck, moss, or peat ashes. This would produce very great crops, both of corn and grass.

When the farm is rich with manure, it makes an early harvest, as admitting of being sown early; and early corns being sown,
such

such as wheat, winter-barley sown in autumn, Lincolnshire barley in March, early Dutch or Essex oats in April, early peas, turnip, and potatoes.

Indeed, every store-farmer ought to have part of his farm in corns, for provender, to prevent his sheep and cattle from dying in time of great storms.

Even near the highest hills, there are glens or vallies in which corn would grow very well, and likewise hay, as said before. The soil in these places is often very rich, which would answer better to be laboured with the spade than the plough.

A number of houses might be built in these places. Wherever there is a good muir lying low, and well sheltered, or could be made so by inclosing and planting, having a good swaird and dry bottom, these might be feued out for houses when near water.

Fort-William is a neat, dry, healthy place, commanded by Captain Cochran, who is an excellent officer, and keeps the garrison in very good order. This fort has contributed in part to the civilisation of this country; where any person may travel as safe as in the low country, or in England.

The town, formerly called Marysburgh, now called Gordonsburgh, lies to the westward of the fort, along the loch side, which is an arm of the sea, running above twenty miles up the country.

It is said to be warm in winter, the snow not lying long there, surrounded on the west, south, and north, with very high hills.

Benevis, lying a little to the south-east, is said to be the highest hill in Scotland, being fourteen hundred and twenty-four yards above the level of the sea.

Gordonsburgh is a neat country town, having many good houses, and several merchants in a thriving way.

If the fisheries increase, it may be of great service, as the herrings come up as far as the town. There is likewise plenty of salmon, and some sea fish, with great plenty of wild fowl.

This may come to be a place of trade in time, and would be very much so, if the cut between Inverness and this place was made navigable, as proposed by Mr Knox, which he particularly describes in one of his tours. I think it might be easily done.

I am informed, that there have been pieces
of

of rich lead ore found at Glenevis, which is not above two miles distant. The great number of high hills furrounding this place, makes it very probable there may be many mines not far distant. The easy access by sea to bring coals, ought to excite the attention of some company to make trial. In the year 1745, men of war came up to the fort.

Lochlochy might be made navigable to this place, being five or six miles in length, and very deep, which never freezes in winter. If that was done, it would be navigable twelve or fifteen miles farther in the country, in the way to Fort Augustus, where there are high hills on every side.

There is almost a certainty of a great many mines in this tract; therefore the gentlemen proprietors should join altogether in one, to get some proper persons to search: And, if they succeeded, it would go a great length to pay a part of the expence incurred by opening this navigation.

Indeed, the whole tract, where the cut is proposed to be made, from Inverness to Fort William, and ten miles below, has high hills on each side.

There are few places where there are so many

many appearances of mines as in this country; and, if once found out, the land carriage would be very small, perhaps more so than in any other place in Britain, as shipping could come with coals and wood, and in return, carry away the lead or copper, or perhaps silver.

I am informed that there is a mine of black lead found out at Glengarrie, which is in the tract of this proposed navigation, within a few miles of Lochlochy. A very little expence would join Lochlochy and the loch at Glengarrie in one.

Gordonsburgh might be made a very good place for manufacturers to settle in, if the muirs and farms in the neighbourhood were improved, and quantities of lint sown.

Though this country seems very much adapted for the production of flax, I was informed that there was very little linen yarn spun here, only woolen.

It ought to be the business of gentlemen proprietors to encourage both linen and woolen yarn being spun, which is the first step towards settling manufactures. They ought to give a number of wheels gratis to the tenants, and likewise annual premiums to the
girls

girls who spun the best yarn. This might raise an emulation, and produce very good effects. The tenants in Athol pay most of their rents with the linen yarn that they spin, and raise a great part of the lint they use themselves.

After having put a value on these lands at Fort William, along with Angus M'Donell, Esq; of Achtrichitan, I had occasion to ride from Fort William through Lochaber to Fort Augustus, and from thence to Ruthven of Badenoch.

I was very agreeably surprised to find such a vast extent of good ground, both in Lochaber and Badenoch, belonging to his Grace the Duke of Gordon, which is capable of a very great improvement upon a small expence.

I will venture to affirm, that the muirs in Lochaber had the appearance to me when riding along the public road, to be equally good with the best in Scotland, if not superior to any I ever saw. What renders these muirs so valuable is, that most of them have a very close sward of heath and grass, and a pretty level surface or gentle declivity; which, when pared and burnt, might produce

duce ſuch a vaſt quantity of aſhes, as would raiſe eight or ten bolls of barley or oats per acre, or perhaps more when the ſeaſon was favourable.

Secondly, That the moſt of the grounds having ſuch a declivity, might be very eaſily drained by ditches made for incloſing, or by covered drains. This is the firſt thing that ought to be done, before any other improvement is attempted.

“ A little to the eaſtward of Fort William
 “ is the remains of the caſtle of Inverlochy.
 “ It appears from hiſtory, that it was antient-
 “ ly a place of conſiderable note, a reſort of
 “ French and Spaniards, probably to pur-
 “ chaſe fiſh, for which it was a kind of em-
 “ poreum, patricularly for ſalmon. (I hope
 “ it may be ſo ſtill.) But the place is ſtill
 “ more noted for its being a reſidence of
 “ kings, and where the memorable league,
 “ offenſive and deſenſive, is recorded to have
 “ been ſigned between Charlemain and A-
 “ chaius King of Scotland in 791.”

When, upon the firſt ſight of this muir, I conceived ſuch a good opinion of the ſoil, I did not, at that time know what is ſaid above, until I read it in Mr Knox’s Tour
 through

through the Highlands of Scotland in 1786. This account confirms me in the good opinion that I then had, and still have, of what great improvements might be made. It is very reasonable to suppose, that this being the seat of the kings of Scotland, a great part of what we now see muirs, were then in corns and grafs, greatly improved, and a good soil, otherwise they would not have taken up their residence in this place.

The soil and situation being good, warm, healthy, and easy communication by water, this, in process of time, may come to be a place of some consequence, as it lies well for dipping deep in the fishing trade.

If the muirs were once inclosed with plantations of wood, and improved, it would be very pleasant, healthful, warm, and plenty of provisions at a cheap rate, which would invite strangers from different quarters to make it their residence for summer and winter.

In a situation like this, the air is undoubtedly more salubrious in the summer-time, than any foreign country that tender people can go to. In summer, plenty of goat milk, fishing and fowling. In winter warmer than

in most places in Scotland, which produces early crops of every thing both in the garden and field. The potatoes at Fort William were the best, and highest flavoured, I have eat any where this season, the mutton also was uncommonly good.

From these considerations, the feuing out a great part of the muirs might turn to a considerable annual revenue. The inclosing with a ditch six feet wide, three deep, and three feet built above the surface, with a row of thorns planted on the top, two feet back, could be done at one shilling each six yards. At this rate, an hundred acres would cost L.25; if a square field 400 acres, L.50:2; 562, L.60, and so on in proportion. See National Improvements, p. 252.

Wherever there is so close a swaird of heath and grass, as in the muirs in Lochaber, the following method makes one of the best of fences at the least expence. Raise the fods nine inches or a foot square, with these build a dyke on the surface of the ground, with the heath or grass side outmost four feet high, cast a ditch in the inside, six feet wide, three deep, about five or six feet from
the

the dyke; throw the mould that comes out of the ditch to the back of the dyke, plant the thorns upon the top of this, which is an immediate fence upon both sides, whenever the fods begin to moulder down, which may perhaps be in twenty years, if properly done. When decayed, face up the dyke with stones. By these means, a very large muir may be inclosed in a few months, at a small expence; and whenever the hedge is a fence of itself, the ditch may be filled up.

Supposing the Duke of Gordon was to begin to inclose a few fields next to Fort William; after draining, to pare and burn, and to sow grass seed with the first crop, either with lime, or without it; then to feu it out into small inclosures, as is mentioned in *National Improvements*, pages 250, 339, and 390. If this was once begun on a regular plan, it would surprise his Grace how rapidly the feuing would go on. The feuers would build their own houses being restricted to the plan laid down.

All the inclosures ought to be planted with thorns, as is mentioned in *Essay ix.* page 133, and more particularly, p. 138. The thorn

hedges, when fully grown, would in some measure alter the climate, by affording such shield or shelter, as would make the grass grounds considerably warmer than they are at present. Stripes of planting would be very necessary for accomplishing this end.

I have no doubt, if once begun and planned out in regular villages, (see page 393.) a great part of the muirs might be improved in a few years. There is no part in Scotland which I ever saw, more adapted for villages than this, having both lime and peat not far distant; and the peat or turf would burn the lime without coal.

There is another method that would tend much to improve these muirs, first, by inclosing them in large inclosures, the expence of which may be seen in page 252. After this, they may be drained with open or close drains. And it may be observed, that no part of improvement will pay so well as draining, even upon the poorest ground. After it was drained, the ground might be limed upon the swaird, which would destroy the heath, bring up good pasture grass, and raise the value of the lands to six times what it is at present.

I must here again express my surprize, that
there

there is so little planting in Lochaber, where it is so much wanted, and where trees would thrive so well. The most advantageous for planting are larch, oak, and beech. These may become the most general, if they are properly attended to, and in time may add greatly to the value of the country. Experience has proved, that the larch will grow in this, as well as in a much colder country, where no other timber can be raised. The oak will thrive in cold backward soils, and the beech answers in such as are both dry and thin.

The third method proposed for improving of muirs is perhaps the cheapest, and not the worst, viz. first to inclose and drain them thoroughly; after which, wherever there is a command of water, to let it run off and on upon the muirs. This will destroy the heath; in place of which good pasture grass will be produced, and every year be growing richer, as long as the water is continued. This should never be given over, but practised every year, making the water run only for a few days in one place, and then shifting it to another, till the whole field is gone over, and so to return again; that is to say,

say, at certain seasons, the water to be running either in one part or other of the field.

The fourth method proposed for improving the muirs is, when they are inclosed, drained, and have got a green swaird, to lay over a coat of black free moss, or hot lime, or both, upon the surface, so as to cover the whole grafs. This will have an amazing effect. Wherever the soil is dry and light, it will increase both the quantity and quality of the grafs very much. Sow a little white clover, and hay seeds, which will be of service.

The last method proposed is planting trees. This ought rather to be the first; but until such time as the farm is inclosed, the young planting would be ruined by the cattle and wild beasts.

Wherever fir, or any other wood grows naturally, without being planted, from the seeds blown by the wind from other plantations, this wood is far superior in quality to that which has been transplanted.

I was informed by an English gentleman, who went to Fochabers on purpose to examine the quality of the woods lately purchased from the Duke of Gordon; that the
fir

fir wood there is equal, if not superior in quality to any that grows in Europe, being mostly all of red wood ; and that there are a great number of fir trees there, that are fit to be masts to the first rate men of war in Britain ; and that the company would gain a profit of fifty thousand pounds by the cutting of these woods ; and that they had built several large vessels wholly of fir, the greater part made from the branches of these plantations.

This proves to a demonstration, that woods growing naturally, are far superior in quality to those that have been transplanted.

Therefore, every gentleman that proposes to raise large plantations of wood, ought first to inclose his ground, and then to plow it, if the ground would permit ; after that to sow the different seeds of trees. And although the wood should grow very thick, they ought not to be thinned, but be allowed to thin themselves, which makes the trees grow tall and straight, and free of knots. If the ground will not admit of being plowed, sowing the seeds will answer the ends proposed.

Plowing the muirs, and then sowing the seeds of different kinds of trees, would be
better

better and cheaper than planting, in the remotest parts, less fit for being feued out. After the planting is somewhat grown up, plowing the muirs of Lochaber, and sowing them afterwards with whins, would answer very well. I saw some growing pretty well near Fort-William, upon a ditch that had been neglected. They would answer very well after paring and burning, and taking two crops of corns, one of barley and another of oats, whin being sown with barley or oats. I know no place in Scotland where whins would answer better than in Lochaber, being both dry, and warmer than many other parts of this country; more so if inclosed with plantations: Likewise having a great command of water for mills to bruise them, as is particularly mentioned in Essay xxii. page 287. I have not the smallest doubt but they would clear from L. 4, to L. 5, per acre, perhaps more.

The greatest part of the hills I had access to see in this journey, would be much improved by making the water run across their face in a sloping direction; not to have a sudden declivity, but to return again zig-zag, till at the bottom of the hill. This would have

have one good effect, to water the whole face of the hill, which would not only destroy the heath, but enrich the soil in grafs.

This is perhaps also the cheapest and most certain way to find out where there are any mines, either of lead or copper.

The pasture upon the very top of Cariatich would be much improved by draining in this manner, and covering such parts as are green with the moss that is lying upon the top, which has the appearance of being much of the nature of rich black earth. Even some of the rocks that are flat, if covered with this moss, and sown with white clover, would make good pasture.

