

*E. P. B.*

OBSERVATIONS  
ON  
MR. ARCHER'S  
STATISTICAL SURVEY  
OF THE  
COUNTY OF DUBLIN.

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BY  
*HELY DUTTON.*

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*Dublin.*

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1802.

## TO THE READER.

*THE Statistical Reports are printed and circulated for the purpose merely of procuring further information, respecting the state and husbandry of each district or county, and of enabling every one, interested in the welfare of this country, to examine it fully, and contribute his mite to its improvement.*

*The Society do not deem themselves pledged to any opinion, given by the authors of the Surveys, or of the Observations, made on their publications; and they desire, that nothing contained in either be considered as their sentiments.*

*The Society hope, that the example, given by the author of the following Observations on the Statistical Survey of the County of Dublin, will create an emulation in others to make similar remarks on the Surveys of other Counties, already published, many of which are very defective, and require much amendment.*

*The author of the Observations has not touched upon the state of the numerous charities, hospitals, and schools, public and private, in this county, which the Society hope will soon be forwarded to them, that a perfect Report may be formed in the course of the following year.*

## P R E F A C E.

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WHEN, at the instance of a too partial friend, I was prompted to remark on the Statistical Survey of the County of Dublin, I imagined a very few pages would contain what I intended to say ; but I found that more was expected than was at first proposed, which has imperceptibly induced me to extend it to its present length. Had I the least idea, when I began, that this would have been the case, every exertion should have been used to make it more worthy of public inspection ; but it was really intended, at first, as a stimulus to others to communicate their observations on the different Statistical Surveys, which was much wanting, as the invitations  
for



for this purpose, from the Dublin Society, have as yet had little or no effect. If gentlemen are determined to observe this silence, the Surveys must remain in a very imperfect state, and fail in conveying to us and to posterity the present state, resources, and means of improving the soil, and ameliorating the condition of the lower orders of the community. It must surely be extremely grating to the gentlemen, engaged in the different Surveys, to have to state the neglect of answering letters, or refusing to convey information; for, without the warm support and active interference of the landed proprietors, it is utterly impossible to carry such a work into execution with any beneficial effect.

It is earnestly hoped it may be still carried in mind, that this can be by no means considered as a Statistical Survey of the County of Dublin; if this had been the author's intention, he would have endeavoured to give it a very different appearance, and it would have been accompanied by a mineralogical map; for what Mr. Archer  
has



## PREFACE.

has written, and the present publication, are mere skeletons of a Statistical Report of the County of Dublin, which deserves a more minute investigation of its natural productions, and an infinitely greater number of suggestions for its improvement, than it has received.

It must be a matter of no little surprize and regret, that, in the whole city and county of Dublin, there could not be found one man of public spirit to undertake this most useful, pleasing, and honourable task, *gratuitously*.

According to my ideas of its importance, it would take at least two years to accomplish this; and it could not be expected, that any professional man, or one of small income, would undertake it for the sake of the trifling sum the Dublin Society are enabled to offer; but surely there are many men of ample fortune, much leisure, and competent abilities, to whom it would be a mere amusement. When we see the elegant and satisfactory manner, in which the Kilkenny, Down, and some  
other

other Surveys are executed, we must regret that the same spirit did not actuate other gentlemen.

Great allowances must be made, in every Survey, for many omissions, and for defective or erroneous information, in a work that includes such a great variety of matter; it requires no small share of assiduity to acquire such information as will conduce to the end proposed by the Society.

The divisions recommended by the Dublin Society, and adopted by Mr. Archer, have been followed in the observations; if thought worthy of notice, they may, at any future period, be more easily found, and incorporated in a corrected Report.

Some gentlemen, who have seen my manuscript, have objected to my statement of the rent of land at 4*l.* per acre (page 2), as being too low. There are many farms in the county of Dublin, that do not let for near so high a rent; but it might as well have been five shillings or

ten pounds an acre, as the same rent is charged in both courses, and does not affect the conclusions I wish to draw from it.

It must be evident to every person, acquainted with rural affairs, that I have barely glanced at each subject; for were I to enlarge on the course of crops, roads, irrigation, cultivation of green crops for soiling in the house, draining, improvement of waste lands, planting, hay-making, and some others, it would extend the work beyond the necessary limits; they are objects of such consequence, as each to require little less than a volume.

In page 14, a method of making potatoe-ridges is suggested, that is not commonly known, but, it is hoped, will be found highly deserving of notice, especially in this county, whose substratum is usually composed of calcareous or other valuable gravels; but it must not be inferred from this, that I approve of planting potatoes in ridges in soils of a different nature; it is merely recom-

b

mended



mended for lands where the gravel lies below the reach of the plough, even aided by the *miner*, and only to be practised on grounds, that have never received this improvement; after this operation, the plough and *miner* will be amply sufficient to keep it so open, as to admit the propagation of carrots, or other tap-rooted plants. Planting potatoes in drills has been unequivocally proved to save labour, money, manure, and time, and to leave the ground in a much superior state of amelioration.

It may perhaps be imagined I am too severe in many instances, particularly on the practices of Fingal. The period has arrived, in which these vaunted practices are undeniably proved to be erroneous; therefore I should deem myself extremely culpable, if I did not point them out; this is the more necessary, as, from being formerly esteemed good farmers, they have acquired an opinion of their superiority, that can only be changed by such gentlemen as Mr. Segrave, who,  
rising

rising superior to vulgar prejudices, will at once confess himself in an error, and change his system.

A circumstance, that occurred lately, helps to throw some light on what I have just stated. A steward advertised that, amongst his other acquirements, he was well acquainted with the *practices of Fingal*; on being examined, he maintained, that less than *six horses in a plough* could never answer in any ground, and that undoubtedly *fallowing was absolutely necessary, and superior to any other preparation for corn*. Under the management of a man of these sentiments, what improvement could be expected? That the inestimable value of green crops is beginning to be known, it may be necessary to state, that I know an eminent grazier, who was formerly (as too many are yet) insensible of the value of any food for cattle but grass and hay, who this year (1802) has upwards of *sixty acres of vetches*.

Many of the errors I have pointed out in roads, and other parts of the subject, may have been

been amended since I saw them, of course my objections fall to the ground ; but I fear they remain as I have stated. If any change in the system takes place, it must originate in an act of the Imperial Parliament, that will throw the management of roads into the hands of *men, who have no other business to mind.* If canals had been carried on in this manner, what errors would have been committed ?

I have ventured to give some hints to citizens possessing small farms near the metropolis, but I fear to little purpose, as I have scarcely ever met one, that did not entertain the dangerous opinion, that farming is a science easily understood.

In page 65 it is stated, that the difference between spring and winter vetches is not clearly ascertained. I am since well informed, that Mr. Grainger of Causestown, in the county of Meath, and several other gentlemen, have unequivocally proved, by the severity of last winter destroying the spring vetches, that a difference does actually exist ;



exist ; and, from a trial I have made this spring, I perceive they are easily distinguishable in every stage of their growth.

Although I have given the Black-rock road as an instance of bad management, it is not that others are conducted in a better manner, but merely because it is more generally known.

On the subject of inland navigation, I have been honoured with the assistance of gentlemen perfectly masters of the subject : as a matter of the utmost moment to the kingdom at large, and to the city of Dublin in particular, it will not be deemed, it is hoped, the least acceptable part of the publication.

The extract from a pamphlet, published by the Right Hon. Edmund Burke, may be of some use in stopping the mouths of those ignorant and dissatisfied croakers, that we are obliged to listen to every day ; possibly it may also induce Government to prevent the unjust intermeddling of persons in office in the sale of hay and straw in

Smithfield

Smithfield market. I can scarcely imagine it is generally known, that farmers are *obliged* to sell their hay before five o'clock in the evening; it seems a bell is rung at that hour, and they must instantly take their hay and straw out of the market, and stand in the streets, where those in the secret are on the watch to buy at any price they choose to offer, which the poor frightened farmer is glad to accept of. This oppressive mode, I understand, was introduced by the late Lord Mayor, a well-meaning man, but entirely ignorant of agricultural affairs; I am surprised to see it permitted by the present Lord Mayor (Alderman Manders), who is a very spirited and good farmer; and it is equally surprising, that the farmers have not had recourse to legal means to obtain redress.

The subject of minerals has been given at some length from Doctor Ruttty and Doctor Blake; it is a very interesting one, and, until lately, too much neglected.

I have

I have given some extracts from Mr. Tatham's Treatise on Irrigation, by means of *warping*; it is new in this country, and highly deserving of notice, as there are many situations, that will admit of it.

Mr. Grierson, with his usual spirit, has been so good as to favour me with plates of his celebrated cattle and pigs.

From reading Mr. Culley's description of the Suffolk punch horse, I was induced to condemn the introduction of them into this country, but I am informed by a gentleman, who has taken pains to make himself acquainted with the subject, that twenty years ago the Suffolk punch was an animal very different from that described by Mr. Culley; he was about fifteen hands and an inch high, very broad, round in the rib, short in the back, well shouldered, deep and wide in the chest, up before, his head well set on, and his legs broad, flat, and free from gum or hair; he was a quick stepper, and extremely well  
winded;



winded; his characteristic marks were his colour, which was a shade between sorrel and chestnut, with a mixture of white hairs in his mane and tail, an aquiline nose, and rather a sour countenance. These horses were admirably adapted for the carriage, the road, and the plough, and instances were not wanting of some of them turning out good hunters. By the mistaken system of enlarging the size of draft horses, this valuable breed has been almost totally destroyed, and a large, awkward, mis-shapen animal (such as Culley describes) substituted in their place. A few of the good old sort have happily been preserved, by the exertions of a few spirited individuals, in Norfolk, Suffolk, and Essex; and this country is likely to be benefited by them, as Mr. Fortescue of Raven's-dale, and Mr. Wynne of Hazlewood, have imported two stallions and six mares, of the very best kind that could be procured in England. No horse is better calculated for this country, as he combines strength and activity with hardiness and thrift. The Suffolk punch, with  
our

our little Irish mares, will probably renovate the breed of roadsters, for which Ireland was formerly celebrated, but which have degenerated by the introduction of Flanders waggon-horses, and dwindled racers.

CHAPTERS.

I beg leave to offer my sincere acknowledgments to the different gentlemen, who have so kindly interested themselves in the work. To General Vallancey's polite and unwearied attention I feel particularly obliged. I regret exceedingly, that several hints and corrections, with which I have been favoured, have been received too late for the present publication.

CHAP. II.

AGRICULTURE.

*On the Soil of Ireland.*

*A Review of it, and of such Sorts of Grain*

*as are*

*most*

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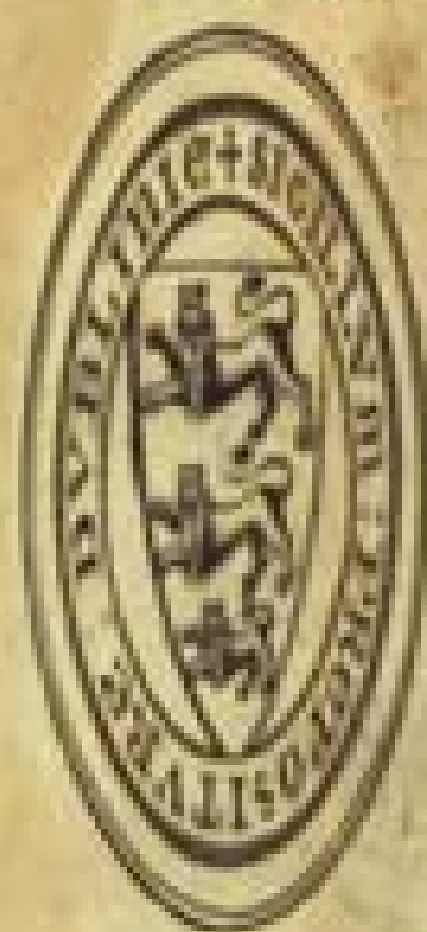
## ERRATA.

- Page 82 line 1, for *thrasb* read *trasb*.  
 102 — 9, for *it* read *them*.  
 124 — 16, for *four* read *poor*.  
 144 — 2, for *Roscommon* read *Galway*.  
 154 — 23, dele—form of the  
 156 — 25, for *use* read *ease*.

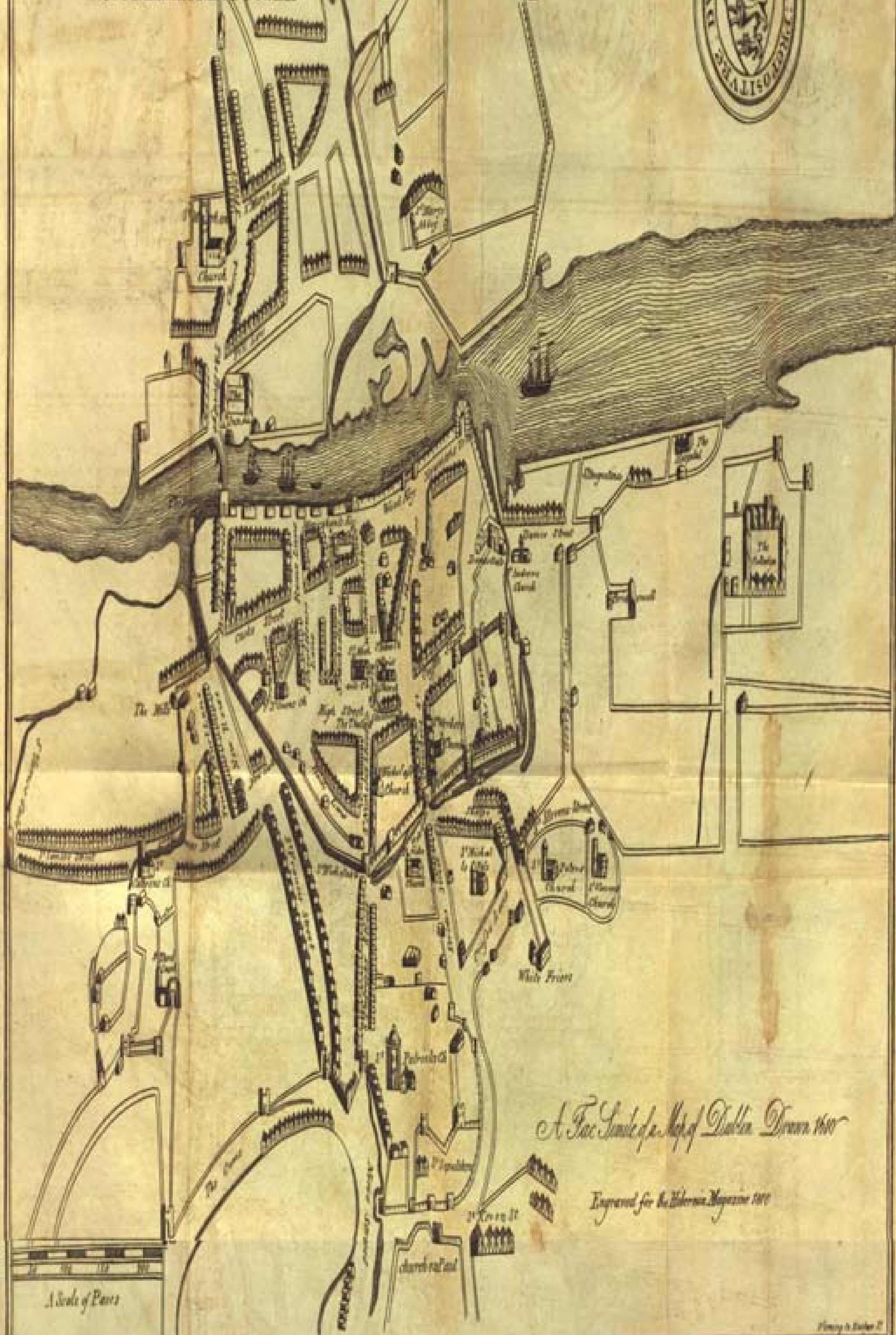
# DUBLINE

1610

*The ancient Seal of the City of Dublin*  
1459



OSTMAN OR MERTOWNE



A Scale of Paces

*A Fac Simile of a Map of Dublin Drawn 1600*

*Engraved for the Victoria Magazine 1880*



OBSERVATIONS  
ON  
THE STATISTICAL SURVEY  
OF THE  
*COUNTY OF DUBLIN.*

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CHAP. I.