Most of the lands in Badenoch that I had an opportunity of seeing, along the side of the river Spey, seemed to be of a light soil particularly adapted for grafs. After being some years in grafs, they would produce great crops of corn. And it would tend greatly to the improvement of all these lands lying along the river-side, which, in time of floods, are wholly overflowed by the water,

First, That the bed of the river should be made as straight as possible.

Secondly, That the whole banks on both
sides

sides of the river should be sloped, then covered with green turf.

Thirdly, The whole land overflowed should be banked in to prevent the water from running, but left open at the bottom, so as to allow the water to run up in time of floods, which would greatly enrich the land, either in corn or pasture.

It is wrong to inclose too large a tract of land, without sluices to let in the water at pleasure. For when the water has to run a great way up, it is clear before it reaches the upper part of the field; and the more muddy the water is, it enriches the land the better.

When a very large field is banked in, it would be a great improvement to divide it into different inclosures of ten or twenty acres, with a bank to run across the breadth of the whole, such as Mr Hugh Tod has done at Ruthven; and immediately above the bank to have a sluice to draw up and shut at pleasure: By which means, it could let in the water, when flooded, into one field, and shut it out from another. This would make the water come in at the bottom of each field,
and

and prevent the sand from running up; at the same time, the fine mud would run up, which enriches the soil every time it overflows the land. The sluices could be made as strong as any part of the bank next the river. See Essay x. page 149. These sluices could be made to shut of themselves when the floods rose very high, if it was found that they were in any danger.

There is no method of improvement so effectual as watering in this way; and the expence is not great, compared with the advantages arising from overflowing.

Draining first, and then watering, are two capital improvements, which, I may say, are much wanted in every part, both in the hilly parts and low country; as they are getting so much into sheep.

Draining would improve the pastures very much, greatly above the expence, or even the hopes of the farmer. The expence of open drains is very small, and they can be easily made upon the tops of the highest mountains.

Wherever the water is confined below ground, it raises a coarse four grass, which,

in place of fattening the sheep, has a tendency to rot them.

It astonished me in this journey, to see the very best parts of the soil and pasture, at the foot of many hills, all in bogs and morafs; when, having so great a declivity, it could be easily made the richest part, either for pasture, hay or corns, at the small expence of a few open drains, if the proprietor did not chuse to be at the expence of covered drains; which, however, would not be great, having so many stones at hand. See page 171, Essay vii. p. 118.

It gave me great pleasure to see the Rev. Dr M'Pherson's small farm at Dallahullie, whose improvements are as good and substantial as any in the low country. His sunk fences, faced with stone, are uncommonly good. All that is wanted to make them equal with the best in Scotland, is, to plant them with thorns upon the top of five years old, which would grow very rapidly, the soil being very much adapted for them, and would also tend greatly to make each inclosure warmer.

The Doctor has a command of lime, which he burns with peats. He has likewise some

fine

fine meadows, which, if once drained, could be water-fed, and then would be very rich, either for hay or pasture.

He had a large store, or pasture farm, which, he informed me, was greatly improved by understocking; so that now it maintains and fattens a vast number of cattle more than when he entered into possession. He has now sublet it all at a considerably advanced rent.

The Doctor was the first I had occasion to see since writing the National Improvements, who proved from his own experience and practice, upon a large pasture farm, what is said in Essay xi. page 171, to be fact: “ That
 “ most of the pasture is overstocked, especi-
 “ ally these wild grounds. I am fully con-
 “ vinced, there would be much more pasture
 “ upon any ground, more especially upon
 “ poor ground, where this method is follow-
 “ ed by not overstocking.”

This was likewise confirmed by Captain John M'Pherson at Ballachron, who informed me, that when he went first to his farm, he did not make above five pounds of his pasture yearly, and now, by understocking,
 and

and keeping a herd to keep his neighbours cattle off, he makes a hundred a year.

It is a very great satisfaction to have what is written, proved from the practice of many eminent farmers. And, indeed, there is scarce one article of any consequence in the whole book, but what has been proved by the experience of some practical farmer.

Here (I must own) I have not seen in any part of Scotland the methods recommended by me for banking in rivers reduced to practice, but in Badenoch on the river Spey. First, by Mr M'Lean at Pitmain upon Mr M'Pherson of Clunie's estate, who has banked a large tract of ground in a more substantial manner than the way I recommended, it being all built with stones at the back, in the form of a sunk fence, two feet below the ground, to prevent the moles from making holes in it, and more than four feet above ground, with a large bank of earth close to the stones, sloping towards the water, and covered with a green swaird. This fence is a little way distant from the water which is very proper.

If this manner of embanking be not too expensive,

expensive, it is certainly better than the way I proposed. If Mr M'Lean was to straighten the bed of the river a little, slope the banks, and cover them with green swaird, it would be more compleat, and unless he does this, it may in time undermine what he has done in some parts. Mr M'Lean has deepened the bed of the river below, which prevents it from overflowing so much as it did. This is of service when in corns, but when in grass is hurtful; as the more it overflows when in grass, being made to run back, the more it enriches the ground. Banks across with sluices would have the same effect to save the corns.

Mr Hugh Tod has banked in the river Spey at Ruthven wholly with a bank of earth, round in the top, and sloped on both sides, covered with a green swaird, exactly the same as is recommended in page 154; which will answer the end proposed very well, provided it be so high as to keep the water out; which does not exceed eighteen pence or two shillings at most each rood.

When the river is at its greatest height, it would need to be carefully inspected after e-
very

very flood; and if any breach happens, it ought to be instantly repaired, otherwise a considerable part may give way. If this answers, which I think it may, being looked attentively after, it is much cheaper than Mr M'Lean's fence. Here the banks also require to be sloped, and the bed of the river straightened in the manner mentioned before, with a bulwark, or head projecting into the water, in some places, to alter the course of it, where it was encroaching.

I was shown at a distance, a large extent of ground, banked in the same manner as Mr Tod's, by Captain John M'Pherson, Bal-lachron; but was not upon the ground. I hope it answers the ends proposed.

In all these embankments, the water should be allowed, by means of a sluice, to come in at the foot, which would enrich the field every time the water came over it.

If sown with lint, it would be a great advantage to the crop, to let the water in after it was three or four inches high. In place of hurting, it might double the value.

Mr Hugh Tod's sunk fences at Ruthven are exactly upon the plan I have recommended,

ed, except that they are not planted with thorns.

Mr M'Lean's, vintner at Pitmain, stone fences appear to be equally good with Dr M'Pherson's; the only defect is, the hedges are not planted upon the top as before mentioned. He has his farm in surprising good order, and a great part in grass. It might pass for a good farm in any part of the Lothians. I am informed he has been at a very great expence for draining, which is quite proper; yet there are some of his inclosures which would need to be better drained. It would tend much to the interest of the Duke of Gordon, and the country, that many would follow his example. Now after he has got so much of his farm into grass, lime would still greatly improve it, for corns and grass, particularly what is in pasture, even the muirs above the road.

If the Duke of Gordon could, by any means, prevail on the greatest part of his tenants to have the half of their farms in sown grass, with a regular rotation of crops of corn and grass, it would be a very great advantage both for the proprietor and tenant, and

would be the means, in a few years, to raise the rents considerably, and not hurt the tenant; as they would be better able to give an advanced rent, after being improved, than they are at present able to give the one half of the present rent.

A few premiums might be of great service. See Essays vi. and vii.

Encourage labouring with the spade every where, more particularly at the foot of hills.

Encourage feuing in every corner of the estate in small parcels, particularly muir ground, where the soil and situation is good, and near water. See the plan of villages in National Improvements.

Give long tacks to every farmer that is willing to improve, three nineteen years. Suppose the present rent ten shillings per acre, to rise at the end of the first nineteen five shillings per acre, at the end of the second five shillings more, which makes the rent double for the last nineteen years; and so on, in proportion to what the present rent of any farm may be. This will neither hurt proprietor nor tenant, but would tend to improve

prove the country very rapidly, and increase population.

By all means encourage good farmers, who are sober and industrious, and are willing to follow a regular rotation of crops of corn and grafs, with a fallow. Although poor, they will soon become rich, if they persevere in following the plan of husbandry proposed.

Give them grafs seeds gratis, upon well-prepared land.

To rent farms properly requires the greatest skill in agriculture, and even natural sagacity; the means of manure; the state of the subject to be let; the markets; the industry of the farmers; and likewise their capacities as to skill in the business, and circumstances with respect to their funds. Even the state of firing and manufactures must be attended to. The rents must be adapted to the capacity of those who occupy the farms; and the farms must be so modelled, as to have a proper proportion, if possible, of light and strong land and grafs. The houses to be central, with many other considerations.

The proprietor who can come nearest to these rules, by properly accommodating his

M m

tenants,

tenants, will have the greatest and best paid rents, and his estate first improved.

If other circumstances are alike, whether the proprietor conducts his business personally, or by a steward, he must have what in Scotland is called a good ground-officer; a person who has skill, and knows the characters of the people of the country.

The following relation given by Mr Marshall, is a proof how easily the most unpromising land may be improved, if a landlord acts with liberality, and a tenant possesses ingenuity and industry.

P. 367. " Minute 37. A principal part of
 " the heath land was laid to the farm of Mr
 " Priest, the young man above-mentioned;
 " and was let to him on the following
 " terms:

" Landlord agreed to raise fences, hang
 " gates, build a new barn upon a large scale,
 " make other alterations, and put the whole
 " of the buildings into thorough repair.

" The tenant agreed to marle twenty acres
 " every year, until the whole should be
 " marled, at the rate of twenty cart loads an
 " acre.

" The rent agreed upon was this: Nothing
 " until

“ until it has been marled three years. The
 “ fourth year after marling, the rent to com-
 “ mence at three shillings an acre; at which
 “ to continue four years, and then, (namely,
 “ the eight year after being marled, to rise
 “ to seven shillings and sixpence an acre;
 “ and at this rent to remain until the expira-
 “ tion of the term of twenty-one years.

“ It was also further agreed, that the te-
 “ nant should be paid for the carriage of the
 “ materials of the new barn; but should do
 “ that for the repairs and alterations gratis;
 “ as also for the subsequent repairs during the
 “ term. Also, that the tenant should pay
 “ half the expence of workmen’s wages for
 “ subsequent repairs; provided that such
 “ moiety do not exceed five pounds in any
 “ one year.

“ This was a liberal agreement on the part
 “ of the landlord; and, on a cursory view,
 “ may seem to give extravagant encourage-
 “ ment to the tenant. The following calcu-
 “ lation, however, will shew, that, in the
 “ end, the plan will turn out highly advan-
 “ tageous to the landlord.

“ Suppose, for the sake of calculation, the
 “ quantity of heath land let to this tenant,
 “ to

“ to be exactly three hundred acres; and
 “ that these three hundred acres are divided
 “ into thirty inclosures of ten acres each;
 “ with a public road, of a drift way, between
 “ each line of inclosures. This is sufficient-
 “ ly near, if not exactly the fact upon Fell-
 “ brig-heath.

“ In this case, every inclosure required to
 “ be fenced on three sides.

“ Ten acres contain one thousand six hun-
 “ dred statute rods. The square root of one
 “ thousand six hundred is forty; consequent-
 “ ly, each inclosure, supposing them to be
 “ exactly square, required one hundred and
 “ twenty statute rods of fencing.

“ The price given for ditching, planting
 “ the quick, and hedging, was eighteen
 “ pence each long rod, of seven yards. An
 “ hundred and twenty statute rods contain
 “ about

“ 95 long rods, which, at 18d. is L.7 2 6

“ 45,000 quicksets, at 3s. 6d.—

15s. 9d.

“ — Furze-feed, 4s. 3d.

1 0 0

L.8 2 6

“ For

" For fencing 30 inclosures at L. 8 : 2 6,

" each, reckon L. 250 0 0

" — 50 gates, with posts, irons

" and hanging - - - 50 0 0

" — The barn (very spacious)

" suppose, - - - 200 0 0

" — Additions, alterations, and

" repairs - - - 100 0 0

L. 600 0 0

" — Compound interest on this

" sum, in 21 yearly payments,

" at 4 per cent. 700 0 0

L. 1300 0 0

" The rents to be received, during the

" term, supposing twenty acres to be marled

" yearly, would be these :

1 year,

1 year	0	0	0	Forward	153	0	0
2 —	0	0	0	12 year	49	10	0
3 —	0	0	0	13 —	57	0	0
4 —	3	0	0	14 —	64	10	0
5 —	6	0	0	15 —	72	0	0
6 —	9	0	0	16 —	79	10	0
7 —	12	0	0	17 —	87	0	0
8 —	19	10	0	18 —	94	10	0
9 —	27	0	0	19 —	99	0	0
10 —	34	10	0	20 —	103	10	0
11 —	42	0	0	21 —	108	0	0
<hr/>				<hr/>			
L. 153 0 0				L. 967 10 0			

“ As the compound interest of

“ the above receipts set down, 232 10 0

“

 L. 1200 0 0

“ Thus it appears, from this calculation,
 “ that on the supposition of the articles of
 “ agreement being strictly adhered to, the
 “ landlord will be paying, at the expiration
 “ of the term, one hundred pounds as the
 “ purchase-money of three hundred acres of
 “ improved land, worth from ten to fifteen
 “ shillings an acre; the principal part of this
 “ allotment being a good loam, lying on the
 “ desirable

“ desirable subsoil, an absorbent brick
 “ earth.

“ But the fact is, and was probably fore-
 “ seen, that the tenant, instead of marling
 “ twenty acres annually, according to the
 “ letter of the agreement, marled, I think he
 “ told me, upwards of one hundred the first
 “ year, and has now nearly finished the
 “ whole.

“ Therefore, supposing the original fix
 “ hundred pounds, and the first seven years
 “ interest, to have been taken up, the land-
 “ lord would, at the end of the term, have
 “ cleared off the incumbrance, and have
 “ found some hundred pounds in his pocket,
 “ beside the fee-simple of one hundred and
 “ fifty to two hundred pounds a-year, from
 “ this allotment only ; beside the advantages
 “ arising from the remainder of the heath,
 “ and the inclosure of the common field ; and
 “ besides having done away a nuisance, and
 “ planted industry and plenty upon an almost
 “ useless waste : and this, too, without ren-
 “ dering himself odious, or his tenants mi-
 “ serable. Improvements like this are real,
 “ and bring a permanent increase to the rent-
 “ roll of an estate.”

These

These observations have been lengthened out longer than was at first intended ; which prevents me from making remarks on other parts of the country through which I travelled.

The hints that are already given may be reduced to practice with great success in Athol, both on the hills, and by the sides of the rivers.

There is one remark I would make, that Athol is a warmer climate than the grounds farther north, the country being populous, the soil good, and more of it improved.

This country would answer very well with the spade culture ; especially such parts in Athol, Breadalbane, and Strathbran, where the soil is good to near the top of the hills.

The same observations will apply with respect to Fyfe ; from Perth to the Queensferry, where there are very little substantial improvements going on by inclosing, draining, summer-fallowing, and liming, and a regular rotation of crops of corn and grass.

It is very much to the disgrace of the proprietors and farmers upon that road, that there is so little done in improving their grounds ; having lime and coals both at a very

ry short distance, and at a cheap rate. They would be the better of having some spirited farmers to set them an example of a regular and steady method of improving their grounds.

There are few situations in any country, but where some of these observations may be very useful, and easily reduced to practice.

I shall conclude, by relating some instances of the good effects of flooding, and the extraordinary crops produced by means of water.

First, It is universally known what astonishing crops were produced in Egypt, by the overflowing of the river Nile only once a year.

Though little or no rain falls upon this country, yet its fertility in former ages is said to have been inconceivable; no less than one hundred fold every year. The river left a rich slime upon the ground, after its annual overflowing; which not only fertilized the soil, but was of such a tenacious nature, that it resisted the drought, still retaining moisture sufficient, with the dews that daily fell, to bring the crop to maturity. As the climate was very warm, and the grain, of

N n consequence,

consequence, a very short time in the ground, they had often two crops in one year. But as it is now more than 3300 years since the Nile overflowed its banks, we may reasonably suppose, that all the large extent of country called Lower Egypt, is now partly filled up, by the sediment or slime leaving a little every year; so that now the water will not have the same effect upon the same ground, that it had in those early periods of time. But still the soil will be very rich, and produce great crops, though not so great as at first.

Secondly, It is above twenty years since I advised the embankment of the river Tay, at the conflux of the Earn with it, upon the estate of Easter Rhind, and likewise proposed, to join the island in the Tay with the mainland.

Although none of these were done at the time mentioned, the embankment has since been made in some parts, and the island also banked in; both of which have produced very great crops. Mr Somerville the tenant told me, he had above twenty bolls of oats upon each acre, the first crop upon the island.

Mr

Mr Hay of Leys has banked in Mugdrum inch in the same manner, where he has had extraordinary crops.

The advantage of these places is, that they can be enriched by overflowing with water, by means of sluices, which ought to be done every year.

Lord Weyms is joining the island to the main land, by a stone bulwark across; by which he will acquire a considerable quantity of very fine soil. And I am informed by Mr Somerville already mentioned, that it is filling up an inch every full tide, in twenty four hours, when the water is muddy.

Thirdly, General Graham has made some very great improvements upon the moss grounds below his house at Gorthie, first, By cutting ditches across to drain it, and dividing the ground into different inclosures; secondly, By banking out the river called the Powe.

By these embankments, he keeps off the water that comes either from the high grounds or the river. At the same time, he has wooden sluices, after the Dutch form, upon each of his inclosures, to let the water in and out at pleasure; and thus he produces
very

very good crops both of corn and pasture. His factor, Mr M'Cale shewed me one inclosure in particular, where he set out with paring and burning. On this field he has had thirteen crops of oats running, and the last better than the first; the crop 1786 being sold for L. 9 sterling an acre as it stood.

The method taken here, is to give the seed furrow in the autumn; then the river Powe, being a slow running water, and very muddy in the winter time, is let in, and stands on the field four or five feet deep during that season, by means of opening all the sluices. A considerable sediment is left from the waters of the Powe, and likewise those coming from the higher grounds; which answers the same purpose as dunging every year.

The General has set some parts of the same moss, so inclosed, at two pounds per acre each year, for plowing, and his tenants are very well pleased. I was much surprised to see so much good pasture upon it; and Mr M'Cale informs me, that the grass is very nourishing and fattening, especially for young store.

This is the greatest improvement upon a moss I ever saw; and the expences of draining
ing

ing and cutting the ditches at first were not so great as any one would imagine from seeing them. Being moss, it was not difficult to cut ; and by persevering in the same plan, the soil will become richer every year ; although I do not approve of taking so many crops of oats running. But this shews the fertilizing effects of the water.

The fourth instance I shall mention is, that a gentleman, whose veracity I can depend upon, told me, that the tenant of certain lands on a river-side in England, where several corn-mills had been erected, came to the proprietor, and told him, that if he would allow the mills to be destroyed, he would still pay him the same rent he was wont to pay for both mills and farm. The proprietor at first refused his offer, alledging that he should lose the multure for his mills ; but, after taking the matter into consideration, he offered to agree to the terms proposed, if the tenant would give him L. 100 yearly of advanced rent. This the tenant engaged to do, and then threw the whole of this low ground, which was of considerable extent, into grass. Having the advantage of the falls for the mills, it was now in his power to overflow
the

the whole of it with water from the river; and this method he practised with such success, that he raised three crops of hay in one year. The gentleman from whom I had this account told me, that he saw some of these hay crops, and that they were the weightiest he ever beheld.

The last instance which I shall mention of the great advantages of embanking, I received from John Erskine, Esq; of Mar. He informed me, that he has banked in about 45 or 50 acres all taken off the river upon the side of the Forth, below Alloa. The bank is about ten feet high, and very broad at the base, all raised from the mud and turf, without any stone. The slope of the bank is one foot in five. This he has covered over with green turf, taken from the inside of the bank. It may appear surprising, that when they first began to raise the bank, there was nothing but mud in the inside, and that very loose and deep; yet, before the bank was finished, they got as much green turf from the inside, as to cover the whole of the sloping bank, which stands very well, and resists the force of both land-floods and tides.

The ground in the inside is now turned
solid

solid and firm, so as to allow the plows to go. The whole of this inclosure, taken off the river Forth, is now let for one guinea per acre. Mr Erskine thinks that he is well paid for his trouble and expence; and that the ground will be still increasing in value, as he has the means of overflowing it whenever he pleases.

It is amazing to see the great encroachments which the river Forth has made, and is still making, carrying away yearly very great quantities of rich soil.

However, the attention of the proprietors is now awakened. Mr Abercrombie of Tullibody, and several other gentlemen have been equally successful with Mr Erskine. And it may be expected, that their example will influence the landholders on the Forth, and in similar situations, to attempt improvements, which are so interesting to themselves and beneficial to their country. For not only in this river, but in almost every river in Britain that communicates with the sea, an immense quantity of ground might be recovered from the rivers and sea; even at the mouth of many rivers. Vast tracts of land might be made good, that are at present sand and gravel.

It

It is astonishing to think, how much good soil every year is carried away with the land floods into the sea; a great part of which might be retained by contracting the rivers, particularly at the end where they run into the sea.

If rivers great and small, were straightened, and more confined, with banks of a gentle slope, covered with a green sward, the damage would not be so great at every land-flood as it now is.

If the mouth of every river was confined, and carried considerably farther out into the sea, in a course of years, a great addition would be made to the coast. For the soil that comes down the river, would in part settle upon the shore, wherever there was an eddy, and, at the same time, the river would be deepened; and consequently, the navigation rendered safer, as the tides would be higher when confined, than when allowed to spread over a great tract of ground.

This plan has been actually carried into effect at Aberdeen; and, by this means, a sand-bank, which had nearly choaked up the mouth of the river, has been carried off.

There are many situations by the sea-side,
which

which are nothing but sand and gravel, and those of large extent, which might be much enriched, if a part of the rivers were turned off a little above, so as to run upon these sands, every time there was a land flood, and made to stand dead; which might be done, by raising a ridge a little distant from the sea, and covered with green swaird. By this means, the mud would settle upon the surface, and, in a course of years, make it a rich pasture; which ought never to be plowed, but to be kept constantly in grass, and flooded every year in the winter time, and sometimes in summer.

Wherever there is a city or town situated a little above a sandy shore, the water from the streets might all be made to run into these flat places, which ought to be levelled as much as possible, and the hollow parts filled up before the water was let on.

What is said, might be applied with great success upon every part of the sea-shore where there is a large tract of sands. The water coming from the city of Edinburgh might be conducted several miles along the sands.

The sands from the mouth of Tay to Ar-

O a breath,

“ do mischief to the land ; or, at least, shall
 “ never correct its ill qualities.

“ At all times, when governments have
 “ taken these different objects into consider-
 “ ation, we have seen entire countries change
 “ their face. What have not the Dutch
 “ done, by damming out the fury of the sea,
 “ and securing themselves from inundations,
 “ with which they are incessantly threaten-
 “ ed? How many lakes and marshes have
 “ been happily drained? In China, we see
 “ two of their finest provinces gained from
 “ the sea, by the industry of the inhabitants.
 “ (These two provinces are called Kiang-nan
 “ and Iche-kiang. Their fertility is extraor-
 “ dinary.)

“ In Persia, on the contrary, a dry coun-
 “ try, where the land requires being water-
 “ ed, what efforts are made, and with what
 “ success, for conducting streams of water?
 “ Among that nation, if any one has the art
 “ of conducting water, or fountains, in any
 “ place where it never was before, he has the
 “ enjoyment of the advantages of it for five
 “ generations. The charge of superintend-
 “ ing the water was, among the Persians, the
 “ most important in the state. All these ex-
 “ amples

“ amplex surely prove, that with the atten-
 “ tion of government, we may be able to re-
 “ press the impetuosity of the waters, and
 “ direct them according to our will to the
 “ greatest advantage of the country. If we
 “ abandon all to hazard, and the care of sim-
 “ ple individuals, we shall never be long in
 “ seeing the most fatal effects. The evil, we
 “ know, increases every day, until it be-
 “ comes irreparable. The conduct of waters
 “ requires much understanding. It should
 “ be under the view of enlightened eyes,
 “ who know well how to direct the necessary
 “ works; otherwise we risque the seeing ve-
 “ ry different effects result from what we ex-
 “ pect.

“ When we would wish to conduct a wa-
 “ ter over a dry soil, every one is not in a
 “ state of pronouncing, if it will be proper
 “ to undertake it; because all the world
 “ knows not how to calculate the advantages
 “ which may be procured by canals for wa-
 “ tering, or the expence of constructing and
 “ repairing them. We ought, therefore, in
 “ all states truly political, to excite happy
 “ geniuses to study the whole that belongs
 “ to the architecture of waters, and to turn
 “ their

“ their views and serious reflections on that
 “ side.

“ What services might be rendered to the
 “ country by men paid by the government
 “ for making it their principal occupation,
 “ to know distinctly all that is practised by
 “ divers nations, and in particular the Dutch,
 “ for banking out rivers, for placing their
 “ works in a state of resisting the action of
 “ the waves, slow, or violent; for draining
 “ marshes; for directing the waters, and
 “ distributing them conformably to the
 “ views proposed.

“ A sovereign ought never to be the subject
 “ of regret, for giving pensions to those who
 “ having the necessary talents, consecrate
 “ themselves to a study so useful to their
 “ country.”

There is a very considerable difference as to the quality of waters, some having a more fertilizing property than others.