SECT. 2. *Divisions.*

I CAN by no means agree with Mr. Archer (page 3), that the high rents near the metropolis would not answer for the propagation of corn. Doubtless, if the old husbandry of Fingal was pursued, of fallow, wheat, oats, oats, almost all the hay and straw sold off the land, no dung drawn from Dublin to it, little or no clover or green crops of any kind cultivated, except a few potatoes, no cattle housed winter or summer, Mr. Archer's position would be very just. If, on the contrary, the most spirited practices of the improved agriculture are pursued, corn crops will be found much more advantageous than hay or pasture, as either of these,

these, according to the *present system of management*, do not improve the land; but by the improved mode the fertility of the soil is annually encreased. I shall attempt a statement of the expence and profits of the two modes, which may perhaps be of some use to farmers, as well as to gentlemen, who farm for amusement near the metropolis.

### OLD METHOD.

#### EXPENCES OF AN ACRE.

##### *First Year—HAY.*

	£.	s.	d.
Rent, - - - - -	4	0	0
Manure from Dublin, at least -	20	0	0
Mowing and making eighteen loads, -	0	18	0
Loading and drawing to market, -	1	19	0
Tythe, - - - - -	0	8	0
Drawing home and stacking, -	0	10	0
Picking stones, rolling, and bush-harrowing, -	0	4	0
Commission and expences, -	0	10	0
	<hr/>		
	£.28	9	0
	<hr/>		
	£. s. d.		
Produce 18 loads ( $4\frac{1}{4}$ cwt.) at 18s. 16 4 0 } 19 4 0	16	4	0
After-grass, - - - - - 3 0 0 }	3	0	0
	<hr/>		
Loss per acre,	£.9	5	0

*Second Year—HAR.*

				£.	s.	d.
Rent,	-	-	-	-	4	0 0
Tythe,	-	-	-	-	0	8 0
Mowing and making,	-	-	-	-	0	18 0
Drawing home and stacking,	-	-	-	-	0	10 0
Loading and drawing to market,	-	-	-	-	1	19 0
Commission and expences,	-	-	-	-	0	10 0
				<hr/>		
			£.	s.	d.	8 5 0
Produce 18 loads at 18s.	16	4	0	}		19 4 0
After-grafs,	-	3	0 0			
				<hr/>		
Profit,				£.	10	19 0

*Third Year—HAR.*

				£.	s.	d.
Rent,	-	-	-	-	4	0 0
Tythe,	-	-	-	-	0	8 0
Mowing and making,	-	-	-	-	0	14 0
Drawing home and stacking,	-	-	-	-	0	7 0
Loading and drawing to market,	-	-	-	-	1	10 4
Commission and expences,	-	-	-	-	0	7 0
				<hr/>		
				£.	s.	d.
Produce, 14 loads at 16s.	11	4	0	}	7	6 4
After-grafs,	-	2	0 0		13	4 0
				<hr/>		
Profit,				£.	5	17 8



*Fourth Year—Har.*

				£.	s.	d.
Rent,	-	-	-	-	4	0 0
Tythe,	-	-	-	-	0	6 0
Mowing and making,	-	-	-	-	0	10 0
Drawing home and stacking,	-	-	-	-	0	5 0
Loading and drawing to market,	-	-	-	-	1	1 8
Commission and expences,	-	-	-	-	0	5 0
				<hr/>		
Produce, 10 loads at 12s.	6	0	0	6	7	8
After-grafs,	-	-	-	1	5	0
				}		
				7 5 0		
				<hr/>		
Profit,				£.	0	17 4

## RECAPITULATION.

	£.	s.	d.
Profit, 2d year,	10	19	0
Ditto, 3d year,	5	17	8
Ditto, 4th year,	0	17	4
<hr/>			
	17	14	0
Loss the 1st year,	9	5	0
<hr/>			
Total profit,	£.8	9	0

## IMPROVED COURSE.

We will suppose the land to be in the same state as when it received the dunging for the meadow, the same quantity of dung used, and at the same price.

*First Year—Potatoes in ridges in the usual mode.*

	£.	s.	d.
Rent, - - - - -	-	4	0
Dung, - - - - -	-	20	0
Seed potatoes, nine barrels at 10s.	-	4	10
Cutting, - - - - -	-	0	4
Planting, - - - - -	-	4	0
Second spitting and shovelling,	-	1	0
Weeding, - - - - -	-	0	4
Digging up, - - - - -	-	6	10
Sorting, picking, and pitting, -	-	0	10
Selling at market, and expences,	-	4	10
		<hr/>	
		45	8
* By 80 barrels (20 stone each) of early potatoes, at 10s. 10d. per bar.	£.	s.	d.
	43	6	8
20 do. apple potatoes, at 8s. 1½d.	8	2	6
		<hr/>	
Profit,	£.	6	0

About

\* As it is probable the potatoes will be dug very early, perhaps four times that sum may be obtained, and the earlier they are dug, the stronger the rape will be.

About the beginning of June a feed-bed of good mould should be prepared; a few perches of one of the potatoe-ridges manured will answer, and about two quarts of rape-feed sowed for each acre; this will probably be more than is necessary; but it is better to have some to spare, as a poor man may always dispose of any redundancy to his neighbours, and a rich one may distribute them gratis amongst his poor tenants; if no better motive actuates him, it will prevent pilfering. These plants should be drawn from the thickest places, and planted in the potatoe-ridges daily as fast as the potatoes are dug; for this I shall take Mr. Archer's estimate.

*First Year—RAPE.*

	£.	s.	d.
Seed, - - - - -	-	0	1 0
Digging the ground and sowing, -	-	0	6 0
Planting, at sixteen inches asunder, -	-	1	14 0
Cutting and carrying to cattle, -	-	1	0 0
	<hr/>		
	£.3	1	0
	<hr/>		
	£.	s.	d.
Produce 20 ton, 10s. per ton, 10 0 0	10	0	0
	3	1	0
	<hr/>		
Profit, £.6 19 0	£.6	19	0

*Second*



*Second Year—BARLEY.*

	£.	s.	d.
Rent, - - - - -	-	4	0 0
Seed barley, 16 stone, - - -	-	0	16 0
Clover-feed, 21 lb. - - -	-	1	10 0
Reaping, binding, and carrying home, -	-	0	14 0
Threshing 16 barrels at 8d. per barrel, -	-	0	10 8
Winnowing, - - - - -	-	0	2 0
Drawing to market and commission, -	-	0	14 1
Tythe, - - - - -	-	0	6 0
Ploughing, harrowing, and sowing, -	-	0	8 0
			<hr/>
	£. 9	0	9
Produce 16 barrels at 16s. £. 12 16 0			
		9	0 9
			<hr/>
Profit, £. 3 15 3			

*Third Year—CLOVER.*

	£.	s.	d.
Rent, - - - - -	-	4	0 0
Picking off stones and rolling, -	-	0	10 0
Cutting and carrying green clover, -	-	1	0 0
			<hr/>
	£. 5	10	0
Produce green for cattle, horses, &c. supposing it only equal to that made into hay, but it is infinitely more pro- fitable; or suppose we value it as rape, - - - - -		10	0 0
			<hr/>
Profit, £. 4 10 0			

*Fourth*

*Fourth Year—WHEAT.*

	£.	s.	d.
One ploughing, harrowing, and sowing,	0	12	0
Rent, - - - - -	4	0	0
Seed, ten stone, - - - - -	0	17	6
Shovelling, - - - - -	0	5	0
Tythe, - - - - -	0	8	0
Making and drawing home, - - - - -	0	13	0
Threshing ten barrels,, - - - - -	0	10	0
Winnowing and drawing to market, - - - - -	0	12	0
Commission and expences, - - - - -	0	2	8
	<hr/>		
	£.	8	0 2
Produce 10 barrels, 35s. per,	£.	17	10 0
		8	0 2
	<hr/>		
Profit,	£.	9	9 10

*RAPE.*

	£.	s.	d.
Expences as first year, - - - - -	3	1	0
Dung 80 one horse car-loads, - - - - -	4	0	0
	<hr/>		
	£.	7	1 0
Produce 25 ton, at 10s. per,	£.	12	10 0
		7	1 0
	<hr/>		
Profit,	£.	5	9 0

RECAPITULATION.

## RECAPITULATION.

			£.	s.	d.
Profit 1st year,	potatoes,	- - -	6	0	8
Ditto, ditto,	rape,	- - -	6	19	0
Ditto, 2d year,	barley,	- - -	3	15	3
Ditto, 3d year,	clover,	- - -	4	10	0
Ditto, 4th year,	wheat,	- - -	9	9	10
Ditto, ditto,	rape,	- - -	5	9	0
			<hr/>		
Total profit,			£.36	3	9
Profit of the old system,			8	9	0
			<hr/>		
Improved corn system superiority,			£.27	14	9

It must appear to any person the least conversant with agricultural calculations, how very difficult it is to draw any satisfactory conclusions from any data, however correct; the endless variations in the expenditures and receipts must make all such calculations liable to many errors; but I trust it will be evident to every person not afraid to open his eyes to the new lights of agriculture, that I have made every item lean rather against my statement than otherwise, and that I have left very sufficient room for many deductions, and still enough will remain to shew the little foundation for Mr. Archer's assertion, that the "high rents near the city would not answer for corn." The most material part of the comparison remains to be considered,



sidered, which leaves the ground at the end of the fourth year in the most profitable state. Meadow in the fifth year will not shew much good effects from the dung it received the first year, and, if it has been kept in pasture, it will be but little improved; for if pasturing ground had that extraordinary effect, that many are apt to think, it would annually encrease in fertility; but a moment's recollection will serve to convince us that pastures (for instance, commons), that have been continually grazed, are at this day little or nothing richer than they were a century ago; besides, in the old system, at the end of the fourth year, as the produce has been sold off the land, there will be little or no dung accumulated to restore the fertility.—Let us now take a view of the improved tillage system; there not only remains a very handsome *annual* superiority in cash of 6*l.* 18*s.* 8*d.* per acre, but what is of vast importance, and which is too often overlooked, the ground has received *two* dungs; and from the great quantity of green food for feeding in the house, a very large quantity of dung will be ready for potatoes as soon as the last crop of rape is consumed, as all the straw of each crop has been *used on the land*. It will be easily seen, that the course has been accommodated to the conception and practices of the commonest farmer, and by no means what may be esteemed the most beneficial course, that could be pursued so near the metropolis, where the ready market for all redundancy daily

daily presents itself; for I am well convinced, many green crops, that I could point out, would be infinitely more profitable, but I thought it best to give that course, of which every farmer knows the expences and profits.

### SECT. 3. *Climate.*

THE wetness of our climate is the constant theme of all those, who are little acquainted with rural affairs; one would be tempted to imagine, that they thought the climate should be made to suit the convenience of the good citizens of Dublin alone. If the climate was as dry as those we hear so often lavishly praised by travellers, what would supply us in dry summers with that plenty of water we are usually blessed with? Or if the quantity of moisture was not equal to the absorption of our in general rocky or gravelly soil, what would feed our numerous flocks and herds, or give us that abundance of that inestimable root of plenty, the potatoe? Those, who have never been out of the county of Dublin, are too apt to form an opinion of the rest of Ireland from our poor clayey soil; but it is a very erroneous one, and, if we make a proper use of our advantageous situation, no soil can be more proper in the neighbourhood of a great and populous city. Can any soil answer better for the sweepings of our streets, or our sea-



coal ashes, which would be not so beneficial to gravelly or sandy soils? Possibly it is not generally considered, that all the manures we possess in abundance in this county are peculiarly adapted to the improvement of clay soils, viz. lime, limestone-gravel, marle, sweepings of the streets, coal-ashes, sea-sand, &c.

The strong breezes from the west, with which our city is favoured, always come in for a share of the odium attached to our climate by the croakers; they do not reflect, that a gentle breeze would not have power to disperse the smoke and vapour of Dublin. Upon the whole few cities possess so many advantages, or so healthful a situation, whether we consider the almost constant current of air from the west to the east, which passes through the city, aided by the flux and reflux of the tide, the great advantage of a constant stream of water to carry off all the filth collected by the sewers, and numberless other happy circumstances, which we seem scarcely to notice, or are very unthankful for to Providence. The air of Dublin has been much improved within a few years, the streets are considerably widened, and numberless obstructions removed, and the complaints of dirty streets have not *so much* foundation now as formerly. If the inspectors of nuisances did their duty, we should have still less cause of complaint, but it seems these gentlemen pay little attention to their business, as the foot-paths are permitted very frequently to remain in the most filthy state;



State; as I am informed they have a share in the fines levied for not cleaning before houses, I am at a loss to account for the neglect. Instead of receiving a salary, a spirited execution of the duties of the office would enable a person to pay a very handsome sum for permission to make the citizens of Dublin cleanly.

The great improvements in land near the city have operated as another means of removing nuisances quickly, and, by a most salutary regulation, the sweepings of the streets must be removed beyond the circular road. If all church-yards, slaughter-houses, chandlers, soap-boilers, and other nuisances were removed out of the city, Dublin would be superior to any city in Europe. "Let rash, gloomy, and ungrateful mortals then forbear to murmur at this climate, since it is evident the bounty of Providence causeth the sun to shine upon us in a far greater degree than we commonly imagine or deserve."