As said before, the muddier that the water is, the better; and the quality of it much depends on the richness of the soils that the river has to pass through; part of the fine particles being carried down and deposited on the low grounds.

Where

Where the water comes over a large body of limestone, it has a particular fertilizing quality.

All waters, especially when muddy, fertilize the soil, provided they are made to stand dead; though every one not in an equal degree.

From these observations it is very clear and evident, that many soils, in the different situations described, may be so improved, by means of inclosing, draining, banking, and then watering, as to make the poorest of them at least double, and some of them above ten times their present value. And that, perhaps, at not the twentieth or even the hundredth part of the advantages arising from pursuing the methods recommended. Therefore it ought to be the study of every gentleman proprietor, and tenant, to improve upon these hints, according to their different local situations.

The very great profits that would arise from inclosing, draining, banking, and then watering of moles, morasses, and meadow grounds, by the sides of rivers, makes me often wonder how they came to be so universally neglected; when it is considered how
small

small the expence would be, and the advantages so great, when properly conducted, agreeable to this plan.

These places would not only produce extraordinary crops in most seasons; but they have this advantage over most of the other grounds in the country, that in a very great drought, when the crops fail in almost every other place, all these places that have been much overflowed in winter, would produce very weighty crops, both of hay, pasture and corns, more particularly, a great crop of lint, as they could be flooded when growing.

These are the only places where a good and weighty crop of flax can be depended upon; and, at the same time, the flax would be much finer. Witness the flax crop in Holland and in Egypt. What is it that has made Egypt so much renowned in all ages for fine flax, but the overflowing of the river Nile?

Although it is not pretended that we could raise such great crops, or so fine as in Egypt; yet these places that were water-fed for many years, would produce as much upon one acre, as the other grounds upon two or three acres, and the flax much finer. This of itself ought to induce the practice recommended, although
it

it had no other advantages ; for a great crop of good fine flax is worth two or three of the best crops of corns.

It is not proposed to plough the ground after one year's flooding ; but the water should be continued for five or six years, or more.

This is what has hurt the character of grounds being benefited by water running upon the lands in the winter time, viz. that a great many plough the land watered only one year, which often produces great crops ; and, what is still worse, they continue cropping for two or three years more without any other manure. This impoverishes the soil very much ; the same as lime and shell marl, when first laid on, which produce very great crops for a few years ; but if continued to crop without dung, and being thrown into grafs, impoverishes the soil so much as to make it unfit to produce either corns or grafs.

Since writing the above, a gentleman told me, he knew a field by the side of the river Tweed, which was so poor, that the farmer despised it, not thinking it capable of any improvement for either corn or grafs, which procured but very little pasture. It com-

monly went under the name of the Windle-straw field. It happened one year, that the river Tweed swelled by a land-flood to an uncommon height. This field was overflowed. The hedges, with the bank kept in the water, so that it stood dead upon it. The consequence was, that the next year, to the farmer's great surprise, the whole field was wholly covered with white clover.

It is somewhat strange to consider, that the greatest improvement in every art is often found out by accident. It is still more strange, when thus found out, these very great improvements, at so little expence, are not persevered in. The field would be still improving, if the water was laid on every year, and would alter the nature of the soil altogether.

The reason why these methods are not more adopted, may in part be owing to one of these things:

First, The want of attention to the nature and situation of the soil.

Every situation has its own advantages and disadvantages, some more than others. The great matter is, to study what is the most suitable improvement that can be made upon
on-

on every situation at the least expence. Wherever you have moss to lay on, it alone will improve the pasture, and arable land: And if you have lime to lay above it, will produce great crops, both hay, pasture, and corns.

Moss and hot lime, laid on carse clay, will produce great crops of wheat. This last is practised in the carse of Stirling with very great success.

Laying moss and lime upon the poorest ground when dry, even the bare rocks, will make good pasture, where neither of them is to be found. Draining and watering will alter the nature of the soil very much.

The second reason may be, some persons are afraid of the expence. This proceeds from want of experience. It would astonish one who was unacquainted with these things, to find how small the expence for draining, banking, and watering is, comparatively to the crops arising therefrom.

Suppose one had occasion to lead the water along the side of a hill or bank, in order to water the plains below a mile long, the cut twelve inches wide and deep. This can be done for a penny at most each rood, being six yards in length; three hundred of which
make

make a little more than a mile; this is only one pound five shillings. If eighteen inches broad and deep, at twopence per rood, would be two pounds ten shillings for one mile. If sixpence per rood, seven pounds ten shillings. If five foot wide and three deep, at one shilling, fifteen pounds per mile; and so on in proportion.

Now, let any person consider the expence, and advantages arising from watering, perhaps some hundreds, or a thousand acres by this cut. The longer the water has to run, the cut would need to be wider and deeper.

This cut might answer in part for a drain to the grounds above, if those below were a dry soil, and moss above the cut. The small moss might be turned into the water, which would enrich the fields below. Even a rich clay, rock, or shell marl, might be mixed with the water, and by these means enrich the plains below.

One person could manure many hundred acres in one year, by mixing whatever soil was above with the water. This would save the trouble of carting it down the hill.

In place of a sluice upon the banks by river sides, in some places, a large fir tree, with a bore
fourteen

fourteen or sixteen inches diameter, or a square box, might answer the same purpose, by having a piece of bend leather nailed upon the end of the tree, upon the upper side, which would open and shut the same as the valve of a pump; having a small piece of wood nailed to the outside of the leather: If thought proper, to place one at each end, to let water in and out at pleasure. The tree need not be longer than the bank is broad.

The expence of draining may be calculated in the same way.

If at a penny per rood, the expence for a
mile would be L. 1 5 0

If at two pence, each mile, 2 10 0

If at sixpence, do. 7 10 0

If at one shilling, do. 15 0 0

The embankment and sloping may be calculated in the same proportion.

Water in this way may be led along the side of a hill for many miles.

In some situations, a narrow level canal could be made to transport goods from one place to another; which might be got done at two shillings or half a crown each rood.

The third reason is, That persons may be doubtful of its answering the end proposed.

What

What is formerly said, it is hoped, may be sufficient to convince every farmer of the utility and advantages arising from enriching the grounds wherever situated, by water-feeding.

The great crops produced by the overflowing of the Nile, and the great expences laid out by the Egyptians for the proper conducting of the water, is a convincing proof of what is said before, as appears from the following extract from Mr Savary's letters on Egypt, vol. ii. p. 227.

“ Agriculture was in great esteem amongst
 “ the antient Egyptians. They had rendered
 “ it very flourishing in the whole extent
 “ of their empire. Witness the immense
 “ works they have made in the distribution
 “ of the canals, and for watering the lands.
 “ At present we reckon eighty canals like rivers,
 “ all dug by the hand of men, several
 “ of which are twenty, thirty, and forty
 “ leagues in length. They receive the inundation,
 “ and circulate the waters through the country.
 “ Six only have water in them the whole year.
 “ The others, nearly choaked up, are dry upon the fall of the Nile.
 “ The great lakes of Moeris, of Behire, and
 “ Mareotis

“ Mareotis form vast reservoirs calculated to
 “ contain the superfluous waters, and at
 “ length to spread them over the adjacent
 “ plains. They raised them upon the elevat-
 “ ed grounds, by means of vertical wheels,
 “ the invention of which is due to the E-
 “ gyptians. One ox was sufficient to turn
 “ them, and to water a vast field. These
 “ wheels gave to Archimedes, in his journey
 “ into Egypt, the idea of the ingenious chain
 “ or chaplet, still made use of in our days.”

Page 229. “ The waters are conveyed by
 “ aqueducts to the very summit of the hills.
 “ They were received there in immense ba-
 “ sons hewn out of the rock; from whence
 “ flowing into the midst of deserts, they con-
 “ verted them into fruitful fields.”

Page 232. “ We may confidently assert,
 “ that upwards of one third of the lands for-
 “ merly in cultivation are metamorphosed in-
 “ to deserts.”

Page 235. “ This negligence gives a mor-
 “ tal stab to agriculture. A whole district,
 “ which owed its fertility and its riches to
 “ the waters of a canal, no longer receiving
 “ a sufficient quantity, become uncultivated,
 “ and abandoned. The Nile, in the course
 “ of

“ of 900 leagues traversing deserts and bar-
 “ ren mountains, brings with it a prodigi-
 “ ous quantity of sand and mud. How cul-
 “ pable are they who thus suffer the springs
 “ of plenty to dry up? For wherever the wa-
 “ ters of the Nile are conveyed, there is the
 “ earth covered with treasures. It only seeks
 “ to be productive.”

The Egyptians in antient ages were esteem-
 ed the most learned people in the world.
 There never was a nation who made such so-
 lid and permanent improvements in agricul-
 ture, only by means of water.

Although they were at an immense ex-
 pence in making canals and reservoirs, and
 keeping them in good order; yet they were
 amply paid for all their trouble and expence;
 by the wonderful crops of all kinds that were
 produced. This improvement was not for
 one age, but has continued for ages, as far
 back as history gives us any account. Egypt
 was often the granary of the world. When
 famine was in most places, they enjoyed
 plenty; having so much grain annually to
 export, their trade was increased to a very
 great height. This was, in reality making
 agriculture the foundation of trade. This
 great-

great and permanent improvement was derived from studying their natural situation, and using the proper means to take the benefit thereof.

Ought not Britain, then, to follow their example, and study the natural situation of every place: And, wherever water can be introduced, to use the proper means for so doing; even although at a great expence, in many canals for many miles.

In making canals, they might, in some situations, attend to two particulars: First, That of water-feeding: Secondly, The transporting of goods from one place to another. The water-feeding would not hurt the canal, as the water could be let on in the winter time, when the water was both plenty and muddy.

It is wonderful to think, what very great improvements could be made every where by means of water, both in hills and low country.

The vast number of great lochs in the hills could be made use of as so many reservoirs to open with sluices in time of drought, to water the plains; or might be led into a different

ferent tract to water barren grounds, either in plains, or by the sea-side.

In many of these lochs, when drained, vast quantities of shell marl might be found.

There might be a small cut made far up upon river-sides, to lead the water a considerable way to water plains.

The very great number of places called links and sands, by the sea-side, would be greatly improved by means of fresh water running and standing dead upon these, and many other places. This watering to be continued every year.

This improvement would last for ages, and the ground would still be increasing in richness, as long as the water was used; which ought never to be given over, but the water to be led on to one field or other, which would greatly increase both pasture, hay, and corns.

Take the most barren sands, or gravel, when level and dry, and make the water stand dead upon it, it will enrich the land to a very high degree, both for pasture and corns.

That we may have some idea what very great crops may be produced from water-flooding,

flooding, and to what an extraordinary length this method of improvement may be carried, let us again take a view of the Egyptians' improvements, by means of water, and the wonderful effects of their national industry.—

What a nation can do, when united in one object! It almost exceeds our belief.

Although the waters of the river Nile had an uncommon fertilizing quality; yet the advantages arising therefrom would have been very small, if the Egyptians had not adopted schemes for distributing the water over a very large tract of country of 200 leagues, never paralleled by any nation in the world. Their schemes were admirably well calculated for answering the ends proposed.

We are informed by Savary, that they first altered the course of the river Nile altogether, which formerly run by the side of lower Egypt; but now, since altered, they have made the Nile run almost through the center of lower Egypt, and branched it off, as he says, “ in eighty canals, like rivers, all dug by the
“ hand of man, several of which are twenty,
“ thirty, and forty leagues in length. The
“ great lakes of Moeris, Behire, and Marco-
tis,

“tis, form vast reservoirs calculated to contain the superfluous waters, and at length to spread them over the adjacent plains.”

He likewise says, “Some great dykes, the ruins of which are to be seen, served to keep in the river; others were opposed to the torrents of sand, which have a continual tendency to cover the face of Egypt.”

These canals were spread over the whole country, like the branches of a large tree.

The immense sum these grand works would cost is almost beyond our conception. Indeed, at this distance of time, it is impossible to calculate the expence. Yet we are sure, whatever the sums were, although many millions sterling, they were amply paid for their trouble and expence, when these canals were kept in repair. But now, we are informed, that a great number of them are choaked up; and, of course, the produce is not one hundredth part of what it was in ancient times.

This shews us, that the best calculated schemes that ever were invented for any kind of improvement, if not persevered in, will soon go to ruin.

The dimensions of lake Moeris were astonishing,

nothing, which Savary says, is reported by Herodotus and Strabo, to be 75 leagues in circumference, and 300 feet deep. This almost incredible lake, said to be dug by the hand of man, shows what mighty works can be done by a great army of men.

However strange this may appear upon the first view, yet if we only consider the situation of the ground where this lake was, in a desert of sand, the attempt will not seem difficult; for the run of the river Nile was considerably above it, which, we are informed was brought by a canal, named Joseph's, forty leagues in length, to lake Moeris.

And thus, having the command of the river Nile by this canal, we may suppose that the most probable means of effecting the work was, to dig several deep canals the whole length of the lake, and to let in the water into one at a time, which would both deepen, and carry off a considerable quantity of the sand, and then by shifting the water to another canal. Some thousands of men that were employed, would be always deepening one of these canals. Thus, by this means, letting the water only run in one canal at a time, and shifting it to another, would

would carry off a vast quantity of sand, when the canals were straight, and had no interruption. And we are to suppose that the fall of the water was very considerable.

The following extracts shew the extent of this lake.

“ The labyrinth, says Herodotus, such as
 “ I have been describing it, is still less sur-
 “ prising than the Moeris. This lake is in
 “ circumference 3600 stadia, or 60 schenes,
 “ which form the dimensions of the mari-
 “ time base of Egypt, (75 leagues), it stretches
 “ from north to south, and its greatest depth
 “ is three hundred feet. Two pyramids con-
 “ structed in an island towards the middle,
 “ rise from three hundred feet below water,
 “ and are as high out of it; which proves
 “ that it has been dug by the hand of man.
 “ Each of them has on its summit a colossal
 “ statue seated on a throne. Their total ele-
 “ vation, taken from the base, is a stadium
 “ of six hundred feet. Lake Moeris occupies
 “ a soil very dry, and destitute of springs.
 “ It derives its waters from the Nile, which
 “ runs there during six months. The rest of
 “ the year it restores them to the river. Dur-
 “ ing the former period, the fishing produces

“ a talent of silver daily to the royal treasury,
 “ and twenty minas only during the latter.
 “ According to the natives of the country, a
 “ canal is pierced across the mountain, the
 “ extended chain of which commands Mem-
 “ phis. This is an outlet, by which the fu-
 “ perfluous waters are poured into the sands
 “ of Lybia, on the western side. I enquired
 “ what had become of the earth taken from
 “ the lake; they assured me that it had been
 “ conveyed to the river, and carried by the
 “ current to the sea.”

And then Mr Savary joins the report of
 Strabo to that of Herodotus, as they throw
 mutual light upon each other.

“ The province of Arsinoë contains the
 “ wonderful lake of Moeris. It resembles the
 “ sea in its extent, its colour, and its shores.
 “ As deep as it is vast, it receives at the be-
 “ ginning of the inundation the waters
 “ which would otherwise cover the harvests,
 “ and the habitations of men. They are con-
 “ ducted thither by a great canal. When the
 “ Nile subsides, they return by two other
 “ canals, (those of Tamieh and of Bouch,)
 “ which, as well as the former, serve for
 “ watering the fields. All this is naturally
 “ performed.

“ performed. At the head of the canals,
 “ sluices are formed, which are opened at
 “ pleasure, whether to introduce, or let off
 “ the waters.”

These canals and reservoirs are said to have been executed by King Moeris five hundred years before the Trojan war; and they were kept in good order for many centuries after. During which periods Egypt produced such wonderful crops of all kinds, as surprised the whole world; and would have still continued to do so to this day, if the same care had been taken of the canals for distributing the water.

Although Egypt in these antient ages was extraordinarily populous, more so than any nation in the world at that time; yet they had not only great plenty to supply themselves, but amazing quantities of corns to export for the supply of many other nations. We know that they frequently afforded assistance even to the plentiful land of Canaan; for we read of three famines at different periods, when they were supplied with corn from Egypt, and could not be served any where else.

But, if I may be allowed to hazard a conjecture;

jecture, I should be inclined to attribute to Joseph the canal which is called by his name, and which served to conduct the water into lake Moeris. Likewise lake Moeris itself, and the other different canals for distributing the water over the whole land of lower Egypt.

The whole of this work appears to be so admirably contrived to answer the end proposed, for enriching every part of the country, and to prevent the river Nile from overflowing its banks, when at its greatest height, by means of these incredibly large lakes, that it seems to have been devised by a very uncommon and extraordinary genius, not to be paralleled in history.

The enormous expence it would take to dig these canals and lakes, to serve as reservoirs, is another reason why we may suppose that none but Joseph could attempt such an undertaking. For what kingdom could defray the expence, or would, although they had been able, being uncertain of the success.

The altering the course of such a large and rapid river as the Nile, is liable to so many unforeseen accidents, that one would imagine it might have deterred any kingdom from such an arduous undertaking. But Jo-

seph had a command of money equal to the magnitude of the work. For the great treasures he received during the seven years of plenty, were sufficient to enable him to effect this undertaking.

It is probable, that a part of it might be done before or during the seven years of plenty. The good effects shown by the extraordinary crops that were produced, would encourage him and the whole nation to go on with alacrity with what remained. The whole kingdom of Egypt was under his government. And it is probable he enjoyed his office for eighty years, and, consequently, would acquire great experience.

It is also well known, that popular tradition in Egypt attributes all their greatest works to him. An opinion, which however false in many instances, is probably in some cases well-founded.

I shall now proceed to make some general observations that may be useful for many situations.

Although it cannot be expected that such great crops as were produced in Egypt can be raised in Britain, as we have not the soil, water of the same fertilizing quality or climate;
yet,

yet, by following the same plans in miniature, very extraordinary crops could be produced, both in Scotland and in England, double of lands not water-fed.

How many small canals could be made in almost every part of Scotland, and many in England, by the side of most rivers, and along the side of hills, for conducting the water many miles, which might answer many good purposes.

That this is capable of being reduced to practice, we are informed by Volney, in page 300 of the first volume of his travels through Egypt and Syria, “ That the inhabitants of Syria, notwithstanding the
 “ mountaneous situation of the country, profited by the water. They conducted it by
 “ a thousand windings along the declivities, and stopt it by forming drains in the valleys; while in other places they prop up
 “ ground ready to crumble away, by walls and terrasses. Almost all these mountains
 “ thus laboured, present the appearance of a flight of stairs, or an amphitheatre, each
 “ step of which is a row of vines or mulberry trees. I have reckoned from an hundred to
 “ an hundred and twenty of these gradations
 “ on

“ on the same declivity, from the bottom of
 “ the valley to the top of the eminence.”

The canals need not be large, but rather more numerous, having them twisting along the banks, or a dead level; and large quantities of goods, might be transported by them, in long, narrow flat-bottomed boats, drawn with a horse, or pushed along by men with long polls.

The canals would, when properly made, help to drain the grounds both above and below.

By these means water could be conducted to many barren spots, both upon the side of hills, and in many plains; in some places by the sea-side, where there is nothing but sand or gravel. Letting the water stand dead, would in time produce a new soil.

In some situations, these canals might serve corn and other mills with water-falls.

Indeed, every farmer who has the command of watering ought to make this his study.

How many lochs great and small could be drained, at least in part, to supply these canals in summer, although in winter less needed.

How

How many of these lochs, when drained, have great treasures of shell marl in the bottom, which is an excellent manure, either for corns or grafs.

The water that is impregnated with shell marl, or lime-stone, is very rich. Rock marl, or fullers earth, is good also, and clay for light soils.

How many very extensive mosses, morasses, and meadows could be thus drained, so as to produce great crops of grafs and corn; and after being drained, much enriched by being flooded yearly? These, in many places extend very far. I am informed, that the moss to the eastward of Glencoe, stretches out as far as the brae of Marr, fifty or sixty miles; all of which could be drained, and then flooded.

Mr John Knox, in his Tour through the Highlands of Scotland, and the Hebride isles, in 1786, says in page 272. "Between Durness and Caithness there is a tract called the Maon, which signifies, the great morass, about twenty or twenty-four miles in length, by eight in breadth, which must be passed by all travellers on that coast.

"This

“ This tract seems to be partly a deep morass floating upon water.

There are a great number of mosses and morasses, some of which are of considerable extent, both in the highlands and low country. Most of them could be drained at a very small expence; and the water might be conducted to other barren spots not far distant, and would greatly improve the pasture.

The want of a sufficient declivity to carry off the water, renders it difficult to drain some mosses. But wherever we can find out the feeder or spring, which supplies the moss with water, and which in some places might be done, the draining could be easily effected, by giving the water a different turn, a considerable way before it enters the moss.

In some mosses, to render the draining compleat, it may be necessary to cut a drain a considerable distance below the moss.

Many landholders are, perhaps, deterred from attempting to improve mosses and morasses, through an idea that the expence will be immense. I am, however, convinced, and shall presently almost demonstrate, that, in many situations, if the work is properly executed,

ecuted, the expence, however great, would be more than reimbursed by the product of the first year. There is, indeed, no other species of improvement, that can be made upon land, which will so amply, or so rapidly repay the expence.

It is not here supposed, that all mosses will afford an equal profit to the improver. The difference in their quality is great. But the poorest, if compleatly drained, pared, and burnt, will make good pasture. Many would be worth twenty shillings an acre for pasture only. And if the situation were such, that it could be flooded with water, in autumn, winter, and spring, great crops of hay might be raised. Nay, in some places where the water could be made to stand dead, a crop of hay might be obtained every year. In this case, however, no cattle should pasture upon it, either in winter or spring; as pasturing would greatly decrease the weight of the crop.

The morafs described by Mr Knox, contains above one hundred thousand acres; which, if the moss is good, would produce amazing crops of corn and grafs; and the expence, though considerable, would probably

bly be defrayed by the produce of the first year.

To rescue such an extent of land from its present wretched state, would be an act of real patriotism. Self-interest, humanity, and fame, call upon the gentlemen of Caithness to make the attempt. They may enrich themselves, give bread to thousands, and acquire a glory, which, to common sense, will appear more brilliant than that of the hero, whose celebrity is obtained by shedding the blood of his fellow-creatures, and whose triumphs are marked by the desolation of provinces.

And to give at once a decisive answer to every objection which can be raised from the supposed difficulty of the task, the greatness of expence, or uncertainty of profit, we shall here point out the proper method to be pursued; and give an estimate of the expence for draining a moss or morass of a mile, or 1800 yards square; and shall add a calculation of the profit which may be reasonably expected.

With respect to the method, I would propose, that a drain should first be cast all round upon the outside; and then, that it should be
divided

divided at right angles, into a number of inclosures equal in size. The number must be determined by the state of the moss. Supposing sixteen divisions are sufficient, they will be about 40 acres each. If 32, 20 acres, or if 64, 10 acres.

The drains should all be equal in size, ten feet wide at the top, four feet deep, and two feet wide at bottom. From these proportions they would have a considerable slope, which would prevent the earth from falling in. The slopes should be sowed with grass seeds as soon as cast; and in a few weeks, in summer, a swaird would be formed upon it.

The earth taken out of the ditches should be thrown to as great a distance on each side, as the workmen can throw it off the spade. But if the moss is very loose, a man should be employed on each side, to throw it farther back, that the weight may not press in the moss.

The plan of villages affords an exact representation of the drains here proposed; if we consider the streets in the plan as representing ditches.

If there is any difficulty in keeping the drains open, another method may be used,

at least in a country abounding with long heather. A small quantity of the heath may be put in the bottom of the drain, and covered over. The water would pass freely under the heather; and perhaps, when thus covered from the air, the heath would not be consumed in less than forty or fifty years. If this method is used, the drains need not be so large as the open ones above described. But the number must be greater; perhaps two for one, or more.

Estimate of expence for draining a moss one mile square, with open drains, and divided into sixteen inclosures.

Three thousand rood of ditching, at 1s. per rood	L. 150 0 0
Paring and burning 540 acres, at 20s. per acre	540 0 0
For seed, (either oats or barley) at half a boll per acre, 270 bolls, at 15s. per boll.	202 10 0
Levelling, grafs-feed, and unforeseen incidents	100 0 0
	<hr/>
	L. 992 10 0

This

This ground requires no plowing, but only harrowing.

Now supposing the produce to be only six bolls per acre, either of oats or barley, and valued at only 10s. per boll, that is L. 3 per acre

	L. 1620	0	0
From this deduct	992	10	0

Profit	L. 627	10	0
--------	--------	----	---

If the ground is dry, and the season favourable, the produce of the first year may perhaps amount to a third more, or even double the above calculation.

But although the first year's produce should barely defray the expence of draining, the advantages gained are surely very considerable. There is, however, the greatest probability, that a profit of above L. 600, would be obtained from the first crop.

It is not proposed to sow the ground the same year that it is drained. The draining, however, should be performed in one season, if possible; and should be twelve months in that situation to drain, before attempting to pare and burn.

The paring and burning may be executed
for

for 15s. per acre, although above stated at 20s.

It would be advantageous to drain a moss, and flood it every winter, even although it were not sown with corn; as it would not hurt the peat for firing. Indeed, it would make the same moss last much longer, as it could be digged for less expence when dry. At the same time, it would have double the quantity of peat in some parts, more upon the same surface of ground by going deeper.

By going deep, when drained, very great quantities of excellent shell-marl are often found in the bottom of mosses.

The small moss mixed with water in the drain, and conducted to grass or corn fields, is of service to enrich both.