#### SECT. 4. *Soil and Surface.*

THOUGH the soil of the greater part of the county of Dublin is inclined to clay, it is not like those deep and tenacious clays so frequent in many parts of England; for scarcely any part of our soil but has a mixture of gravel, and almost every where, if farmers will be at  
the

the pains to search for it, it will be found that, at no very great depth, they possess limestone or other beneficial gravels, with this uncommon advantage attending it, that the operation of draining the ground generally raises a sufficiency of gravel to manure the whole surface. Great improvements have been made in many parts of the county by this practice; and where great caution is observed in the mode of *filling in* the drains over the fods or other materials, with which the drains are constructed, the practice, aided by the great facility of procuring manures from Dublin and elsewhere, must tend to counteract the bad effects attendant on retentive soils. For a more particular account of the method of draining wet lands, see Chap. IV. Sect. 12.

Planting potatoes in ridges has been in derision called by our neighbours the Irish lazy-bed method; but I am convinced, in retentive soils with a gravelly bottom, such as we generally find in the county of Dublin, it is the most beneficial practice that could be pursued. To make this answer the purpose of preventing cohesion, it should be continued for three years; this may be easily effected by making the ridge six feet wide, and the furrow three feet the first year; the second year half the ridge should be made the furrow, and the third year the other half; by which means in three years the whole field would be completely trenched. If the gravel lies below the usual depth of potatoe-furrows, it should be dug for, and  
well



well mixed with the surface, which by this means will become porous; even where the bottom is not good enough to bring to the surface, it will be found highly useful to loosen the bottom of the furrows in all retentive soils; and if, instead of the usual mode of running the ridges in the direction of the ground, they were made diagonally to the fall of the ground, they would in some measure serve as drains.

#### SECT. 5. *Minerals.*

LIMESTONE-GRAVEL abounds in almost every part of this county, but is by no means used in that quantity it ought; there is the less excuse for this, as generally the soils, which most abound with it, are those that want it most on the surface. There is a kind of black gravel very frequently to be met with, of a very fertilizing nature; it generally passes under the denomination of limestone-gravel, but Mr. Kirwan informs me it is not calcareous; however, let its component parts be what they may, its very beneficial properties are well established.

Marle abounds in many parts of the Dublin mountains, and elsewhere; but though its operation on heathy or boggy soils is well established, yet the inhabitants of those waste tracts make little or no use of it; that its  
value



value was formerly well known is evident, by many old pits being found in different parts of the mountains.

From the accounts given by Mr. Archer, and Mr. Donald Stewart, itinerant mineralogist to the Dublin Society, it would seem, that we have a very great variety of the mineral kingdom in our county; but it is surely a strong proof of the most extraordinary neglect of the proprietors, that the hints given by them, and by Doctor Rutty many years since, have never been pursued with spirit. The expence of a set of boring tools could be no object, and the trouble would also be very trifling. As Mr. Archer has made the very liberal and spirited offer of pointing out previously, where it is likely they may be found, ignorance of the probable situation or method of searching cannot be pleaded in excuse. I know not how to account for that very blameable carelessness and want of spirit in our landholders, that prevents their taking every advantage of the bounties of Providence, so lavishly thrown under their feet unheeded.

Few cities, I believe, have a greater variety of stones for the purpose of building; for there is no part of the vicinity, that does not produce both limestone and others for this purpose, and if the extension of the city should at any time cause a scarcity, the south side presents an inexhaustible fund of mountain granite; and I imagine, in a climate so moist as ours, more use should

should be made of this kind of stone than many that are used, which imbibe and retain moisture in a greater degree than our mountain granite; it possesses, in a very eminent degree, the desirable property of remaining unchanged for ages by every vicissitude of climate, which is what can be said of very few other kinds; witness the College library, the greater part of our churches, the new gaol, and most of our public buildings; it is also peculiarly fit for flagging our streets, as the roughness of its surface prevents the feet from slipping; it likewise stands fire better than any other we possess. The difficulty of splitting this stone was formerly an objection; but as most workmen know, that driving wedges in the direction of the flakes of mica rends the stone tolerably regular, the business is now more easily accomplished; besides, this stone is easier dressed fresh from the quarry, as it hardens in the air.

Slates have been found in some parts of this county, but they were too porous, and did not split into laminæ thin enough for the purpose of covering houses; it is not improbable that, if they were quarried from a greater depth, the quality might be much improved; for in general all quarries are harder, the deeper they are worked.

We are given to understand by Mr. Archer and Mr. Stewart, that there is every likelihood of finding coal in the following places, viz. Porter's-town on the



Royal canal, Hill of Howth, Garristown, Lambay island, and the Naul, yet I cannot find that any spirited attempt has been made by the proprietors to ascertain it.

#### SECT. 6. *Water.*

THE bar across our harbour prevents the admission of vessels of a great draft of water, and has been adduced as a strong reason for constructing a canal from Dalkey to the Grand canal docks near Ringsend, which would admit vessels of more than twice the burthen of those, that can pass the bar.

The dangerous state of the walls on each side of the river Liffey calls loudly for amendment; I do not know in whose department such repairs are, but their present ruinous state does them little credit; and every person, the least acquainted with such affairs, must perceive, that neglecting to stop a breach of very small dimensions in time, and which would cost only a few shillings, occasions the expenditure of a large sum at a future period.

Another very great neglect is, permitting the accumulation of a large heap of rubbish in the river Liffey, behind the fountain on Ormond-quay; every flood washes part of it away, and as oyster-shells and other rubbish from Ormond-market form a great part of it, it will at

some



some future period cause an obstruction to the current, or may be thrown by it where it will be very injurious to the shipping; if inspectors of nuisances did their duty, this would have been prevented long since.

The docks at the new custom-house, it is now perceived, are not by any means adequate to the increase of trade, as vessels are obliged to lie many tier deep, which is exceedingly inconvenient to merchants and to the ships; this can be only remedied by building another more capacious dock to the east of the present one, where a stone-cutter has his yard; I imagine this could be effected at a moderate expence, as little excavation is necessary, and the wall next the river is already built.

Turning the course of the river Dodder to the east of Irishtown was a very favourite idea some years since; for what reason it was not carried into execution I am still to learn; it has been long complained of as accumulating a bank of sand, that obstructed the shipping in their passage up and down the river; by a great deal of expence and labour this has been for the present a good deal removed, but must still accumulate. I am informed the levels, for the purpose of turning this river, were taken some years since, and reported *impracticable*; I am convinced it is perfectly practicable, and, if applied to, will point out the line, and method of conducting it.

## CHAP. II.

## AGRICULTURE.

SECT. I. *Mode of Culture.*

IT is recommended to “ depasture the first growth of clover until the latter end of May, and mow the second in the latter end of August or beginning of September.” This is contrary to the practice of the best agriculturists of England, and it will be found a great waste of clover to permit beasts of any kind to pasture it; the most economical way of using it is certainly for soiling *in the house*, as it not only goes at least three times as far, but an immense quantity of manure is accumulated, and dung *made in summer*, from the great quantity of urine, and from its fermenting sooner, and with more certainty, is much more valuable than that made in winter.

Clover, after having been pastured on, is of very unequal growth, unless eat too bare for the thriving of stock; some of it is in flower, whilst others are only  
just

just beginning to shoot, consequently can never answer the purpose of a second crop for either hay or for seed; and indeed it will be found a great waste to save any of it for hay, but to give it all green in the house. If the farmer chooses to save any part for seed, the previous cutting should be as early as possible, to allow the second time to ripen the seed, and he need not be apprehensive of its shedding, as it is with some difficulty made to quit the seed-pod.

Many experienced agriculturists doubt whether borecole, or any other kind of vegetable, will succeed between the drills of *late* potatoes, as their rambling manner of growth renders them very unfit for this purpose, and their shade usually makes plants between them unable to bear exposure to winter cold. If planted between the drills of potatoes *dug early* for market, it may answer very well; but if planted between the rows of beans, they will be found to answer much better, as the beans are generally reaped or pulled early enough to afford an opportunity of landing the borecole or rape with the plough, an advantage which cannot easily be obtained from *late* potatoes, which are seldom taken out of the ground until November.

In page 17, the course of crops pursued by Mr. Lenahan, Mr. Johnson, and Mr. Segrave, deserves to be held up as an example of defective husbandry, as these



these gentlemen are looked up to, and followed closely, by the farmers in Fingal.

Surely it must be astonishing that, in this enlightened period of agriculture, men so near the metropolis, who must mix in the society of many, who pursue different systems, and who do or ought to know, that very different practices are followed by the best agriculturists in England and Ireland, should still persist in the same mode of cropping that their great grandfathers did; perhaps they are above being instructed *from books*, as I have heard many farmers say they would not give a rush for all the books on the subject, and that they would rather take the advice of their ploughman, a mulish race of men, that would sooner perhaps leave their service, than plough *sand* with less than four bullocks! A very pretty agricultural preceptor, much superior, no doubt, to Mr. Young, Doctor Anderson, &c. &c.

We will suppose Mr. Segrave has only three hundred acres out of four hundred under tillage, the profit on which, by his course of cropping, *according to Mr. Archer*, is 1*l.* 8*s.* per acre; this, in four years, amounts to 1,680*l.* By the improved husbandry, the profit on this number of acres will be 8,570*l.* 12*s.* 6*d.* which leaves a balance against Mr. Segrave, in four years, of no less than 6,890*l.* 12*s.* 6*d.* besides the rapid improvement his land is still making. Probably the old hackneyed argument of prejudice and ignorance may be used here (not, I am convinced, by Mr. Segrave),

“ that

“ that these profits are only *on paper* ;” but it would be no difficult matter to prove (as it has been often done) that they can also be *put in the pocket*. It is probable Mr. Segrave has more of his land under tillage than I have supposed, which makes his loss, by persisting in this ruinous course, still greater. I have too good an opinion of Mr. Segrave’s good sense, to be apprehensive he will be offended at these well meant hints ; if they make him sow *one acre of winter vetches*, or plant *one acre of rape*, I shall think myself amply rewarded ; the profit on these *two acres* will speak to him in more persuasive language than any I can make use of.

In many places the use of only two horses in a plough (but still a driver) has obtained very much ; but so prejudiced are most ploughmen, that I have often seen, in the adjoining field, four horses or oxen used, although the ground was in every respect alike.

It is surprising that kitchen gardeners, who are always complaining of high rents and the great expence of labour, do not use the plough instead of the spade ; the saving would be very great, and the ground much better cultivated.

The late Mr. Christopher Brangan, of Swords, was an exception to the general mode of culture in the county of Dublin. I saw, about three years ago, at his farm at Collins-town, *at one time*, potatoes in drills, set and taken up by the plough ; vetches for soiling horses ; red clover for the same purpose ; red clover  
sowed



sowed amongst flax, &c. This farm is adjoining to Mr. Domville's farm of Cold Winter, near the forest, and, when I first saw it, was in the same wretched, wet, commonlike state, in which this gentleman chooses to keep his different farms in the county of Dublin. Mr. Brangan made *underground* drains, spread limestone-gravel and other manures, and left it one of the best farms in Fingal; it is more than probable it will now fall into the old darling course, wheat and oats, wheat and oats, until completely exhausted.

SECT. 2. *Extent of it, and of each Species of Grain sowed.*

THERE is reason to apprehend that, instead of agriculture receiving any benefit from the late exertions of farmers to break up grass-lands for different kinds of corn crops, it will receive an injury proportionate to the erroneous method of cropping. If farmers could be prevailed on to abolish their wretched system of fallowing, and pursue the *alternate* course of cropping, I should be glad to see every inch of land in the county of Dublin broken up for tillage; but, until that system is generally adopted, breaking up grass-lands cannot be considered advantageous. A very happy change has lately taken place in the ideas of *enlightened* graziers; they now begin to perceive the very great benefit



nefit of green winter crops, but ftill too many are infenfible of the fuperiority of a crop of rape, or potatoes, to one of rotten grafs, the boasted winter food of many of our beft grazing counties, and they feem to be equally infenfible of the fuperior profit of an ameliorating courfe of crops, that will fupport more cattle than their beft lands in their prefent ftate; for, until lately, it was no uncommon thing for graziers poffeffing three or four thoufand acres to have only forty or fifty acres under tillage. Doubtlefs this affertion may furprize many of them; but I imagine very little calculation would ferve to fhew them the fallacy of their ideas, and that tyrant custom only can be pleaded in excufe.

Nothing can tend more ftroingly to fhew, how little they know of the improved fystem, than the notes we have fometimes feen attached to advertisements of land to be fet; “a convenient place to throw manure into the river.” As thefe notes have been for fome years difcontinued, it is hoped it has proceeded from a conviction, that their fystem was inferior to the prefent improved one.

Rapid improvements are now taking place, becaufe men of fortune and liberal education have at length turned their thoughts to the plough; before this little improvement could be expected, as the tillage was moftly in the hands of thofe, who were not able or did

not know how to improve it; but as landed proprietors have shaken off a good deal of that laziness attendant on the grazing system, great improvements may be expected, and they will find that their lands will support *more cattle*, and at *the same time* produce great crops of corn, which is the great superiority of the improved husbandry, besides giving employment to multitudes, that are now idle or half employed, which is a matter of the utmost consequence.

It is not an easy matter to ascertain the average produce of each kind of grain from the acre; it was formerly, I believe, estimated at six barrels of wheat of twenty stone each; ten barrels of oats of fourteen stone each; and nine barrels of barley of sixteen stone each: but I am convinced that, from the great extension of the potatoe culture, and in some places clover, the average has been raised to eight barrels of wheat; twelve barrels of barley; and fourteen barrels of oats: the least doubt does not remain, that a spirited adoption of the improved husbandry will still considerably encrease the average; and, as an inducement to make some exertions, I annex a statement, from men of high character, of what has been produced in land in high condition; and at the same time it helps to prove, that the produce will amply repay a spirited agriculturist for almost any expenditure of money.

			Barrels.
Young's East. Tour,	vol. I. p. 416.	Oats per Ir. acre	$29\frac{5}{14}$
——— Annals of Agr.	vol. II. p. 159.	Ditto.	$29\frac{1}{2}$
——— Ditto.	vol. V. p. 240.	Ditto.	$30\frac{9}{14}$
——— East. Tour,	vol. I. p. 401.	Barley,	$25\frac{1}{6}$
——— Ditto.	vol. III. p. 19.	Ditto.	$28\frac{5}{16}$
——— Annals of Agr.	vol. II. p. 79.	Ditto.	29
——— Ditto.	vol. II. p. 243.	Wheat.	$18\frac{7}{8}$
——— Ditto.	vol. XII. p. 45.	Ditto.	$19\frac{1}{6}$
——— Ditto.	vol. II. p. 93.	Ditto.	$21\frac{1}{6}$

On my late father's farm near Mallahide I have seen thirty-three barrels of very fine wheat *sold* off two acres of ground, which had not been manured in the memory of man, and produced a crop of oats the preceding year; the quantity of seed sowed was only two bushels; this has been frequently exceeded in Ireland, and ought to stimulate farmers to make exertions; for surely it must be a wretched system of cropping, that permits land of this fertility to remain every third year worse than unproductive, and ought to open their eyes to the ruinous course they are blindly pursuing.