The following calculation of the expence of preparing, and profit arising from peats, will shew how advantageous a moss may be made to the proprietors by proper management.

Marshall's Rural Economy, page 98.
 " Minute 54. January 24. The following
 " is an accurate account of the peat grounds
 " of the fens.

" The

" The turf-man pays for rent	L. o	4	o
" For cutting, from 1s. 6d. to 2s	o	1	9
" For chimneying, (that is, pil-			
ing them lattice-wise to dry)	o	o	6
For boating to the staith, 6d. to			
1 s.	o	o	9
	<hr/>		
	L. o	7	o
" Profit and hazard, (great quan-			
" tities are sometimes swept away			
" by the floods)	o	1	6
	<hr/>		
" The felling price per thousand	L. o	8	6

" The peats, when cut, are about four
 " inches square, but dry to about three inches
 " and a quarter; and from two to three feet
 " long, or of a length equal to the depth of
 " the moor; every foot of which, therefore,
 " affords nine peats; each yard 81; each
 " rod, $2,450\frac{1}{4}$; and each acre, 392,040;
 " which, at 4s. per thousand, amounts to
 " the sum of L. 78 : 8 : 2 an acre : Besides the
 " additional advantage of having uncovered
 " a stratum of earth, which, in many parts,
 " produces reed spontaneously; and on
 " which, it is highly probable, that valu-
 " able

“ able aquatic might on every part be propagated.”

How many meadows in several places, if drained, and then overflowed, would raise good grass and corns. The muddy water coming from these meadows, would help to improve other places at some distance.

In carrying an open cut many miles along any part of the country, it would meet with a great number of different soils; one part would help to improve the other.

Even where there is no run of water in summer, making small cuts in almost every farm, and conducting the rain-water in winter to stand upon a barren spot, would enrich it much; more so, if the lands above were rich, and much improved.

In short, there are very few situations, either in the highlands or low country, but might reap some benefit more or less, after being thoroughly drained, to make the water either run, or stand dead for a short time when in grass.

Even where the farm is wholly in tillage, when rich with lime, marl, or dung, if there is no dry grass ground below to receive the water, having either a deep ditch the whole length

length of each field, upon a dead level to receive the water, where the mud and sand would subside. This carted off, to be mixt with dung, or laid on by itself. Perhaps this ditch would not need to be cleaned out but once in three years. Or having a large ditch, or pond, in the lower part of every farm, to receive the water in time of rain, with a sluice to let off the water, after the sediment settled to the bottom. This ditch or pond to be emptied when over full.

All these are only intended as hints, which farmers may improve upon, according to their different situations. But it is certain, that very many and great improvements can be made by these means of draining and then flooding.

Every farmer ought to study his own particular situation, and lay down his plans agreeable thereto. After trying some experiments, if they answer, (which without doubt they will, if properly conducted upon these plans proposed) then to persevere in them every year, doing but little properly at the first, and increasing as they found the advantages arising therefrom.

If once this plan of banking, draining, and
flooding,

flooding, came to be universally adopted, the great profits would be better felt than can be expressed.

There are many ponds made below Edinburgh for damming the water that comes from the city, where the sediment subsides, which collects great quantities of rich dung, some of which is used by farmers in the neighbourhood, and sold by others. I have heard of one person selling dung collected this way for L. 70 a year.

Others flooding the small meadows in grass, with the water from the city, which raises both weighty and early crops, which admit of being cut three or four times each year. This is a very certain and profitable way for these persons, when situations will admit of it in the neighbourhood of any town; or when they have water coming from lime or shell marl.

The water that comes from the city, if properly conducted, would enrich more than ten times the quantity of soil it does at present.

It is hard to say how much might be done this way, both here, and in many other places, having the same declivity.

Improvements

Improvements by embanking and overflowing with water, according to the plans here suggested, will, perhaps, apply, with some expence, to every spot in Great Britain, and every country in the world. As, even in those places where they do not possess a running water, the rain water, during winter might be collected, either upon the farm, or at a distance from it, and conducted wherever it might be required; and the rain water coming off plowed lands is, at least, as rich as that derived from rivers or springs.

To conclude, I shall add, as an additional encouragement to the practice of this mode of improvement, that corn, and other vegetables raised by flooding, must be more wholesome than those which are produced by any other species of manure. And many farmers that have practised it, have found it more beneficial than any other mode.

O B S E R V A T I O N S

O N

V I L L A G E S, &c.

I HAVE read most of Mr John Knox's publications concerning the British empire and fisheries, with his tours and observations. The public in general, and the inhabitants of the North of Scotland in particular, are under singular obligations to Mr Knox, for the great trouble and expence he has been at, in order to inform the nation how great advantages would accrue to the whole nation, and the navy in particular, if proper encouragement was given to the herring and cod-fishing.

It is very illiberal in the Reviewers, or others, to take notice of any little inaccuracies in Mr Knox's works, when his intentions are good. And, if the directions were followed,
they

they would be productive of great advantage to the whole country.

If any person chooses to improve upon Mr Knox's hints, I dare say he will think himself much obliged to them; but it is mean and wicked to overlook the spirit and end of any performance, and to carp at trifles not worth the mentioning.

I think the general principles Mr Knox insists upon are good, and might be reduced to practice; although in some particulars I perhaps might differ a little as to his plan of villages, &c.

With all due submission to the honourable members of the British Society for extending the fisheries, &c. I have presumed to make a few observations, or throw in my mite towards the improvement of the fisheries.

The institution of this society is highly laudable, and merits the encouragement of every one who has a love and regard to his country.

Observation first. Although the institution is good, yet the future success much depends upon the society laying down simple and proper plans at first, and executing them with vigour.

Mr

Mr Knox, in his observations on the Northern fisheries, printed in 1786, mentions many companies being formed at different periods, but from some unforeseen accident they always failed. What has happened in former ages may happen in this.

One great cause why many of these companies failed, was fitting out vessels with the proper apparatus, fishing tackle, &c. at a great expence, employing sailors and fishers, at so much per month, who had no interest whether the fishing succeeded or not. I was informed, by a very intelligent person who was employed in the fishing within these fifteen years, that the shipmasters went into one anothers vessels and caroused; which not only made the expences very high, but likewise neglected the business for which they were sent.

Another great cause of their failure was the ships being at a great distance from any proper harbour; and when their nets gave way, they had not others to supply their place. Sometimes in want of salt, and a sufficient quantity of barrels to hold their herrings. Or, if any misfortune happened to the ship, they often, from one or other of these

these causes, returned home with a very small cargo, that did not defray the expence. Whereas, if they had had proper harbours to go into upon the fishing coast, with great store of salt, casks, and spare nets, they might, instead of one cargo, have had three, four, or half a dozen, if allowed to purchase herrings from the natives.

Observation second. The most simple, and the most effectual way of making the fishing trade profitable, is by following the Dutch method ; among whom small companies join together, such as ship carpenters, coopers, net, or twine, and sail duck makers, blacksmiths, seamen, and fishers ; every one to be paid in proportion to the quantity of fish taken. This would connect their interest, and the success of the fishing together. There is no scheme that ever yet was devised will encourage labouring so much as piece-work. This is proved by the great height that manufactures of all kinds have arrived at in England, since this practice was followed.

It is very observable, that although you were to give a man a guinea per day, he is not able to work so hard as when employed in piece-work. When he knows his certain wages

wages each day, by hard labour flattens his spirits; whereas, employed in piece-work, the thought of a little more gain, or hope of reward, keeps up his spirits, and he does not weary so soon as in the former way.

Wherever the company's ships are near a harbour upon the fishing coast, with proper warehouses, wherein is plenty of store, of salt, barrels, and nets, they can load six cargoes of fish, for one they do any other way; and vessels of larger burdens might come to the store-houses, where their cargoes would be waiting for them. This leads us to the

Third observation. In order to accommodate the ships employed in the fishing station, it would require a number of harbours and villages along the fishing coast, sufficiently supplied with the above-mentioned stores. They ought to have all the salt duty-free, which might be made at each of these villages, as I am informed there is a great appearance of coals in that country.

The best method for making salt, would be, to have a large reservoir for holding a large quantity of sea-water, which might be pumped up, and there to stand for a considerable time, before let in to the salt pans for making.

making salt. The sun would exhale a considerable quantity of the fresh water, which would make the sea-water much stronger, and take less fire:

Possibly, the chrySTALLISATION of salt might be effected considerably cheaper than it usually is, if the sea-water was conveyed into large reservoirs in autumn; and, when frozen during the winter, the ice broken and taken out. As it is only pure water which congeals, the remainder would be much more strongly impregnated with salt. And, perhaps, in a hot summer, the heat of the sun would chrySTALLIZE it; at least, it would require less fire than the common method.

The fourth observation is, the proper plan for constructing these villages. In a great measure, the future success of the fisheries depends upon the villages being properly planned out at first. Every village ought to be as near the shore as the situation will admit.

In some places where there is a good harbour, which will only admit of building a few warehouses, it would not be very inconvenient, although the villages were placed a short distance from the shore.

There

There are several things to be considered in fixing upon the best situations for villages.

First, The nearer the shore, the less expence for all carriages.

Secondly, Some regard ought to be paid, to prevent the place from being exposed to privateers in the event of a war. There are many places upon the fishing-coasts, by going a little up into a bay, river, or loch, the village would not only be warmer, being less exposed to the winds and storms from sea; but the entrance could be easily defended by placing a few cannon upon a rock commanding a bay, without being at the expence of building a regular fort; although the village was up the bay, river, or loch, two or three hours sailing.

Thirdly, Some regard ought to be paid to the most easy access for fuel, as peats, &c.

Fourthly, Although the village may at first be but small; yet, it ought to be kept in view, that perhaps the increase may be very considerable afterwards; therefore a large portion of ground ought to be purchased at first.

Fifthly, As provisions in that country are

often very dear, and scarce, every house would require a large garden from two to five acres, that would not only maintain a family in greens and roots, but also maintain a cow, to be wholly laboured with the spade. Vide National Improvements, page 270. Having the one half or two thirds of the garden in grass, to be broke up by rotation. The remainder could very easily be laboured with the spade, at those seasons they cannot go to sea; as the quantity of ground to be manured every year would be but small, it could be done extraordinarily well; having the refuse of the fish and salt, sea shells, and weeds, or ware, with other dung made about the house or byre. Each house having a large garden annexed to it, would encourage strangers to come and settle there.

Lastly, The form of the village ought to be as near a square as the situation of the ground will admit, and so planned out, if any additions are wanted, in order to enlarge it; still the form, when finished to be a square. This can be very easily done, by making whatever additions are wanted of an equal breadth in each side of the square.

After the most deliberate consideration, I

am

am clearly of opinion, that it is the interest of every proprietor in Britain, in whatever situation, whether upon the sea-coast, or more in the centre of the country, to feu out as much of his estate in gardens as he can get persons to engage to build houses upon, agreeable to a plan fixed upon by the proprietor; the feuers always being at the expence of building every one his own house, inclosing his garden and improving it. Thus the proprietor will find it much for his interest, whether in the neighbourhood of a city or town, whether the land be improved or not. Even a muir, if he only feus a part, it will increase the value of what remains; and if he can get the whole of his estate feued out, it would be better for himself, and the nation at large. Although this is not to be expected till perhaps an age or two hence.

If the noblemen and gentlemen were to adopt Lord Gardenston's plan, mentioned in Mr John Knox's tour through the Highlands of Scotland, 1787, page 90, where he says,
 " I made public advertisements, that future
 " settlers, who should build and make out
 " their garden in any village-lot, without
 " any farm, should be entitled to possess free
 " of

“ of rent for the first seven years. This en-
 “ couragement had the intended effect ; and
 “ now my ground for village-lots is also ex-
 “ hausted ; so that I am obliged to treat for
 “ my tenants for land to accommodate new
 “ settlers, who now offer more than ever.”
 If once this came to be universally reduced
 to practice, the increase of feuers and vil-
 lagers would be very rapid, and no person
 hurt. What is it that has made the build-
 ings in London, Edinburgh, and other cities,
 increase in such an extraordinary degree, and
 so very rapidly, but feus and long tacks.
 The same effects will be seen in every corner
 where feuing was once begun, though not so
 rapidly at first, nor so great in extent.

There was a very uncommon circumstance
 that took place at Fort-William, the govern-
 ment took possession of some ground there,
 belonging to his Grace the Duke of Gordon,
 the family being then popish, where they
 built the fort. Not many years ago they a-
 greed to pay rent for what ground the fort
 took up, together with the gardens and in-
 closures ; which they are about making pur-
 chase of from the present Duke of Gordon.

What is still more surprising, there is just
 now

now a large village built to the westward of the fort called Marysburgh, now Gordonsburgh, without any liberty from that noble family. I am informed, that there are about three hundred families, who built houses and disposed of them to one another without any disposition from the proprietor.

The present Duke of Gordon was so generous as to take no advantage of this. His Grace, within these few years has given all of them feus upon very easy terms. By the feus being low, the village is increasing every year, and will continue so to do for many years; so that there is no saying how much it will turn to.

From the examples of the two noble patriots above-mentioned, who merit much praise, we may learn what are the most effectual means for raising villages very rapidly; which is to give every feuer or tacksmen a house and large garden seven years free of rent, and at the expiration of that time, the rents to be moderate, either a perpetual feu, or a long tack for a hundred years; and at the expiration of every hundredth year, the tack to be renewed for another hundred, upon the tenant's paying two rents advance; and so to
continue

continue in this way for ever. This is Lord Gardenston's method of granting his tacks.

If once this practice of feuing came to be generally followed, it would increase population very much, and would be a nursery both for the navy and army.

The superior advantage of every person building his own house, and inclosing his garden, to any other scheme as yet proposed, for the improvement of the fisheries, is so great and so permanent, that it needs little argument to prove it. It may be asked, Where are the people to be got that are able to build their own houses, and to carry on the fishery? The answer is short, Give proper encouragement by feus, or long tacks, rent free for the first seven years. This, with the view of the profits that can be made by the fisheries, will induce many persons, from different quarters unexpected, to come and settle there. It only needs to be once begun.

What made so many persons emigrate to America? From the report that they would get ground to improve for little or no rent.

There are many persons with small capitals would settle in these villages, in order to
buy

buy fish from the natives, and to serve them in provisions, nets, or twine, barrels, &c. The natives would, in a few years, save as much money as would build a house and garden; and when once settled, having a small property they could call their own, would never think of removing; and when once begun to make a little money of the fishing, would encourage others to come and settle there also.

If the British society inclined, in order to encourage the building, to give all the wood wanted for each house, for interest for seven years, they could never be losers, when the feuers are at all the expence for mason and wright work, &c.

But suppose the company were inclined to build all the houses themselves, and let them out for rent; this would not be so certain a plan, as some part of the rents would be still unpaid. As soon as they were much in arrears, many persons would be tempted to leave the place altogether. Whereas, were every one to build his own house, and to have families, it would be like a teather-stake to keep them in one place.

Whenever a person gets, or contracts a disposition

position of roving about from place to place, he is not so much to be depended upon, neither has he such a regard for his own character, as one that is settled in one place. By having a cow, with a large garden, with different roots, greens, and potatoes, would be the means of living comfortably at little expence, and would find employment for both men and women, when not engaged in the fishing; and when fully improved would raise part corns. The larger the garden the better at first. Although the ground was but poor, it would be yearly turning richer, having such a command of manure, and wholly laboured with the spade.

Whenever the village was built, having a number of houses and gardens, in order to excite industry, and raise a spirit of emulation, to improve their gardens most rapidly, and raise the greatest crops of every thing the garden produced; it is proposed, that there should be two premiums given annually, one of ten pounds, and the other of five; but no person to receive the ten pounds but once, till such time as it went over the whole village. The person who gained the five pounds might contend for the ten pounds next year. This would

would have wonderful effects to quicken industry and ingenuity. And if once the village got into good reputation of the feuers living comfortably, and saving a little money, would soon increase, perhaps to ten or twenty times its size, or more.

And still further for encouragement, let all garden-seeds be given them for the first two or three years gratis; such as cabbage-seed, different kinds of greens or kail, turnip, onions, carrots, leeks, potatoes, red and white clover-seeds; and only to those who agreed to follow the regular rotation of crops, as mentioned in *National Improvements*, page 270. Likewise a few slips of gooseberry and currant bushes, and fruit trees.

All that the British society, or any proprietor that chuses to feu out ground for villages, have to do, is to build a pier, large warehouses to hold salt, barrels, nets, and wood, &c. The whole of the herrings, or cod-fish, to be repacked at these warehouses, and carefully examined by an inspector appointed for the purpose. The name of the village marked with a burning iron upon each cask. This is very necessary in order to prevent frauds,

and to raise a good character to the fish when sent abroad. Every village would strive to obtain the best character.

This inspector to have the charge of the whole warehouses. Every vessel to pay a small duty for shore-dues and warehouse rent ; part of which to go to the inspector's salary, and the other part to the proprietors, in order to indemnify them in part for the expence of buildings, &c.

If any of the fish was found at a foreign market not properly cured, both the inspector and the proprietor of the fish to be subjected to a fine.

It would certainly be advantageous to the nation in general, and to the landholders in particular, if every proprietor in Britain was to plan out villages upon every part of their estates, where the situation is agreeable, and the soil and water good.

When the ground for one village was all let, another, at some distance from it, should be immediately planned out ; so that every year there would be lots to be feued.

This would not only increase the rent of every estate, but also increase the national produce and population. And the proprietor

tor would be certain of his rents being well paid, and collected at little expence.

If the plan was good, and the terms reasonable, persons would probably be found, who would contract for all the lots of a village; and by thus proceeding on a large scale, they would be able to sell them cheaper than individuals could erect a single house for themselves.

This would encourage many persons to purchase, as they would know the expence before they entered.

Or perhaps, some monied persons would choose to lay out their money on such villages, and let the houses.

When estates are to be sold off, it would be an eligible method to feu out the whole in small lots. It would be for the interest of creditors to adopt this method, at the same time, a saving might be made in favour of the proprietor.

How much waste ground is there in Britain, in muirs, and upon the face of hills, that would answer very well for gardens, when laboured with the spade; having always the one half, or two-thirds in sown grass, which would maintain one or two
COWS.

cows. What remained to be laboured would be but small, at the same time, the crops would be extraordinarily great.

Extract from the Husbandry of the Antients, page 176.

“ Cato says, If you ask me what kind of
 “ farm is best, I will answer in this manner.
 “ Suppose one should buy an hundred jugera properly situated; of all fields the vine-
 “ yard is the best, if it produces plenty of
 “ good vines. In the second place, is a garden that can be watered. In the third
 “ place, a willow-grove. In the fourth, an
 “ olive-field. In the fifth, a meadow. In
 “ the sixth, a corn-field. In the seventh, a
 “ wood that grows up again after it is cut.
 “ In the eighth, a field planted with trees for
 “ vines. And in the ninth, a wood for
 “ masts.”

Although this is not a country for vines, yet a great variety of fruit trees, and berries of different kinds answer well. The gardens might be so planned out, that the water could be let on and off at pleasure.

This extract, however, shews, that the Romans were in the practice of watering their gardens, which would benefit them much.

Multiplying

Multiplying the number of villages in every part of the country would tend to increase manufactures, and would answer a better purpose than erecting new colonies abroad.

How many proprietors have ten times more land than they can improve; which not only is a hurt to themselves, but the nation in general. A small estate or farm well improved, is far better, and more profitable, than a large extent of ground, when the cultivation is neglected.

The following quotation from the Husbandry of the Antients, page 193, tends to illustrate this.

“ Pliny says, The antients were of opinion,
 “ that above all things, the large extent of
 “ farms ought to be kept within proper
 “ bounds. Wherefore, it was a maxim a-
 “ mong them, to sow less, and plow bet-
 “ ter.”

“ Columella says, in speaking of farms, To
 “ the other precepts we add this, which one
 “ of the seven wise men has pronounced as a
 “ maxim that holds true in all ages, That
 “ there ought to be limits, and measures of
 “ things; and this ought to be understood

“ as

“ as applied not only to those that do any o-
 “ ther business, but also those that buy land,
 “ that they may not buy more than they are
 “ fully able for. To this is applicable the
 “ famous sentence of our poet, You may
 “ admire a large farm, but cultivate a small
 “ one ; which antient precept the most learn-
 “ ed man, in my opinion, expresses in num-
 “ bers. This too is agreeable to an acknow-
 “ ledged maxim of the Carthaginians, a very
 “ acute nation, That the land ought to be
 “ weaker than the husbandman ; for when
 “ they struggle, should the farm prevail, the
 “ master must be ruined. And indeed, there
 “ is no doubt, but a small field well culti-
 “ vated produces more than a large field ill
 “ cultivated.”

The great extent of waste ground in every
 county of Britain, is a proof, that it is ne-
 cessary the legislature should encourage and
 enforce improvements in agriculture.

A part of the amazing sums raised in Eng-
 land every year for the poors-rates, might be
 appropriated for erecting villages and gar-
 dens, for lodging and maintaining the poor ;
 by which they might be maintained at half
 the expence they are at present, and probably
 with

with much wholesomer provisions. This is more fully handled in National Improvements, Vide p. 261.

If the crown lands were divided into lots for villages, or small farms, and sold for a small quit-rent, payable yearly to government, the produce, population, and annual revenue of the nation, would be considerably increased.

If government were to erect villages, with gardens, for the disabled soldiers and sailors, considerable tracts of waste ground might be cultivated by them, as almost all of them are able in some small measure to labour. This is more fully treated off in National Improvements, p. 266.

In such villages the men could live comfortably, and perhaps save the pensions which they receive from government. And were such a reward held out to the veteran who was disabled in his country's service, it is probable the army and navy might obtain recruits, with much greater ease than they do at present.

The following extract from National Improvements, p. 390. exhibits a view of such
" villages

villages as the author apprehends would fully answer the above purposes.

“ Having said so much about the constructing of new villages, in pages 250 and 339, it is needless to be repeating what is there said : But as it is of so much consequence that a village should be properly planned out at the beginning, the success depending greatly upon it, I shall here subjoin a method how, in my view, it might be planned, and to advantage ; it being as easy a matter to follow a good plan as a bad one.

“ The regularity and neatness of a village, (each feuer having his house and inclosure whether great or small, distinct by itself,) would be the means of drawing a considerable number of feuers, of different kinds of manufacturers, to settle there, and more especially if the ground was improved, and all thrown into grass by the proprietor before entry, as proposed in page 340.

“ If once a proper plan was fixed upon, the most effectual method of carrying it into execution, would be for the proprietor to trench it all himself, and lime and throw
“ it

ed together, or c

[illegible]

“ it into grafs; and by taking the three or
 “ four crops propofed, it would do more
 “ than indemnify the proprietor for his whole
 “ expence. It would be a great encourage-
 “ ment to the feuers, when they faw the
 “ ground brought in to their hand, and
 “ knew what good crops it produced before
 “ their entry, and that the ground was not
 “ exhausted, having only taken two crops
 “ after liming, before thrown into grafs.

“ As the whole village was thrown into
 “ grafs before it was feued out, it would be
 “ an eafy matter for the proprietor to form
 “ his plan, how it fhould be cropt for the
 “ firft ten years.

“ The feuer ought to labour his ground
 “ only with the fpade, unlefs he had as ma-
 “ ny parks as would keep two horfes con-
 “ ftantly employed. The proprietor, as he
 “ had no connection with building the
 “ houfes, could carry on the trenching, in-
 “ clofing, and liming, to a great extent, if
 “ once begun and perfevered in; and there
 “ would be no difficulty to get as many fe-
 “ uers as would take it, and build their houfes
 “ at their own expence, the feu-duty being

Y y “ only

“ only proposed to be ten shillings an acre
 “ for muir ground.

“ Although the proprietor was to take the
 “ feuers bound to improve their land, it
 “ would be difficult to make a number of
 “ them to follow one plan ; and if any failed
 “ in their schemes, it would be discouraging
 “ others to settle there. But when the ground
 “ was improved to their hand, there would
 “ be little difficulty to get them to follow one
 “ plan for the first ten years ; and when they
 “ saw that that plan turned out to their in-
 “ terest, they would persevere in it ; and af-
 “ ter that they might be left to do as they
 “ thought proper.

“ To show fully how I propose to erect
 “ new villages or farms, I have represented
 “ in page 393, the plan of a village, or four
 “ connected together. You may suppose the
 “ square to be what you please : If you sup-
 “ pose that each house is to have two acres
 “ and a half, then the first village will be on-
 “ ly forty acres, which is divided into six-
 “ teen parts, as is marked upon the plan ;
 “ the other three villages of the same size,
 “ which in whole make one hundred and
 “ sixty acres.

“ If

“ If you suppose five acres to each house,
 “ the first village would be eighty acres, and
 “ the other three of the same size, which in
 “ whole would be three hundred and twenty.
 “ ty.

“ If you suppose each house to have $6\frac{1}{4}$
 “ acres, then the first village would be one
 “ hundred acres divided into sixteen parts,
 “ and the other three of the same size; which
 “ would be in whole four hundred acres,
 “ and so on in proportion whether for great
 “ or small villages or farms. The streets in
 “ each village cross each other at right angles,
 “ as may be seen in the Plan.