### *Course of Crops.*

In page 21 it is recommended to plant rape after potatoes, in the beginning or middle of September, about six or eight inches asunder. Rape plants, sowed in



June, will *by this time*, if they have been transplanted, cover much more than that space of ground; they should therefore, if planted the beginning of September in rich ground, be at least eighteen inches asunder; but, if not planted until a month later, a foot will be sufficient. It is of great consequence to give these, and indeed all plants, room, as they become *very full in the middle, and much thicker in the leaf*; and although they may not appear *to the eye* so large a crop, they will be found vastly superior *in the scales*.

It would be a great advantage, if near a market, to dig early potatoes *daily*, as it not only makes the work, by dividing it, lighter, but gives an opportunity to women and children to plant as much with rape each evening or morning, as had been cleared of potatoes the previous day, whilst the plough or spade is taking up more, and which will be ready for the women and children by the time they have planted out the rape. As it is of very great consequence they should be planted as soon after the ground is stirred as possible, it would be a great advantage if the planters could be induced, by an additional reward, to plant them after the usual working hours; and permit me here to remark, that I am surprized labourers of all descriptions are not employed in this manner; a calculation of what they earn in an hour could easily be made, and paid accordingly. Amongst other advantages (and not one of the least), it would help to keep them from *private* whiskey-

whiskey-houses, which are near almost every gentleman's house in the county of Dublin.

Previous to sowing clover amongst corn, it would be very useful to harrow the ground, which would not only be of infinite use to the corn, but all seeds sowed in earth fresh stirred will more certainly vegetate, and it also destroys young weeds, that are by this time above ground. One of the strongest reasons for not sowing clover-feed, until the corn has attained some growth, is the shade the leaves afford the young clover. I imagine if, after harrowing the ground, a small plough was introduced once up and down in each furrow between wheat ridges, and the loose earth shovelled in *between* the wheat plants in the month of March, April, or May, it would be a very beneficial practice, and assist the tillering of the wheat very much. If a top-dressing could be procured, it would be a good time to apply it between the harrowing and shovelling.

Mr. Talbot of Leixlip has introduced a new method (at least in Ireland) of planting potatoes. They are set four in a clump, and each clump four feet asunder, to be landed by shovels several times during the summer. Mr. Talbot speaks largely of the great produce, but until we know the *net profit*, let it be ever so great, no judgment can be formed of its value; it certainly must leave the ground in a very fine state (in light soils much too loose for wheat), and gives an opportunity to employ the women and children of a poor man hourly.

But



But of all the methods yet tried of planting this valuable root, that by the eyes scooped (but not so deep as generally practised), seems, from several trials made by many *unprejudiced persons*, to deserve the preference; and a still stronger proof of this superiority is the adoption of it by the labourers in their own gardens.

In the estimate for tilling an acre of ground, by a county of Dublin farmer, page 28, I imagine Mr. Archer has overlooked an error in the fourth year, “A Barley Crop.” He has charged 1*l.* 7*s.* 6*d.* for clover-feed, sowing, and rolling; now as the course and the calculations on it end with the fourth year, it is not fair to charge it to that course, without at the same time giving credit for the produce, which, if equally good with his clover in the improved course, would be worth 17*l.* 3*s.* 10*d.* clear of all expences; but, as it will be greatly inferior in produce and mode of consumption, a very considerable reduction must be made, but still something must be allowed.

In the improved course, page 35, under the article “Fourth Year, Winter Crop, Rape,” Mr. Archer says, “Dunging this crop is absolutely necessary, and it may be well presumed, that the preceding crops have afforded an ample supply of this article.” As all the produce, except the rape, has been supposed to be sent to market, and credit given for the receipt in the course, there remains nothing to make dung of, as without the straw it is utterly impossible, that the stock  
can



can have made in the proportion of 150 loads of dung for the acre of rape recommended at the conclusion of the course; if the dung had been drawn from Dublin, the 150 loads of dung would have been worth at least 16*l.*; but as he has charged only three pence per load, it is evident home-made dung is here meant.

The strong predilection of farmers for corn crops has chiefly arisen from an ignorance of the value of green ones; but the influence of example must ultimately tend to change their ideas, for Irish farmers are not that race of mules that prejudice so often calls them; only *convince their judgment* that they shall not lose, and I am persuaded they will pursue very different methods from what they follow at present. How very justly might these very farmers retort on their landlords, that make it a *fashion* of using this language, “Why do not you, who have plenty of money, and have an opportunity of seeing improvements, reclaim your bogs and mountains, or inform us in what manner these improvements are to be conducted? We cannot read, or leave our farms, and unless you send us a person to instruct us, how are we to learn?”

#### *Use of Oxen.*

I conceive nothing can be more erroneous, than mixing horses and oxen in the same draft. Surely it must strike every person, that a spirited quick-stepped  
horse

horse and a slow-paced bullock can never draw an equal share; even oxen should be matched as nearly as possible in the step.

The general method of driving plough beasts is a most cruel one. I have frequently examined plough-goads, that had a sharp spike above an inch long at the end, for the purpose of teasing these poor patient creatures; and I have not a doubt, that if the skin of a weak or slow ox could be stripped off, it would be found like a riddle. The ignorant ploughman and his careless master look on with indifference, whilst an ill-tempered young ruffian is indulging this infernal disposition.

If farming societies withheld premiums from ploughmen or farmers, that permitted this or any other cruelties to their beasts, it would doubtless have a good effect. A whip would answer every good purpose, without doing any injury; for cattle, that are much goaded, at length grow callous. If a bundle of hay was left on each headland, and every time the plough came there the driver would pull a good handful, and give it to his cattle as they walked on, *possibly* it might have a much better effect, and not *quite so hard work*, as beating on the head, and punching his cattle with a *ten foot goad*. In general the proper harnessing of all beasts seems to be but little attended to; if the collar and straddle are made so soft as not to hurt the horse, and a great quantity of *white stitching on the leathers*,  
 little



little attention is paid to the *line of draft*; yet a glance must convince any person, that *any angle in this* must add considerably to the pressure on the horse's back; this may be observed every day in three-horse carts, where the middle horse happens to be taller than the other two.

*Nature and use of Implements of Husbandry.*

The Scotch plough has lately been very generally used; ignorance and prejudice say it will not do for this country; that it kills the horses, &c. &c. &c. Those who have given it a *fair trial* recommend it highly; but it is very probable it may have been often badly made, or improperly set. This aversion to any but the common implements of the country is a general complaint every where, and by no means confined to Ireland; one of the most pregnant proofs of this occurred at the Castleknock ploughing match two years since; the beam of the plough used at this exhibition was of very great length, the mould-board very long and very high. When the plough was entered in the ground, the ploughman threw himself almost on his left side, and by this means loaded this monstrous mould-board with at least four hundred weight of earth, which he carried to the other end of the ground, and with no little exertion threw it off, to enable him to turn; this, I was informed very gravely



by an old farmer, was to *keep the plough steady*; until this time I thought the posture of a good ploughman was nearly upright, but here the farmers of the neighbourhood seemed to prize the man, that carried the greatest weight of earth, and kept his left hand nearest to the ground. As there was no plough of a better make produced at the meeting (to the shame of the neighbouring gentlemen be it spoken), there was no little exultation at their *unfortunate* superiority. For the honour of my country, the remark made by a gentleman's English steward was not a little grating, "that this meeting did not seem to be intended for the promotion of good ploughing, but to make the bad worse." On removing the earth after this wretched ploughing, the ribs of hard untouched earth might be easily discovered, which in a retentive soil must be very prejudicial to crops, as they prevented the water from running into the furrows.

Many farmers object strongly to ploughing deep, for fear of turning up the bad earth. I conceive nothing can be more beneficial than turning up a *small quantity* every year, if the ground has been loosened by *the miner* (which does not turn up any earth) the previous year; this loosens and *admits air* to the substratum, and renders it more fit for turning up the ensuing year; it also helps to remove the wet below the roots of fibrous plants, and, where tap-rooted plants are to be propagated, will be found highly useful, as it

will,

will, if *steadily* and *judiciously* persisted in, give an opportunity of sowing these crops in soils, that otherwise never would be fit for them; but if an ignorant enthusiast was to turn up a great quantity of clay *at once*, as we see frequently done in gentlemens' gardens, the consequence would be very bad. The miner\* is an admirable instrument for preparing the ground for planting trees; it saves the expence of spade-trenching, which is an item in planting of no small amount, very frequently more than all other expences. A strong argument in favour of deep ploughing is the beneficial effects of gradual trenching in kitchen gardens, which, though frequently of no better quality than the adjoining ground cultivated by the plough, is rendered infinitely better. Deep trenching in kitchen gardens occasions a great waste of dung to counteract the pernicious effects of a large quantity of clay turned up *at one time*; this causes vegetables very often to have a rank taste, which those produced in fresh earth, moderately manured, never have.

## F 2

## Cross

\* A plough-share fixed in a strong beam without mould-boards, and drawn by four horses or oxen, and follows in the furrow the plough has just made, and, without turning up the substratum, penetrates into and loosens the soil from eight to twelve inches deeper than the plough had before gone; which operation, besides draining the land, causes the water to carry along with it any vitriolic or other noxious matter; by the substratum thus loosened, the roots of plants may penetrate the deeper, and, in course of time, that which is but a barren substance may become fertile soil.—*Lancashire Survey*, p. 33.



Cross ploughing is very much practised in this county; I cannot perceive any benefit in it: indeed, where ground has been ploughed in the Castleknock mode, it is very useful, as it chequers some of the hard ribs left by this *premium ploughing*, but it must be considered always as a tacit confession of some *previous imperfection* in the ploughing.

Until lately, we could not boast much of any improvement in these matters; the drill-barrow is now generally used, and, from its extreme simplicity and usefulness, is likely to obtain a place amongst the implements of the poorest farmers, as they will soon save much more in feed than their original cost. As a strong proof, that greater attention has been lately paid to the proper construction of the plough than formerly (tho' I am informed by a Scotch ploughman, far inferior to Small's plough), I have been informed by Messrs. Nugent and Orson, that they have sold at their manufactory in Henry-street, from the 24th of October 1800 to the 25th of March 1802, 119 ploughs, mostly after the Scotch model; and from September 1801 to March 1802, 31 drill-barrows, chiefly their own improvement on a former model, and every other kind of improved implement in proportion.

As this is the amount of sales at only one manufactory, what must be the number throughout all Ireland, exclusive of the great numbers imported into Dublin, the North, and other parts of Ireland from Scotland?



As men of fortune and science have turned their thoughts to this very necessary branch of mechanics, doubtless we may expect that some data may be given, that will bring it to that certainty, which workmen in general cannot attain. Owen Wynne, Esq. of Hazlewood, county of Sligo, obtained a premium from the Farming Society of Ireland, at Ballinasloe, in October 1801, for his invention of a plough, that, I am informed, bids fair to accomplish the wishes of agriculturists, and is therefore likely to be brought into general use. Many other gentlemen, I understand, are most laudably employed on this most useful subject. The very high prices, at which those improved implements are sold, are a very great obstruction to their adoption by small farmers, as few ploughs are sold for less than six or seven guineas; possibly this may be as low as they could be sold, according to the mode of making and finishing; but until some change takes place, either in the materials or construction, that will bring them within the reach of small farmers, they must fail of that general adoption, so desirable in all improved implements of agriculture.

*Use of green Food in Winter.*

The soil of the greater part of this county is well adapted to the cultivation of cabbages, and Dublin market always prevents any remaining on hands; the  
culture

culture of them is so well known, it is needless to repeat it here; but I imagine it would be an improvement, if they were planted in the intervals of beans, in four-feet rows; they would be sheltered from the sun, and kept moist by the shade of the beans; by the time they wanted room the beans would be fit to pull, and, when carried off the ground, the cabbages might be landed with the plough. Early mazagan beans are the best for this purpose, as they are ripe a month before horse-beans, and always sell better; by this constant shading, stiff soils *in summer* will be (contrary to the opinion of fallowists) greatly ameliorated. If cabbage-plants are dipped as high as the first leaf into liquid cow-dung and lime, it will prevent the grub injuring them, and will also assist their taking root speedily.

I am very much inclined to think, if beans were sowed thick, and cut when beginning to blossom, they would be one of the most valuable vegetables we propagate, either as green food, or made into hay. Horses and cattle are particularly fond of the withered stalks of beans, after they have been threshed; then how much more palatable and nourishing would they be, if cut in this succulent state, made into hay, and, as they are wanted in winter, cut by a straw-cutter? I should think, infinitely better than cut straw of any kind. One great advantage of this crop is, that it may be sowed from January to July, and will be an admirable *preparation for wheat*, much superior to beans *saved for seed*,



*seed*, and, for an intermediate crop, certainly much superior to buck wheat.

As many farmers are frequently prevented from sowing turnips at the proper season, it may be useful to them to be informed, that early stone and early Dutch turnips will answer for a late sowing much better than any kind of sheep turnip, as they not only come into use much sooner, but they do not run so much *to tops*, are much more apt to apple, and equally hardy as any other sort, except the Rutabaga or Swedish turnip. The value of this most useful root seems to be but little known, and, where they have been tried, they have generally failed; this, I am convinced, is caused by sowing them too late, which prevents their having any bulb; they seldom succeed, if sown later than the beginning of May; and I am inclined to think, if they were sowed in March, it would not be too soon, especially if they are to be transplanted. I have had these roots very fine in a *stiff clay*, and, after saving the seed from them, they were eatable, which is a convincing proof, that they would be very valuable for sheep or cattle, when other kinds of turnips were consumed, or in a forward spring had run to seed.\*

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\* William Jones, Esq. of Listoke, near Drogheda, has experienced the uncommon value of the Swedish turnip last winter (1801) in fattening cattle, which we may hope to have detailed in the County of Louth Survey, with many other spirited practices of this gentleman.



The practice of covering potatoes in the lazy-bed method with a great quantity of earth is very prejudicial; this may in some measure account for scanty crops; it proceeds generally from an opinion, that landing them is useful; so it undoubtedly is, but they do not discriminate between putting earth gradually between the stems, when they are *above ground*, and covering them deeply *before they come up*; one is landing, the other is smothering.

Planting the smallest and worst potatoes is a very general practice; this may also account for bad crops: if the largest and fairest *only* were always planted, I imagine, contrary to the opinion of many, they would never degenerate.

The Right Hon. David Latouche has this winter at Marly-stall fed a number of bullocks on borecole, cabbage, turnips, and finished them with steamed potatoes. For this purpose a boiler has been lately erected, which steams six or seven hundred weight at one time; the contrivance for washing saves a great deal of trouble, and the whole arrangement does great credit to his steward, Mr. Blackman. When Mr. Latouche's watered meadows are finished, he will be able to *feed in the house* winter and summer, by which an immense quantity of manure will be made for the part of the demesne, that cannot be watered. The plantations in this demesne are constantly mowed for foiling *in the house*; this makes a very great addition of food for

for stock from ground that, in the usual way of managing such places, is totally unproductive; this, in a demesne of great extent like Marly, is a matter of some moment, and deserves more attention than it generally receives. Carrots for horses are also used here, and have produced uncommonly good effects, insomuch that they are likely to be introduced on a large scale; in short this demesne is likely to become the school of improved husbandry for the county of Dublin, as it has long been for ornamental planting.

## CHAP. III.

SECT. I. *Pasture.*

## NATURE OF IT.

THIS branch of rural œconomy is improving rapidly, and might still be vastly improved, if farmers were more sensible of the value of limestone or other valuable gravels, which almost every farm in this county possesses. Every person is now become so sensible of the value of manure, that the price of dung is raised cent. per cent. higher than it was ten years ago, and the kitchen gardeners complain, that the farmers take all the dung from them; this is a most convincing proof, that rapid improvements are making in land. If ever the farmers become sensible of the great and lasting value of *watered meadows*, and of manure *made at home*, at less than half the expence of what they buy, the dung will again be had on reasonable terms by the kitchen gardeners, which, with the use of the plough instead of the spade, will enable them to bring vegetables to market on better terms than they can at present.



Breaking up pasture to prepare it for corn or potatoes, when the sod is tough and grassy, is very frequently a work of some difficulty, as we often see them drawn about the field into heaps without being divided into small pieces; this, I presume, could be very easily prevented, by harrowing the ground across *previous* to the ploughing; for this purpose the harrow ought to be so heavy as to sink into the sod two or three inches; the teeth should be very sharp, and made without any bend, as they are only to score the sod; this, if judiciously performed, will save much time and expence: the instrument called a scarificator, with coulters *only*, is well adapted for this purpose, but the harrow will answer where this implement is not to be had. Harrowing grass-lands in spring will be found a most beneficial practice, as it helps to destroy moss, and causes a fermentation highly serviceable.

The pasture of the Phoenix Park forms a most disagreeable contrast to the ground around it in every direction. I am at a loss to account for the neglect of this charming place; if it was properly drained, that alone would change the appearance and the nature of the herbage, and the produce would be infinitely better and more abundant. Some attempts were formerly made to drain it, but indeed most wretched ones. I hope this hint will be noticed by those, in whose department such affairs are.

There seems in general to be a very great carelessness in laying down gentlemens' lawns; a very little additional expence and some attention would in general accomplish it, as nature seldom wants more than a little assistance.

If children were employed in pasture ground to collect dung and weeds, it would have a good tendency; they might have small baskets, and collect it in small heaps, to be paid *according to the quantity they collected*, and not by the day; it would help to make them industrious and emulous, and it would also make a very large addition to the dunghill, of a manure, that is of little use to the pasture in summer; and the weeds, if gathered *before they seed*, might also be turned into manure in the *urinarium*, which no farm should be without.

There might be a vast addition to the pasture and meadow of this county, if the proprietors of the Dublin mountains could be induced to improve them; were they sensible with what ease bog and moory ground may be reclaimed, we might hope to see those dreary wastes in view of Dublin highly improved and thickly inhabited.

Counsellor Caldbeck has on these mountains made a beginning; Mr. Foot too, I am informed, is about to plant a large tract of the same mountain, which is fit for nothing else. Mr. White has also lately purchased a very valuable part of Hutchinson's Charity, which,  
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if improved with judgment and spirit, will be more valuable than probably he is aware of, as irrigation, the cheapest, most rapid, and most permanent improvement, I am informed, can be carried into execution at a very moderate expence. This mode of improvement seems to be totally unknown to Mr. Foot, who possesses an uncommon fine situation for the purpose, with great command of water.

Nothing can be more injurious to the proprietors of bogs and mountains, than the general mode of setting them. The usual method is to set perhaps twenty, fifty, or more acres of arable or meadow, and throw into the bargain the side of a mountain of perhaps many hundred acres, as of no sort of value, and which the tenant neither knows how nor has the means to improve; these hills are generally stripped for scraws for burning, or covering their cabins, which deteriorates the land for ever, and is a most wretched firing. I recollect once to have asked a gentleman, why he set his land in this manner; “Why *my agent* tells me they are worth nothing, that they are totally irreclaimable.” Yet at the same time streams of water were pouring down the sides in every direction, and for, I dare say, from three to five guineas per acre, it might be made to produce an *annual rent* of from one to five pounds an acre, as it was in the neighbourhood of a large town. I hope I will be pardoned when I assert, that nothing has hurt the landed property of Ireland so much as  
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the management of estates being committed to those, who are totally unacquainted with rural affairs; and, until an *agricultural agent* is appointed to great estates, they must suffer great losses, as drawing leases, and being able to give advice in law affairs, though absolutely necessary, are very different from reclaiming waste lands, or pointing out the capabilities of estates. I am positive the rent-rolls of many estates in this country might, by a little exertion, be nearly doubled, and, at the same time, the condition of the tenantry ameliorated. It is a melancholy reflection, that there are many estates, that have from *twenty to ninety thousand acres* of waste land, the greater part of which might be made to produce *at least* 20 per cent. for the money expended on their improvement.

#### SECT. 2. *Breed of Cattle—how far improved.*

THE improved breed of sheep have lately been objected to on account of their exceeding fatness; it is said, that such over-fat mutton is profitable only to the chandler. It is proper they should be informed, that this great propensity to fatten is one of the chief perfections of all animals destined for the use of mankind. The Leicester sheep are as fit for the butcher at two years old, as the other breeds are at four; from this consideration, and their producing much less *offal* than  
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the old breeds, they are more valuable for both feeder and consumer. Few people, I imagine, would wish to eat mutton as fat as what has been generally produced *for shew*; but this is easily prevented by stocking the ground harder, or killing or felling when at the wished for point of fatness, and stocking the ground again with others. Mr. Grierson has procured some of the South Down sheep, which are admirably adapted to our higher grounds.

Nothing can prove more strongly the superiority of the improved breeds of both cattle and sheep, than the avidity with which rams and bulls are hired by men, who live by the breeding of cattle; were these sought after only by men of fortune, we might perhaps be led to think there might be a good deal of *fashion* in it; but when we see professional men engage with spirit in it, we must conclude they are influenced by more *weighty* reasons.

SECT. 3. *Breed of Cattle—how far capable of further improvement.*

It would be great presumption to offer any thing decisive from myself on this head, as the breeders are by no means determined amongst themselves to which breed to give the preference; but I presume the very different purposes, for which the cattle are destined, must

must be always considered, as it seems to be the opinion of Mr. Culley, and other skilful breeders, that the two most essential qualities, a propensity to fatten, and the giving a large quantity of milk, are very rarely to be found in the same beast.

As the richness of milk is a very desirable quality, and it is very generally agreed that some breeds, or individuals of breeds, possess this quality in a very eminent degree, it is incumbent on us to pay a great attention to this circumstance; but in general cows, that give the greatest quantity, are more sought after than those which, though they give less milk, make ample amends in the richness of its quality. Our native Kerry breed are generally allowed to possess these two qualities, considering their size, in a very superior degree; and I have little doubt, if this breed was improved by *an unprejudiced scientific breeder* for a few years, they would be brought to a very high degree of perfection; and Mr. Culley seems to think the Galloway and Kyloe breeds, to which last kind I understand our Kerry are nearly allied, are very valuable.

As an inducement to pursue the hint *I have ventured* to give, and to shew what may be done by judicious selection and perseverance, it may be necessary to remark, that the general character given by Mr. Culley of the Leicester cattle, before the late Mr. Bakewell had the spirit and judgment to improve them, was very unfavourable to the attempt; he says, page 53, “they  
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are distinguished from others by the length of their horns, the thickness and firm texture of their hides, the length and closeness of their hair, the large size of their hoof, and *coarse, leathery, thick necks*; they likewise are deeper made in their fore-quarters, and lighter in their hind-quarters than the other breeds in general; they are narrower in their shape, and less in point of weight, than the short-horns:" and in another place, "this breed is understood by graziers to be in general rather *slow feeders*." It is needless almost to mention what the improved breeds are—the very reverse of what they were.

The improvement of the breed of sheep has engaged the attention of men of fortune and liberal ideas, consequently a rapid improvement must very naturally be expected. I am not sufficiently acquainted with the subject, to offer any hints for their improvement; but I presume there cannot be a stronger proof, that breeders view this subject with a most discriminating eye, than the importation of the South Down by Mr. Grierson, and the intention of importing the Cheviot breed by other spirited gentlemen, for the purpose of stocking elevated situations, where it is imagined they will succeed better than the other valuable breeds.

Nothing can more strongly evince the rapid improvement in the breed of cattle and sheep, and, at the same time, the spirit and discernment of the breeders of Ireland, than the shew of fat cattle and sheep, held before

the Farming Society of Ireland, at Leinster-house, on the 8th of April 1802. The numerous attendance of men of fortune, and of the most eminent graziers from all parts of Ireland, and some from England, proves most unequivocally, that they view it in the light intended by the Society, when they offered premiums for the propagation of a breed, that would give more profit to the grazier, the butcher, and the consumer. It is very generally allowed, that handsome fine-boned cattle and sheep require less food to rear, or to make them fat, than large-boned coarse ones, and that they are fit for sale at an earlier age than the old breeds, which makes them more profitable for the grazier. The beef or mutton is finer in the grain, and better marbled; and, as the improved breeds put the meat most on the parts that sell highest, they are consequently most advantageous to the butcher. To the consumer it is evidently most profitable, because he has to pay for less bone in proportion to the weight of the piece.

The result of this shew tends to strengthen the opinion of the most enlightened, consequently the most unprejudiced breeders, that *beauty of shape* generally accompanies a propensity to fatten; for Mr. Martley's cow, that gained the premium last November for having least offal, was very fine in her shape; and Mr. Reynell's cow, that gained the premium, for having least offal, at the present shew, was exceedingly handsome. Though the day was very unfavourable for the exhibition,



exhibition, so warmly interested were men of the highest rank, they seemed to defy the inclemency of the skies. His Excellency the Earl of Hardwicke, actuated by those feelings, which have unceasingly directed him to the promotion of every object connected with the prosperity of Ireland, seemed regardless of every thing but the gratification of the most laudable and most minute enquiry, and, in his remarks, evinced that some motive more noble than mere curiosity occasioned the welcome visit; and, in his inspection of the cattle and sheep the second day, when slaughtered, his questions and observations shewed a desire to obtain correct information on this interesting subject, and helps to prove most strongly the rapid advances any science must make, when men of exalted situation undertake this most useful, and, I am sure, this most pleasing task.

The fat cattle produced at this shew greatly exceeded, in number and fatness, those at any former exhibition; and as, by this means, the inestimable value of green winter food is now fully established, we may expect the next shew will even exceed this, as numbers are preparing for the purpose.

By a mistake in classing below his weight, a fine ox belonging to the Right Hon. David Latouche was debarred his chance of a prize, which, from his extreme fatness and small bone, there was every reason to expect he would have obtained; his fat was exceedingly yellow, which was objected to by many; but I am



informed the fat of the Guernsey beef (the finest flavoured in the world) is a very high yellow; the great fatness of this ox is a strong proof of the nourishing quality of steamed potatoes, with which I am informed he was fattened.

Many beasts, though very fine, did not stand a competition; for they must be of no ordinary degree of excellence indeed, that could obtain a prize amongst such numbers of fine cattle; but the good humour, with which candidates received a rejection or information of losing a prize, evinced in the happiest manner the liberal ideas, that are now entertained by every class of men, and at the same time proved most unequivocally the deservedly high sense, that was entertained of the candour and impartiality of the judges appointed for the occasion, and that they were not influenced by the pre-judgment of others, which, as in all such cases, was pretty freely given.

The shew-ground, given for the occasion by his Grace the Duke of Leinster, with equal public spirit and polite attention to the accommodation of the Farming Society, though much more capacious and commodious than could be obtained elsewhere, was by no means large enough for the purpose, and failed in some degree of that striking effect, which more room to arrange the cattle would have produced; but there will be this advantage attending the inconvenience, that the Society will have an opportunity of forming a  
better

better opinion of the space of ground, that will be requisite for the erection of a permanent place of exhibition, than they otherwise might have had; and they certainly should look forward to an establishment, that will not only comprehend the different classes of fat cattle, sheep, and pigs, but also the easy accommodation of all the different kinds of breeding stock, that public spirit, emulation, or interest will doubtless pour in from all parts of Ireland, and most probably from England. They will likewise want ample accommodation for a *permanent flock* of their own, of the most select of all the different breeds of every species useful to mankind, by which means the inexperienced will have a daily opportunity of making their *eye and hand* familiar with the perfections and defects of each breed, which must ultimately tend to establish some unerring data, that may in future be relied on; for at present, though great advances are made by some enlightened individuals, the predilection *for bone*, which is still very strong in the minds of some extensive graziers, can only be removed by frequent repetitions of the shews, whereas, if the prizes continue to be uniformly gained by beasts of fine bone, we may expect conviction will be followed by a dereliction of their former prejudices.

Some very fine pigs of improved breeds were produced, particularly a small Irish one of a very perfect shape; also a very large sow was produced, but the owner



owner did not seem to be aware, that size alone does not constitute perfection.

From the precautions taken by the Society, not the least accident happened; and every attention and accommodation was provided, that the nature of the business would admit; it must have been highly gratifying to the Farming Society to observe pleasure expressed on every countenance.

Though the Dublin Society have mentioned only cattle in their suggestions for enquiry, I presume they do not wish the Surveys to be so limited, as to preclude any observations, that may tend to improve any other kind of useful stock. The breed of horses has been rapidly improving for some years past; but many of our breeders, I presume, like the breeders of cattle and sheep of the old school, think that a great increase of size constitutes the chief perfection; but I believe it will be found, that horses do not possess strength in proportion to their size; if this was the case, mules would be very weak, which, every one knows, draw much more in proportion to their size than the largest dray horse; and not one of the least injurious consequences of this predilection for size is the near affinity it has to the prejudice in favour of very large waggons, in preference to light carts; if the trustees of roads or the commissioners of paving were aware of the ruinous consequences attending the admission of these unwieldy machines on roads or pavements,



ments, they would lay a tax on them amounting to a prohibition; besides, the exertions of these great horses, armed with cocks to their shoes, very often two inches long, must break up the most firm road.

I imagine the Cleveland bays, mentioned in such high terms by Mr. Culley, would be a much more desirable kind of horse to introduce into this country, than either the Suffolk Punch or unwieldy dray horse, as they possess equal strength, and more activity; and, if a little pains is taken in selecting the mares, a great probability arises of obtaining very fine hunters or carriage horses; but from the Suffolk Punch nothing can be obtained but a serviceable ugly drudge, and I am convinced we possess many of that description already; if quickness of step, so necessary in seed sowing and for other purposes, is wanted, the Cleveland bays I presume deserve attention, as well as for their colour.

*Markets or Fairs for them.*

SMITHFIELD market is much too confined, and by no means adequate to the business transacted there, and which is likely to encrease. I beg leave to suggest the necessity of opening it up to Brunswick-street at one end, and down towards the river Liffey, as far as a stable-lane in West Arran-street, at the other end; this could be easily accomplished, as the houses are of small value.