“ The plan proposed for restricting the feuers for the first ten years, the whole being
 “ in grass at their entry at the commencement of their feus—To have the one half
 “ in grass, and the other in tillage, and to
 “ keep by the same rotation before mentioned, viz. 1st, oats after grass; 2d, drilled
 “ beans or pease; 3d, wheat; 4th, pease,
 “ beans, turnip, potatoes, cabbage, or greens,
 “ to be well dunged, which would answer
 “ wholly for a garden; 5th, barley and grass
 “ feeds.

“ As all this is proposed to be mostly done
 “ with

“ with the spade, the whole of the corn might
 “ be sown in drills, and covered with the
 “ machine mentioned.

“ If there were a considerable number of
 “ feuers, the proprietor might give a yearly
 “ premium of L. 5 to him who had the
 “ greatest number of bolls; none to be en-
 “ titled to this premium more than once.
 “ This would have the good effect of caus-
 “ ing each to exert himself towards the im-
 “ provement of his ground, superior to that
 “ of his neighbours.

“ It is a very difficult matter to make per-
 “ sons alter their course of husbandry all at
 “ once, though it should be far better than
 “ the present; therefore, some means should
 “ be used to induce them to adopt the pro-
 “ posed plan, such as appointing premiums;
 “ and when once they see it turn out to their
 “ interest, they will need no inducements to
 “ persevere in it. So soon as the country
 “ sees their success, a great number will
 “ adopt that plan. But their success much
 “ depends upon their setting out upon a pro-
 “ per plan, and getting encouragement at
 “ the beginning.

“ This Plan also shews, what is the most
 “ regular

“ regular way of dividing a farm, and the
 “ cheapest method of inclosing; and that the
 “ houses ought to be placed in the centre of
 “ the farm, in order to save the expences of
 “ carrying the corn and dung, which is a
 “ great hindrance to the work about the
 “ farm, when improperly placed.

“ In planning out a new farm, it is of great
 “ consequence to have the inclosures so con-
 “ trived, that, by opening and shutting the
 “ gates, one of them may be divided into
 “ eight subdivisions, and these subdivisions
 “ made into one.

“ By looking into the Plan, it will plainly
 “ appear, that if the farm-houses are placed
 “ in the centre of any of the quarters, there
 “ will be sixteen inclosures of ten acres each,
 “ at equal distances, around them; and if
 “ the houses are placed in the centre of the
 “ four quarters, there will be sixty-four in-
 “ closures of ten acres each around them,
 “ which make six hundred and forty acres in
 “ whole. It also shews, how these inclo-
 “ sures may be enlarged, by having one in
 “ place of two; so that there would be eight
 “ inclosures around the houses, containing
 “ each twenty acres; and if only into four
 “ inclosures,

“ inclosures, it would be forty acres each,
 “ and so on in proportion, according to the
 “ size of the farm.

“ Although there is only one house built
 “ upon each division, that does not hinder
 “ the feuer, if he prospers, to fill up the
 “ front with houses; only he should be
 “ restricted to have them all of one size, ex-
 “ cepting the length, which may vary as the
 “ feuer finds it for his interest. The streets
 “ ought to be thirty or forty feet wide. Al-
 “ though the beginning be small, there is
 “ no saying how large it may be through
 “ time.”

The dominicales, lands formerly belonging to the kings of France, were, by order of Charlemain, rented in small parcels to little farmers, at a ninth part of their value. This philanthropy, as it raised many industrious families from want, contributed to the welfare of mankind.

If Britain was to follow the same example, it would be attended with the same happy consequences,

CONCLUSION.

C O N C L U S I O N.

THERE now remains very little doubt with the Author, that every candid and intelligent person, who has carefully perused the foregoing treatise, will be convinced of the truth of what is there set forth. It requires but little attention to the present state of agriculture in Britain to perceive that its produce might be increased to ten times the value, or perhaps to a still greater amount. A demonstrative proof of this may easily be had, only by taking a view of the many waste, uncultivated, and ill-improved lands, with which the country abounds. Two obstacles, however, occur to the execution of the plan proposed in this work; the one arising from the incredulity and diffidence natural to mankind when any new scheme is proposed; the other from their negligence and inattention to their real interest. With
regard

regard to the former, it seems entirely to arise from prejudice, or being unaccustomed to think of these matters. Very few have taken the pains to inquire what the real produce of Britain is, whether it be possible to increase it at all; or, if it be possible, what means ought to be taken for the purpose. To such as are willing to investigate the subject, this treatise will most probably give satisfaction, and convince them, not only that the produce of the Island in general might be increased in the above mentioned proportion; but, that no soil is so bad but it may receive considerable improvement, and, in a short time, repay the expence laid out upon it.

The second obstacle arising from the general negligence and inattention almost universally prevalent, must be much more difficult to combat, and such as no art nor pains of an individual can overcome. The great scheme proposed in this treatise requires for its execution the united efforts of the whole nation; and, without the general concurrence of all ranks of men, each in their proper sphere, there is not the least hope of accomplishing it.

As improvements in agriculture, must undoubtedly

doubtedly depend, in a great measure, on the conduct of the landholders, it is necessary to consider, in the first place, what line of conduct they ought to follow, in order to make the most of their estates. Here, indeed, I am sorry that any advice should be necessary to the proprietor of an estate to reside upon it. Such an advice, however, seems at present to be too much wanted, as the contrary practice of many gentlemen not only tends manifestly to the ruin of their own fortunes, but the general destruction of all with whom they are connected. Should it be asked, What is the the best course of life for a nobleman or gentleman? What would tend most to his own interest, peace of mind, and to establish a character of real patriotism, &c. The answer must be, To reside upon his own estate; take proper measures to improve every part of it; and to live within his income, so that he might have, every year, a considerable sum to bestow on his tenants, for the purposes of improvement; to feu out villages, and to take care that there should be few or no poor unprovided for. It is indeed the best, if not the only patriotism to be exercised in private life, to be diligent and regular in our appli-

cation to business, and careful in the management of our affairs. What pleasure must it not give to a humane and civilized mind to view his dependants happy, to see the blessings of industry spread as far as his own influence extends, at the same time that he reaps the fruits of his laudable endeavours, not only by the increase of his fortune, but in being loved and esteemed by all those with whom he is connected ! What an amazing fund of entertainment may a view of the works of nature afford to a speculative mind, and what an excellent field for meditation and amusement of the most innocent kind, while, along with the most sublime mental enjoyment, the health of the body is promoted, and those baneful diseases, the effects of the confined and polluted air of a city, not to mention the still more pernicious effects of dissipation, are kept at a distance ! Let this again be contrasted with the tormenting reflections attending the course of life, which too many of our gentlemen follow in London or Edinburgh, the real danger to which they are always exposed, and the certain ruin which sometimes overtakes them ; and there is no person in
the

the world, that can hesitate at giving the preference to the former.

It is not, however, to be supposed, that those who have habitually given themselves up to the neglect of every principle of religion or reason, will be influenced by what I or any other person can say. With such it is necessary that the legislature should interfere; and, as a parent corrects undutiful children, compel them to act for their own good, and that of the community in general.

A plan for this purpose was lately hinted to me by a gentleman of very considerable landed property, viz. That all proprietors of land should, by the legislative power, be obliged either to reside upon their estates, or to discount ten per cent of their real rents to their tenants, in order to enable them to go on with improvements in their absence. This would in a great measure counteract the evil, if it did not entirely remove it. And it is humbly hoped, that our present patriotic minister, who, on all occasions, has shewn himself so diligent in promoting the true interest of the country, will soon turn his attention towards the very important science of agriculture,

culture, and rescue it from that oppression under which it has so long groaned.

Another evil, scarcely, if at all inferior to what has been just mentioned, is the monopoly of land, both by the proprietor and the farmer.

What vast tracts of land do we not every day see in the possession of those who neither attempt to improve them, nor seem to have any inclination to do so; while the farmers, imitating the conduct of their superiors, seem to be ambitious each of possessing half a county, without considering how it should be improved; or, indeed, having it in their power to do so, by reason of the great extent of their farms. Thus the country is depopulated, and even the means of real improvement, should any person attempt it, rendered much more difficult to be procured than they ought to be.

This, like the former, can only be removed by the interference of the legislature. It has already been remarked, how careful the Romans were in the distribution of their lands in the infancy of the republic; how powerful they were while this continued; and what was the consequence of deviating
from

from the rules they had once laid down. It surely cannot be thought unworthy the attention of the British legislature to follow the example of a nation so wise, so politic, and so powerful.

Suppose a law were enacted, that no person should purchase an additional quantity of land before he had improved the one half of what he already possessed; or that he should be obliged to feu out his waste grounds, at a moderate rate, to such as were capable of improving them, if he did not chuse to improve them himself. By this he could not possibly be hurt; but, on the contrary, would receive very great benefit, as the value of his lands would soon increase to more than double what it was before.

The mode of improvement, by keeping one half constantly in grass, and the other in corn, might also be enforced by law; and thus a regular system of agriculture, and national uniformity in its practice would take place, which could not but be attended with the most happy effects, both to gentlemen and farmers.

Gentlemen, by purchasing large estates, not only hurt and depopulate the country,
but

but injure their own interest also ; for very few receive more than two and a half per cent. for their money ; and it is thought extraordinary if they receive five. But by following the method of improvement here recommended, they might soon receive ten per cent. And the farmers would likewise find it for their interest to have no more land than their stock would allow them to improve.

Along with what is here recommended, the mode of giving premiums, as mentioned in the Treatise, or some other, to promote a more general attention to agriculture, would seem to be an object highly worthy of the notice of the British legislature. It is certain indeed, that without a hearty concurrence of every class of people, all encouragement that could be given by government, or by the proprietors of land, would be entirely vain.

The plan laid down in this treatise is universal. It is designed not only to promote the interest of those who are already in easy circumstances, but to increase the happiness and comfort of every individual, whatever their situation may be.

The natural desire which every person has
to

to enjoy a certain proportion of the comforts of life, must certainly awaken their attention to any proposal which offers to make their situation more easy and agreeable. And, I believe, there never was any time when such a proposal seemed to be more necessary than at present. This is evident from the general spirit of adventure in the commercial way, which now so universally takes place among us. I need not say how precarious the success of these adventures frequently is, and how often, even those who seemed to proceed on the surest foundation, involve not only themselves, but others also in the most inextricable difficulties.

Adventures in trade, indeed, offer the person who engages in them a sudden and great increase of money, and thus allure by that natural indolence which makes us dread long and continual employment of any kind. Any scheme, however, merely commercial, while it holds out golden views at a distance, often leaves the adventurer, in the mean time, destitute of the necessary means of subsistence. Thus his mind must be continually uneasy and embarrassed, as well by the thoughts of the present, as of keeping his credit for the future.

future. Agriculture, on the other hand, though it offers no great wealth, or holds it out only as a distant prospect, always assures us of the means of subsistence while we follow it, as well as of health and pleasures entirely unknown to the manufacturer confined in an unhealthy workshop, or the shopkeeper confined in his shop, who have scarce ever liberty to breathe the common air, or to see the light of the sun.

We are not, however, to imagine, that agriculture is inconsistent with any kind of commerce or manufacture, useful or necessary to mankind. It has already been shewn that it is the foundation of these; and that by encouraging agriculture, we encourage also commerce and manufactures. It is evident, indeed, that all the people of a nation cannot be merchants or manufacturers; for, in that case, who should buy the goods? But great numbers might cultivate the ground; and while they did so, the vast increase of population would undoubtedly raise a much greater demand for manufactures of all kinds, than even can be procured by the methods followed at present.

Should the plan of small farms and villages
come

come to be generally adopted, no person could be said to want subsistence, while he had a cow and large garden; on the contrary, he would find himself able to live more comfortably, in a manner without money, than he could do when confined in a large city, even though he had considerable weekly wages. How many families are maintained in Ireland with potatoes and milk alone, and in the north of Scotland in the same way? And it ought to be particularly taken notice of, that where there is the greatest quantity of milk, we always observe the people to be the most robust and healthy, as well as of the greatest stature. I scarce need to add, that in large towns, this article so necessary and agreeable to the human body, is almost entirely denied, and the inhabitants in its stead accustom themselves to the most pernicious liquors. When I asked the Irish giant in Edinburgh what food he was brought up with when young? he answered bluntly, "Milk, Sir;" meaning cow's milk.

As the subject of this treatise, therefore, seems to be so interesting to every individual, it would be of great consequence to the nation, that the generality of its inhabitants

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could

could only be brought to consider what are the most proper plans for answering the ends proposed. Could the public attention once be turned towards this most important point, there is no doubt but that some plan for the general good of the country would soon be adopted.

The author will not pretend to say, that the plans he has laid down are the best that could possibly be devised; but he is certain, that, were they followed, the wealth and population of the kingdom must very soon be considerably augmented. If any other, however, could be thought of, more eligible, or conducive to the public interest of the kingdom, he should reckon himself happy in seeing them adopted, though every thing that he has recommended should be entirely rejected.

F I N I S.

I N D E X.

A

A Berdeen, a sand bank there, removed by the method recommended in this work, Page 288.

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