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On many market days there is scarcely room to pass, and hay-cars are frequently obliged to stand in the adjacent streets, liable to the depredations of pilferers of every description. The state of this market is always very filthy, and, as a day intervenes between each market, there is no excuse for it; those who want hay or straw are frequently obliged in wet weather to ride through it.

The present mode of keeping cattle at random, close to the houses, is a very great nuisance; were they ranged with their heads towards the sheep, leaving a broad passage between them, they could be more easily and safely handled and viewed, and a much less space of ground would answer; at present they are only kept in order by the sticks of the penny-boys; and I am sorry to say, that the abuses cattle and sheep sustain from these ruffians do little credit to the humanity of the sales-masters, who are the only persons, that can redress this grievance, simply, by refusing to deliver any beast to one possessed of a *stick*.

Donnybrook fair has been long complained of as a nuisance, and a most dangerous one it is; as the recruiting service is at an end, that excuse can no longer be used. The scenes of riot and drunkenness, that take place, are most disgusting, and can surely answer no purpose, but to put money in the pockets of publicans, at the expence of the morals and health of the people. I sincerely hope to see it abolished before the



next meeting, and a compensation made to the proprietor of the tolls, which could be easily adjusted.

*Mode of Feeding, and how far housed in Winter.*

ONE of the greatest inconveniencies attending the want of green winter food for cattle is, the necessity graziers are under frequently to sell them, whether fat or lean, before or about Christmas, from want of feeding. This is also a public loss, as about that season a glutted market pulls down the price often below the value; for if these cattle (such as are lean) were provided with green food in winter and spring, it would help to keep the market steady, and cattle would not only increase in size, but vast numbers would be reared, that are now killed when calves, from a deficiency of green winter food. This mode of feeding would also give a great increase to the dairies, which are declining very much, as, where they are distant from distilleries, hay alone produces but little milk. I have heard many farmers complain, that their cows gave little milk, though they were possessed of great quantities of small potatoes; on advising the use of these, I have more than once been told, *boiling was very troublesome*: then give them raw; they will choak them. I am surprised such people ever propagated them, as the planting, digging up, &c. &c. are nearly



as troublesome as washing and boiling a pot of potatoes, or cutting a few raw ones.

All those, who have housed cattle through the year, have borne testimony to the uncommon benefit of the practice. One very great advantage attending the housing system is, that fences (except a ring one) are no longer necessary; no unnatural clipped hedges—no tasteless white paling—no expensive sunk fence—no waste of food—*no waste of ground*, &c. &c. This last item, where ground bears a high rent, is a very material article, as, on examining maps, the ditches make a very large share, especially as inclosures here are generally small.

It will be always a most happy circumstance in laying out improvements, as the expence and difficulty of fencing often marrs the most elegant designs, as clumps or single trees, whilst young, are with great difficulty protected from cattle. How happy must be the man then, that can plant as taste, not as convenience dictates?

Doubtless it is only want of resolution, that prevents many from practising this method of feeding; but if they only *begin on a small scale*, they will be agreeably surpris'd at the *great* comforts of this method. Let me ask any of those agricultural sceptics who have working beasts, would they not thrive better by having a belly-full of nourishing food, and then lie down to rest themselves, than perhaps *walk about for it* the greater

part of the night in a bare pasture, or breaking into their neighbours or their own meadows or corn.

Beasts that are not working, and young cattle, should have a small dry inclosure to air themselves in for about an hour every day, whilst their stalls are cleaning.

Permit me to remark here, that the *mountain of manure* raised at Marly by this method of feeding, in two months only, will speak forcibly in its favour, and in a *language*, which every farmer understands.

#### SECT. 7. *Natural Grasses.*

WITH very little care our natural grasses would be most excellent, as we in general possess all the best sorts ; but scarcely any attention is paid to the time of their foliation, which is a very necessary, but neglected study of farmers. It cannot be supposed that, whilst some are in seed, and others are only just beginning to vegetate, either the hay or pasture can be good ; for, if made into hay, the farmer frequently waits until the late kinds are fit to cut ; if these predominate, the early kinds must *then* be not near so good as straw ; on the contrary, if early sorts are the most numerous, the late kinds are cut at a period when they either fall through the teeth of the rake, or shrink into almost nothing when dry.



The Dublin Society, and many other agricultural societies, have very laudably endeavoured to direct the attention of farmers to this subject, by pointing out the kinds of grasses most proper to be sown together, and offering premiums for saving the seed of each kind distinct; this, if seconded by landholders, will in a short time be of infinite service. It has been objected to this, and to the cultivation of artificial grasses, that our soil is in general so much inclined to produce an infinite variety of grasses, and some of them very bad sorts, the selected kinds would soon be overpowered and destroyed. If a little attention is paid for a year or two, and the ground *completely* occupied with the selected sorts, scarcely any other will have room to grow; a few may undoubtedly escape the attention of the most diligent, but this can be but a matter of small moment. I suppose to this I shall hear the same objection, that I have been eternally bored with, when I have proposed any thing out of the old mode, "It is too troublesome."

One of the great advantages of irrigation is the production of the best kinds of grasses, or, at least, the amelioration of the quality of inferior sorts.

When the great benefit of lime, limestone-gravel, or marle are better known, we may expect the best kinds of grasses will become more prevalent, as it is well established, that all calcareous manures dispose the soil to produce this effect.



From the invitation of the Dublin Society to farmers to view their gardens at Glasnevin, one would have naturally expected, that on every market day, or at least on Sundays, we should have seen them in crouds examining the hay and cattle gardens; learning which plants to propagate, which to extirpate, what kinds *preserved the leaf in winter*, or were food for cattle *very early in spring*, &c. &c. On enquiry I found, that men of this description scarcely ever appeared at the Botanic Garden; perhaps many, that would avail themselves of this permission, do not know any thing of it. Possibly a board put up on the gates with, “Farmers are admitted to see these Gardens every day, between the hours of \_\_\_\_\_;” or, “Farmers are invited to see all the most valuable sorts of grasses, and other plants most useful to them, of which seeds, with the best mode of cultivation, will be delivered to them gratis; hours of admittance, &c.” would contribute to the promoting of the laudable views of the Society.

Many advise the sowing of grass-seeds alone; this I must consider a very bad practice, as not only a valuable crop of corn is lost, but, if the ground is not uncommonly clean, great quantities of weeds will get the start of the grass-seeds and overpower them; and, if a continuance of dry weather should happen after they are sowed, very few will vegetate for want of *the shade* of the young corn, which should not be sowed quite so thick as if sowed alone. I am so convinced of the great use of this practice that, were I to sow grass-seeds

feeds in June or July, I would sow a thin crop of oats, which should be mowed *green* for foiling, and two mowings may be expected. This I have seen practised at Sir Thomas Lighton's, at Merville, near Dublin, in a very dry summer, with great success.

As barley is generally sowed in ground in good tilth, grass-seeds are usually sowed with it; and, as it is sooner ripe than most kinds of grain, it is the most proper; flax also, for the same reason, is very proper for this purpose.

There is no error citizen farmers are more apt to fall into, than over-cropping their ground; as they always pay very high rents, and, in the *beginning*, are very spirited farmers, they imagine they cannot have too many crops to help to repay them. The usual mode is to break up as much as they can procure dung for, and plant potatoes. Apple potatoes are generally most planted; they are not fit to dig perhaps until November. Wet weather comes on, and they cannot sow their wheat (for it seems nothing but wheat will do) until December or January. Rooks and all species of birds at this season devour great quantities; the red-worm then attacks it, with a train of other misfortunes incident to late sowing. Next season, instead of breaking up the stubble the moment the wheat is carried off, it is permitted to lie (perhaps the furrows full of water) until March, and then *scratched* (not ploughed), and sowed with oats. The third year wheat  
again;



again; the fourth year oats again; and in this impoverished dirty state it is laid down with the sweepings of the hay-loft *uncleaned*, consisting of every kind of rubbish. All this severe cropping is on the strength of the dung the potatoes got the first year. Very frequently instead of laying it down, the fifth year horses and cars are again set to work to draw dung from Dublin, at an expence of *at least* twenty guineas per acre: probably by this time he begins to complain to his friends, that “there is little to be made by farming.” Instead of this barbarous course, if the first year *early potatoes* had been planted, they would be off time enough for a crop of rape, which should have been sowed the previous June; these would be fine feeding until April, at which time *early potatoes* in drills should be planted, to be succeeded by rape, as before, for winter feeding, and in March or April barley or oats sowed with *clean hay-seeds*.

This, I am satisfied, would be a much better mode, and would leave the ground in the finest condition, and, contrary to the general wish of farming citizens, they would have *little to send to market*, which is a place they ought carefully to avoid. At the end of the sixth year they would find the balance of the account greatly in favour of the last method, besides the land being left in the most fertile state. In this account a large sum must be placed to the wear and tear of horses and cars, and the endless torment of collecting  
manure,



manure, and *endeavouring* to counteract the numberless frauds, that will be practised on them in every thing they either sell or buy; above all things they should have *as little to do with Dublin as possible*. Probably this may not accord with the feelings of some, and may be thought to glance at citizens keeping country houses; by no means; I do not know any description of men, that deserve the enjoyments of the country more. I only wish to point out the danger of citizens, of moderate and *uncertain* income, commencing farmers, with no more knowledge of the business than a farmer has of printing books, or giving a legal opinion. What would we think of a farmer that took a shop in Dame-street, and commenced haberdasher? and yet, with due deference, it requires infinitely more abilities to be a good farmer, than to measure ribbands and tape.

Rye-grass continues to be sowed yet in some places, but appears to be, notwithstanding all the encomiums, that have been passed on it, a very worthless kind in many situations. There has been a new kind of this grass introduced lately by Mr. Peacy of Northumberland, which possesses some superior advantages, which we are not as yet sufficiently acquainted with to point out; for we ought not to form a general conclusion from a few trials in soils, that have received an uncommon preparation *for this purpose*, which is generally the case with any new kinds of plants, and always tends to mislead us, and hurts the cause it was intended to serve.

SECT. 8. *Artificial Grasses.*

MR. ARCHER says, vetches are frequently half-threshed, and given to horses instead of hay and oats, and seems to think it an “excellent practice.” I have frequently seen this practised, and the horses were in fine condition no doubt; but *at what expence*, the farmer could not ascertain. It must be a very uncertain way of using any crop, as it is not easy to know what quantity of grain is left in the straw; that depending very much on the state of the crop when reaped, or on the pleasure of the thresher. Horses may be made very fat by giving them as much sheaf oats as they choose to eat; yet few farmers, I fancy, will be inclined to pursue this mode of feeding. There is nothing farmers are more remiss in, than keeping farming accounts; it is more than probable those, that use vetches in this loose manner, do not know whether they have a profit of ten shillings or five pounds an acre. It is probable, if vetches, made into hay, were cut by a straw-cutter, they would be used with more œconomy.

It is not a little extraordinary, that the distinction between spring and winter vetches has not as yet (that I could hear) been clearly ascertained.

It has been asserted, that spring vetches do not stand the winter, if sowed in autumn; and that winter



vetches, sowed in spring, do not generally ripen their seeds. As some corroboration of the first assertion, I am informed Mr. Hamilton, of Larkfield, near Palmerstown, has lost four acres of spring vetches, sowed in September last; and in contradiction to it, they have stood this severe winter in many places extremely well. If there is not some misnomer in this case (the distinction not being known in the seed-shops), the opinion of their tenderness falls to the ground; until this point is satisfactorily cleared up, no opinion can be formed. Some time since, samples from Mr. Grainger, near Navan, in the county of Meath, were produced at a meeting of the Farming Society of Ireland, which he says were spring and winter vetches; one appeared to be much smoother and paler in the leaf than the other, and I understand the same distinction takes place in the feed. But as this gentleman is with great spirit trying experiments very largely (on twenty-seven acres), which we may hope to have detailed in the sixth number of the Irish Agricultural Magazine, something decisive may be expected; he has sowed them in succession from August to November, and they have stood the late frosts.

There are two kinds of indigenous perennial vetches, that seem to deserve *great notice*; one is the bush vetch (*vicia sepium*); the other the wood vetch (*vicia sylvatica*). They produce at least as much as any of the annual kinds, are uncommonly hardy, and are equally good  
for



for either soiling or hay; as they are, in common with the annual sorts, furnished at the same time with ripe seeds, flowers, and a profusion of the finest herbage, which must, I imagine, make them particularly eligible for hay.

The propagation of vetches has encreased greatly these two years; and, when their value is better known, they must still encrease more rapidly.

It appears to me there is a very great error in the general mode of using clover, or any other crop that is to be cut *more than once* for soiling; it is the usual practice to begin to cut when the plants are *in flower*, consequently, by not beginning to cut at an earlier period, some must become at length too old, and of small value. It is the opinion of the most enlightened agriculturists, that clover, and most kinds for soiling should be cut as soon as the scythe can catch them, which I would recommend, even if the first cutting was thrown on the dung-hill; otherwise there cannot be a daily succession of *young growth*. It must be evident, that it would be a wasteful practice with vetches, if they were cut so very early; but I must still think that they are, in general, cut at too late a period. I am aware that vetches, and many other plants, are commonly esteemed a stronger food, and to have more substance, when used in a more forward state than I advise; perhaps they may encrease muscular strength, but it is probable they are not *so fattening*. As Mr. Grainger's stock is very large, and

he sows *in succession*, it is probable he never has them too old.

Oats and rye are in some places sowed with vetches, both for supporting their trailing stalks, and to add to the quantity of foiling or hay; but I am convinced beans would answer the purpose much better.

Probably oats for foiling, or hay, will be found on trial a very valuable grain. An instance of their great value occurred last season (1801), at Mr. Cave's, at Raheny, near Dublin. A very uncommon crop of oats, after potatoes, had been reaped the previous year, and a great quantity had shed, which grew so very luxuriantly the following spring, that Mr. Cave was induced to let some of the cleanest part stand for feed; the other part, which had some weeds in it, was partly mowed green, and given to cows and horses *in the house*; the remainder I advised to be mowed for hay, which was given to horses in the stable, without any oats; I never saw horses in finer condition, or smoother in their coats. This helps to confirm me in an opinion I have long entertained, that oats mowed green would make an excellent hay.

When to the superior state of the ground, after oats *cut green*, is added the opportunity it gives of sowing turnips, planting rape, cabbages, or borecole, or even as a preparation for wheat, I earnestly hope it will at least be thought to deserve *an experiment*.

Timothy-



Timothy-grass (*phleum pratense*) seems to have fallen into great neglect, though once a great favourite. Perhaps it was sowed in improper soils; but on reclaimed bog it will probably be found a very valuable kind. It is a very early and hardy grass; two qualities, which should never be overlooked.

Sainfoin seems to be also little noticed; in England it has continued, in dry gravelly soils, to produce uncommon crops. We certainly have a great quantity of ground, that seems well adapted to its growth; ground that at present scarcely returns the seed. The very general opinion of Irish farmers (and English too), that few crops are profitable but corn, has done more injury than is generally imagined; but as we begin to be sensible of the inestimable value of *green winter food*, and *feiling in the house in summer*, better ideas may be expected to take place.

Lucerne has engaged the attention of agriculturists very much in England, but seems to have declined greatly in Ireland. When the soil is suitable (a deep, light, rich one), it is a plant of inestimable value. The best mode of sowing it seems not yet to be clearly ascertained; some authors advising it to be sowed in rows three feet, and other intermediate distances asunder, whilst others contend for broad-cast sowing; of this last opinion I profess myself. It has been objected to this mode, that it is difficult to clean; this has arisen, in a great measure, from sowing too small a quantity of  
seed;



feed; for in this, as in clover, and every other plant, if the ground is not covered *with them*, weeds will occupy the vacant places, as every person must have observed in clover fields; for where the clover has grown thick, not a weed is to be seen; on the contrary, where the clover has failed, the ground is usually covered with weeds. Another reason for want of success, is either sowing them in dirty ground, or not *previously* harrowing the corn, amongst which I would advise them to be sowed. Where previous harrowing for this or clover is neglected, the young weeds get the start of them and overpower them; the harrowing destroys the young weeds, and at the same time makes shallow drills for the seed in *fresh-stirred* earth, which, added to the shade of the young corn, causes them to vegetate rapidly, and be soon out of danger from annual weeds. Rolling after sowing, *if the ground is dry*, is one of the most necessary operations, that can be performed. I am firmly persuaded, more spring crops miscarry by neglecting this simple operation, than from all other causes put together. Permit me to give an instance, that came under my own eye. In the month of August I sowed a large border with cauliflower-seed in the usual manner; after watering it frequently, I found very few, if any made their appearance, so I gave them up: some person came over the wall, under which they had been sowed, and made several marks with his feet in his passage; in a few days more I perceived

perceived that, where the print of the feet was left, the cauliflower-seeds came up rather too thick: it remained in this state *until October*, and not a plant grew in any other part of the border. The necessity of this operation is well known to all kitchen gardeners, and deserves to be made known to farmers.

That lucerne and sainfoin will maintain their superiority, may be frequently seen in meadows where they have been accidentally sowed: as it is a larger seed than clover, it requires a greater weight of seed; if they should be sowed too thick, they may be thinned with a hoe like turnips, or transplanted to fill up vacancies, or into other ground; and, as they are a much more valuable crop than turnips, they will amply repay the expence of hoeing.

As a corroboration of my opinion on broad-cast sowing, I shall beg leave to quote the authority of the indefatigable Mr. Young, in his Six Weeks Tour. The experiment, as tried by a Mr. Johnston, near Ilford, in Essex, is reported as follows. “Four years ago, last spring, he marked out three acres of land; the soil an *hot gravel*, to some depth, as appears from a large gravel-pit adjoining. One acre he sowed with lucerne, broad-cast (without any corn); another with the same, over barley, broad-cast; the third he divided into three parts, and drilled them at two feet, two feet and an half, and three feet distance. On the corn acre he sowed five pecks of barley, which yielded him forty-five



five bushels; an encrease very surprising. Mr Johnston assured me of the accuracy of the account, as he saw the barley measured himself. The general result of the experiment hitherto is, that the drilled lucerne is always earlier than the broad-cast; but not so much as to arise to one cutting in the whole year, the latter being cut as often as the former. In respect of quantity there is no comparison, the broad-cast yielding *nearly double the drills*, consequently Mr. Johnston gives it the preference; nor can he yet determine how long it will last in the ground. The acre, which was sown *without corn*, cost him near two guineas to clean; but after the first year he weeded all the broad-cast piece with an harrow of his own contrivance, &c." Again Mr. Young says; "Between Shorn and Gravesend I observed two fields of very fine broad-cast lucerne; one of them of several growths, having been cut at various times for feeding cattle in racks; and, from the number of *oats amongst it*, I apprehend it was sown with that grain last year, &c."

A conviction of the great value of this plant in the soiling system has induced me to dwell rather longer on this subject, than perhaps I ought, but by no means as long as I think its importance deserves.

Burnet seems most unaccountably to have been also neglected; many have complained, that their beasts did not seem to like it; possibly this might have arisen from giving it to them when too old, and at a season, perhaps,

when



when plenty of other succulent food was to be had. From the small experiments I have tried and seen, it appears to be one of the most valuable plants we are in possession of for *winter and spring* feeding. Mr. Johnston abovementioned tried this plant. Mr. Young, in the same tour, says, “last year he fed cows and horses with the produce; both of which eat it freely, and *even with greediness*.” Again he says, “The landlord of the Crown, at Stoak, has an acre of burnet, which is, I think, three years old; he sowed it *broad-cast*, and kept it perfectly clean from weeds a year, at the expence of about two guineas; but it has answered greatly, for it has every year yielded a great quantity of hay, besides luxuriant food, so early as the *month of February*, for many horses; it is a regular crop, and appears to grow very quick. The landlord informed Mr. Young, that in July he mowed it for seed, of which it produced as much as he sold for 5*l.*, and a large load of hay, which *his horses eat very freely*. In *January* it was fed off with sheep, being a thick and luxuriant crop. He finds it so profitable, that he has sowed another larger field with it, *with rye* in November, the seed for which he kept, *exclusive of the 5*l.** At Gosfield, the seat of Lord Clare, his Lordship has a piece of burnet, for the use of his deer *in winter*, which answers extremely well.”

Chicory seems to be gaining ground very fast. For a further account of its value, see the fifth number of

the Irish Agricultural Magazine, page 17, where its uncommon value *for soiling* is clearly ascertained by Mr. Young. It seems to possess an advantage that, I believe, no other plant does; "it was eaten clean when the feed-stalks were four or five feet high;" a state in which few, if any, plants are relished by cattle in summer.

Canary-seed is scarcely ever sowed in Ireland; yet, from many trials made by my late father at Mallahide, it will succeed well; but, from repeated experiments, it will not in general ripen the seed *equally*, unless sowed early in autumn, nor will it answer in poor or stiff soils.

#### SECT. 9. *Mode of Hay-making.*

THERE are few parts of farming conducted in a more wretched manner in this county than hay-making. The hay is in general turned, and turned over and over again, until at length it is frequently caught by rain; then it must be dried, and this process of turning is renewed and continued, until it is devoid of either the proper colour or smell. Frequently this hay is bought by *judges* in Smithfield for *old hay*. The great hay farmers, with which this county abounds, have no longer the same excuse; "The citizens of Dublin would not buy any but long-white hay:" a better opinion has taken place, and now *green hay* is very justly preferred in Smithfield.

Instead



Instead of throwing the grafs out of fwathe immediately after the fcythe, as generally praftifed, I would advife to let the fwathe remain until the middle of the next day, or till the ground is dry, and then, *without any tedding*, rake it into windrows, and make it into fmall grafs-cocks *early* in the evening; next morning, or when perfectly dry on the outside, break it into a windrow again; and in the evening, *before the dew falls*, make it into large grafs-cocks, as much as two men can carry between them. It may remain in this ftate two or three days; then thefe cocks fhould be broken up, and made anew into the fame fized cocks, placing the hay, that was in the bottom, at the top of the new-made cock; if made up free from rain or *dew*, it will not be injured for fome days: particular care fhould be taken to pull the bottoms all round, and lay it on the top of the cock; in a few days the cocks may be gathered in, and made into field-cocks of four or five loads each (about a ton). If the grafs is very thin and dry, much of this labour may be omitted, or the fmall cocks may be gathered in at an earlier period. I am inclined to think it would be the beft method to make *field-cocks*, without letting a man on them to prefs them close together, as ufually praftifed; it is probable the hay would ferment more equally (as happens with ftale dung in making hot-beds), and lefs dangerously, if it was put up with a fork and well beaten; Doctor



Anderson, in his Essay on Hay-making, seems to be of the same opinion, to which I beg to refer the reader.

The method recommended by Mr. Archer is a very good one; but it is no small task to get labourers unacquainted with, consequently prejudiced against the practice, to execute it; indeed it will require some *firmness* even to pursue the method I advise, though none but the usual operations are performed. Permitting mowers to work in wet weather, or when heavy dews are on the grass, is a very great and a very common error; they should be employed in some other kind of work at such times, and paid *by the hour*, which could be easily calculated, and their task by the acre for mowing still be performed at favourable intervals. Doubtless they will expect, and, at such a season, deserve some consideration for this; but it will be well laid out, and amply repaid, in the superior quality of the hay. It will certainly require a good share of resolution to withstand their solicitations (generally backed by the *handyman of the old school*, which almost every gentleman and farmer has about him), to continue cutting on *their* certain assurances of the *weather clearing up shortly*; *what signifies a slight shower of rain?* &c. &c. Nothing is more common than to hear farmers, and often those that *ought* to know better, say, that a shower of rain can do their hay little injury, if it has been but recently cut. How he would stare at a proposal to throw all his grass into the river, and then make it into  
hay?

hay? surely the most ignorant would exclaim against it, yet I can see little difference in the effect.

Hay is very much injured in this county, by the careless manner of making cocks, and permitting them to stand too long in the field. It is not unfrequent to see upwards of a foot at the bottom of the cock quite spoiled by this neglect; this to some of our great hay-farmers is no loss, as, with all the bad and refuse hay of the farm, it is (if not reserved for cows, which deserve the sweetest and best hay of the farm) lapped up in the inside of each roll of hay, and loaded for Smithfield. The frauds, that are practised in loading hay for this market, call loudly for redress; it is a very common practice with many hay-farmers to shake a little fine hay on the ground; then a quantity of bad is shook evenly over this, and lapped up and loaded for market. In the market the farmer's man stands with a handful of hay, drawn from some part, that has not been *doctored*; therefore the buyer should previously examine the *inside* of each roll. It is very probable this is the reason, that the English method of sending hay to market in trusses has not been practised, as it would shew the bad hay immediately. It is perfectly ridiculous to say, we are not used to the mode; it was practised some years, but was not persisted in long enough to establish it; if gentlemen would *determine* to adopt it, and not be persuaded by their *handyman* to desist, it would become in a short time as common here



as in London. Nothing can be more disgusting than a strong well-fed horse walking slowly to market, with  $4\frac{1}{2}$  cwt. (frequently much less) of hay, and, perhaps, at the most, only four or five miles; and, still to add to the loss, return home without *a load of dung*. There cannot remain a doubt that a horse, going a slow pace with a moderate load of dung, will be less injured, than by the usual furious mode of driving home empty hay-cars. The loss to hay-farmers by this must be very great; for many, I am informed, keep upwards of ten horses with hay at market twice a week; supposing them to go only six months to market, it must make a difference of at least 50/; but the frequent loss of seasons for other work, and wear and tear, must make it infinitely more.

#### SECT. 10. *Dairies—their produce.*

THE deficiency in the number of dairy cows must, as Mr. Archer justly remarks, be a very serious loss to the inhabitants of a populous city; but I can by no means think with him, that the deficiency is not likely to be filled up for many years; for, as soon as the dairymen are induced by a prospect of gain, doubtless the number will keep pace with it; from the great plenty of grains, and cheapness of potatoes, they have every inducement they can wish for, and I have not a doubt



doubt this will have a very rapid effect in April and May next.

The average quantity of milk produced each day by a dairy in Dublin (eight quarts in summer, and five quarts in winter, each cow), appears uncommonly low. When we compare this with the average produce of a London dairy, we are led to imagine there must be either some defect in the breed or feeding.

If dairymen could be induced to give their cows hay-mash, or hay-tea with their food, perhaps it might have a good effect.

Potatoes are now at such a price, that it is very probable they would be very beneficial for this purpose; certainly the milk and butter would be of much richer quality than that produced by grains and *wash*; but dairymen are more anxious for quantity than quality.

One of the causes of the deficiency, of both quantity and quality, may be in some measure imputed to the very great carelessness of farmers, dairymen, and even gentlemen, in the choice of their bulls; those in general we see with dairymen, are the most wretched ugly animals, that can be conceived; few look further than the goodness of the cow, and still fewer ever once imagine the bull has any influence on the quantity or quality of the milk or butter; this influence seems to be well known and closely attended to by the breeders in England, and, notwithstanding the *sneers of ignorance*,  
is

is making its way rapidly amongst the best informed in this country.

Forestalling cows, like many other species of forestalling, has lately occupied the pens and tongues of many; but I imagine it is a subject of more difficulty than is generally allowed. It has long been a fashion to raise an outcry against forestalling, monopolizing, flour-mills, flour-factors, &c. &c. It has been asserted frequently, that flour and corn have been thrown into the river, that government have had upwards of twenty men many nights throwing flour into the Liffey, and a number of such inflammatory reports. I have made frequent and close enquiries, but could never trace them to any *respectable* source, and they have always ended in, “*I did not see it myself, but I know those that did.*” It cannot be supposed any man would be so blind to his own interest, at a time when these articles were so dear, as to destroy them, instead of selling them to the starch-makers, or for feeding swine; or that any man would be so weak as to trust his reputation to his porters. Contrary to the opinion of many, I *venture* to think that, if we had a flour-factor in every street in Dublin, it would be very much for the advantage of the inhabitants; and I also *venture* to think that, supposing no flour-factors to exist, it would be only throwing the business into the hands of the bakers, and would not lower the price in the least to the consumer. Let us suppose for a moment (what is  
often



often really the case), that a farmer has to pay his rent on a certain day: he sends his wheat to market; a glutted market, or an expectation of a reduction, prevents his selling: what is he to do? he *must sell*; a corn merchant, who has a capital, *relieves him*, and benefits the public, by storing it, until a period of scarcity induces him to bring it into market again. If bakers did not find their account in dealing with flour-merchants, *why not grind for themselves?* The commonplace cant, that our ears have been dinned with for some time past, against flour-mills, flour-merchants, the *monstrous* profits of farmers, &c. by those, who are totally unacquainted with the subject, has led me inadvertently to say more than I intended, as I feel myself very inadequate to the task; but I cannot help thinking, that a man has as much right to employ his capital in this line, as in any other species of traffic. There are thousands of ignorant people, that think provisions cannot be too cheap; they never consider the ruinous consequences to the poor farmer that feeds them, and ultimately to themselves; for without a prospect of profit, no farmer will cultivate his ground.

If dairymen could be persuaded to adopt the soiling system in summer, they would find it very beneficial; as their grass, from the richness of the ground, is very luxuriant, therefore more easily destroyed by the feet of the cows, besides many other advantages mentioned under the article *Green Food*. As the Dublin milk is



wretched thrash, it has often surpris'd me that those, who have yards, do not keep a cow ; she could be easily fed with grains, small potatoes, hay, and, very frequently, refuse vegetables. The winter butter of Dublin is also in general very bad, owing chiefly to putting too much hot water to the milk whilst churning, to hasten the process, and also to conform to the taste of those, who think no butter *nice* but that, which is white.

I must think a dairy very incomplete without a stove and flues all round it ; by which means, with the help of a thermometer, the milk could be always kept to the necessary heat, and would produce butter of the *natural* colour and taste, and which would not spoil in a day or two, as the scalded butter generally does. Ventilators are also indispensibly necessary in dairies. Churns of various kinds have been tried, but have in general failed, either from prejudice or ignorance in the dairy-maid, or possibly from the fault of the maker.

## CHAP. IV.

SECT. 5. *General State of Leases.*

MANY tenants, that would wish to improve their lands, have not the means. Perhaps it would be an advantageous mode for the landlord to make such improvements as *the tenant wishes*, and charge him ten per cent. until paid. I am convinced, in the article of draining alone, great improvements would be effected, as I have scarcely ever known a farmer, that was not sensible of the value of this necessary operation ; but how can this be expected from a poor farmer, who with great difficulty can make up his rent? That it would be for the advantage of the landlord, needs little argument to prove. This mode has been adopted in England with great success ; and, notwithstanding the common-place sarcasms against Irish farmers, they possess as much energy, and as much honesty, as any of the same class in the world. Perhaps it would be a useful clause, to oblige tenants to pay an additional rent for fallows, and to make them some abatement for green crops *manured for*. It might, perhaps, be also useful, if farming societies would always give a preference, in every pre-

mium, to those, who *do not fallow*. I need scarcely premise, that landlords must shew an example themselves, by abolishing their ruinous system of fallowing, before they can exact any thing from their tenantry.

#### SECT. 6. *Of particular Clauses therein.*

THE clauses in leases, that prevent breaking up or burning grafs-lands, are very necessary in the present state of agricultural practices; for the certain consequence of a permission to plough them up, or burn them, would undoubtedly be repeated crops of corn, until the land would be completely exhausted. If, on the contrary, farmers could be induced (and I prophesy before many years they will) to adopt the alternate husbandry, the breaking up grafs-lands would be highly beneficial; and, on their agreeing to this course of cropping, they should be permitted to do so whenever they thought proper; and I venture to pronounce that, once a farmer pursues this system, the superiority in *immediate* profit will induce him to adhere to it.

It gratifies me exceedingly to be able to assure my readers, that the good example set by some gentlemen has tended greatly to wear away prejudices; and that the value of green winter food, and soiling in the house in summer, is beginning to be known, and very much practised.



Another advantage of permission to break up grafs-lands is, the opportunity it gives of laying them down evenly for irrigation. The wretched mode, in which grafs-lands are generally laid down in this country, has very frequently prevented the adoption of this improvement; and so little are the gentlemen of this county acquainted with the great benefit of this operation, that, when I have proposed their breaking up, burning the land, and laying down *immediately* to grafs, they are generally *persuaded* to follow the old course, which throws them back at least three years, and then the ground is laid down in an impoverished state.

I am not fond of introducing clauses prejudicial to the tenant, because I know they have many difficulties to struggle with; but, until they are sensible of the value of an improved system of farming, I think a clause to prevent breaking up their land the last three years of their lease, and another permitting the landlord or his assigns to enter, and sow the land under corn with clover, or such grasses as he thought proper, the last year of the lease, would be highly useful.

Mr. Archer very justly reprobates the too general mode of taking fines; in addition to the destructive effects pointed out by him, I must add the injury the national character sustains; for I have very frequently heard Englishmen exclaim against this practice, as tending to stamp us with the character of swindlers. So firmly has this custom taken root, that now, if a  
man

man has only a stable, at 6*l.* a year, he will ask a fine. It is ridiculous enough to see advertisements stuck up in waste lots of ground; "This ground to be let in lots for building, *without a fine*;" so far from demanding a fine, I think it would be much more reasonable to say; "This ground will be let for building, *rent free for two years*." I am convinced this would stimulate many to build, that are prevented by having to pay two years rent, and very often more, before they can set their houses, besides the money expended in building.

We will suppose a young farmer, with 500*l.* in his pocket, wishes to take a farm of an hundred acres; as the last tenant generally leaves the land in an exhausted state, he has to manure the greater part of the farm, and buy stock; but instead of doing this, and proceeding with spirit, he has to pay perhaps 250*l.* as a fine; this cramps all his exertions, and, instead of a spirited and profitable husbandry, begun by the purchase of manures, &c. he is obliged to adopt the too common system of the country, and, dispirited and listless, conforms to all the erroneous practices of the neighbourhood. That this picture is not an exaggerated one, the experience of multitudes can bear testimony to.

On the other hand, it would be an extreme weakness in landlords to let their lands to the first adventurer, that came up to their terms, without enquiring into his character, circumstances, and particularly his skill



skill in agriculture ; but I am well convinced, that this Irish custom has operated more against population and agricultural improvements, than any, or all other causes put together, and must have originated in the management of estates getting into the hands of those, who are totally ignorant of agriculture, and to whom the use of the money would be profitable. I have touched on this subject in another part of this work, and am not a little surpris'd, that men of penetration are not aware of its injurious tendency.

SECT. 10. *Nature of Fences.*

MR. Dillon, and Mr. Hime, near Roebuck, have adopted an excellent method of levelling down the *land side* of the ditch, by which means it is grazed or mowed to the bottom, and very little ground is lost ; but, where this practice is adopted, it must be covered with good mould.

A very erroneous practice has crept into the county of Dublin, of leaving their hedges, when cut down, three or four feet high, by which means they are generally bare at the bottom ; if these hedges had been laid *close to the ground*, they would be quite thick in the bottom, and form a fence in one year, that would annually encrease in goodness.

Another



Another very material error is, planting very small thorn quicks in new-made ditches : after the first heavy rains or frost, the bank is often washed away from them, and they are exposed to the harsh winds of spring, or, when weeding, are drawn out by the least accidental pull. It would be much more economical to give half a guinea per thousand for *transplanted* quicks (the price I understand they are sold for at Messrs. Simpsons nursery at Inchicore), than one shilling for one year old. If those, who are making new ditches, will be at the small expence of a trifling quantity of manure, spread over the roots of the quicks when planted, they will be amply repaid in the superior quickness and strength of their growth. Mr. Archer very judiciously advises the top of the ditch to be sowed with furze-seed, as it will not only help the fence, but will be an admirable food for beasts in winter. If a drill is opened, and a small quantity of rotten dung laid in it, and on this the seed is sowed, and covered with the back of a rake, they will make more progress in a year, than they would in three without it, as the tops of ditches are in general very poor. The best season for this purpose is April or May, as, if sowed earlier, they are apt to be destroyed by wet weather. It is surprising, that hollies are not planted by gentlemen for this purpose ; nothing can be more beautiful than this tree in winter, and they make an admirable fence ; if planted, as I have advised for quicks, in April or May, they will succeed perfectly

perfectly well. As winter is a season of most leisure, many are tempted to make ditches at that time, though none can be more unfit, as frequently wet weather or frosts cause the earth to fall into the ditch; if the cape sod was turned, and quicks planted, and covered with earth, the remainder of the ditch might be finished in May or June, when all the danger of wet or frosts is over. But I really must think and hope that, at no very distant period, the advantage of feeding in the house, *winter and summer*, will be so well established, as to preclude all necessity for *interior* fences of any kind. If those, who have small demesnes near Dublin, could be induced to try this system, and *peremptorily insist* on the execution of it, they would find not only great advantage, but *great comfort*, by having their stock *always under their eye*. I beg most earnestly to recommend to *their* serious perusal the fourth number of the Irish Agricultural Magazine, page 316, where they will see the great benefits of the soiling system clearly ascertained by the pen of Doctor Anderson, in much more forcible language than any I can make use of. I have seen a good method practised in a few places, of laying rows of sods parallel to the cape sod, at about a foot asunder in the face of the ditch; this in a great measure prevents the earth from sliding into the ditch.



SECT. 12. *Mode of Draining.*

WITHIN a few years the value of this improvement has been well known in this county in many places, but, from the improper direction of the drains, much money has been thrown away; for the men usually employed in this business are mere labourers, and understand only the manual operations. As justly observed in the Survey, if drains are not made in a direction *diagonal to the descent of the ground*, they are of little use: from want of attention to this, though seemingly of little importance, *ten* drains are frequently made where *one* would answer; and also, from want of knowing the nature of the land to be drained, they are often made unnecessarily deep.

In Fingal, and many other parts of this county, sod-drains have been found to answer every purpose; where they have failed, it has been occasioned by ignorance of the method, or not making them with sods sufficiently adhesive; and it is oftener caused by the careless manner of filling them in. The usual mode is to lay the sod at one side, and the loose clay at the other; the sods are laid *on their end* against the side of the drain; if they are the least weak in the middle, they give way when the weight of the wet earth comes  
against



against them, and ruin the drain. I have frequently opened drains, that have been stopped, and always found that it proceeded from this cause. If, instead of this method, the cut was made in the middle, and not in the side of the drain, and the sod laid flat, it would bear equally on each side; and if the sod is cut wedge-shape, as I have directed for *lawn drains*, it will divide the incumbent earth equally on each side; and even if, in ploughing, a horse did put his foot so deep as to touch the sod, it would be so thick in the middle, and, as the cut is not more than three inches wide, so strong, as to bear his weight without injuring the drain. But the greatest error, and indeed a *most common one*, in these and in stone drains, is *filling in again* all the stiff impervious clay, that is thrown out of the bottom of the drain: a moment's consideration must inform any person, that it is precisely causing what the draining was intended to prevent—the stagnation of water on the surface. If, on the contrary, the light surface mould *only* is filled in, the water will easily penetrate it, and the evil be cured; but as what is taken out of the drain is seldom sufficient for this purpose, the top mould should be borrowed from either side of the drain; or if gravel or sand is convenient, it should be filled in to meet the surface mould; at all events, *the clay should never be returned into the drain*. I must confess I have never seen *any place*, where the *absolute necessity* of this caution seemed to be attended to.

Wherever I have been engaged for this purpose, I have been very particular in my directions on this head; but the moment I have turned my back the clay has been *always* filled in. Where stones are in great plenty, or fods sufficiently tough are not to be had, they should be always preferred. Those, that are usually made, have the fault Mr. Archer mentions, of being too broad in the bottom; and, if not carefully covered with a thin fod (the grass side down), straw, heath, rushes, furze, &c. they will be in a few years rendered useless, by the loose mould washing through the stones.

Many persons are possessed with an opinion, that tapping will drain all kind of wet land. Where the evil proceeds from surface-water on an impervious soil, tapping is perfectly useless; but where it is caused by springs, tapping will be highly beneficial. But I must caution young improvers, who try this method, against being frightened at meeting with stones; *they must go through every obstacle*. This caution I am induced to give, as many have desisted at the first difficulty that occurred; as some encouragement to them to proceed, I assure them I have seen many situations draining at a vast expence, that might have been drained by tapping, for perhaps *a few shillings*.

Lawn or wedge drains, where the ground *is not to be ploughed*, will be found highly useful. I conceive if a fod, the shape of a wedge, about a foot deep, and a foot broad, was dug, and about two inches of the lower  
angle



angle pared off, and turned into its place again, it would catch the surface-water, and conduct it to the other drains. It may be necessary to remark, that this is only fit for lawns that will not be ploughed, and where the sod is adhesive, nor would I advise these alone to be depended on; they are merely to dry the surface quickly.

### SECT. 13. *Nature of Manures.*

THE use of lime, in reducing tanner's bark to a manure, is not sufficiently known, as immense heaps of it may be seen in many places unused. In this county, and, I believe, in general through Ireland, lime is used in such small quantities, as often to be of little benefit; it has been frequently brought into disrepute by being used on poor worn-out soils, totally deprived of any of those substances proper for the action of the lime; and not unfrequently, on the strength of the liming, another crop is taken from ground, already exhausted by successive corn crops.

As Mr. Archer says the lime of this county in general contains such a large alloy of sand, as from one-fourth to two-thirds, it requires some consideration from farmers possessed of gravelly or sandy soils; for, if it is of this nature, it would be encreasing the evil.

Many



Many make up their dunghills with alternate layers of *unslacked* lime and dung; this is a very bad practice: but if lime is mixed with scouring of ditches and roads, moory or boggy substances, green vegetables, tanner's bark, &c. it will be highly beneficial.

Doctor Anderson gives some rules for the choice of lime, which may be useful to farmers. The best lime is that, which is whitest, lightest, and feels soapy in the fingers when wet; if gritty, it contains sand.

There seems to be no great danger of farmers using too great a quantity of lime; the price in this case being generally the guide. Doctor Anderson gives great encouragement to the liberal use of lime; he gives an instance where part of a field was limed four inches thick: "The effect was that, for many years afterwards, the grain was so immoderately luxuriant, that it fell over, and rotted before it came to the ear." Had Doctor Anderson, with his usual perspicuity, informed us what the nature of the soil was, in which this happened, it would have been very material.

The great benefit of lime, in reclaiming bogs and heathy moors, has long been known and practised in some parts of Ireland, but infinitely short of the quantity that might be done, as there are few situations of this nature, that do not produce either limestone, limestone-gravel, or marle; but the cheapest, and most lasting of all manures, is certainly *irrigation*: few, indeed, are the places of this kind, where this great  
improvement

improvement may not be effected at a very moderate expence.

We possess a kind of black gravel in great plenty in this county, which, although Mr. Kirwan says is not limestone-gravel, is a very valuable sort. What its component parts are I do not know, but I have had many opportunities of witnessing its very beneficial effects.

Peat or turf thrown in a heap to dry and rot, and then mixed with lime, is recommended by Mr. Archer. It is very generally agreed that, unless peat is kept moderately moist, the lime will not act on it; nor will it rot if kept dry;\* this is well known in the improvement of bogs.

I must beg leave, in some points, to differ with Mr. Archer on the value of peat-ashes. I agree with him, that *very thin* bogs should very seldom be burned; but where they are *not thin*, I hold it to be a very beneficial practice. By what other means can we so readily destroy heath, and many other strong growing vegetables? and in situations remote from lime or other calcareous manures, or where irrigation cannot be adopted, I see no other mode of proceeding so efficacious. The greatest danger arises here, as in many similar cases, in taking successive *corn crops*, without the intervention of *green ones*; but where alternate cropping

\* See Headrick on the Improvement of Waste Lands.



cropping is pursued, I must think any preparation, that gives an immediate power of producing green food for *soiling in the house*, must be very beneficial, as not only the shade of turnips, rape, &c. helps the rotting of the peat, but the great quantity of dung produced enables the farmer to extend the potatoe culture, and other food for stock, which, but for this, he could not have accomplished to so much advantage. It is pretty plain, that without cattle he could not have had dung; and equally plain that, without the *green food*, produced solely in this case by the agency of the ashes, he could not have supported cattle. This helps to shew, how intimately connected the improvement of land is with the encrease and improvement of the breed of cattle.

Soap-boiler's waste has been used with great success in many places, and can be generally had in good quantities. I have seen it used with great advantage in mortar for building, and the cement formed was uncommonly hard.

Sea-weed, or sea-wreck, is used in considerable quantities at the Earl of Howth's; an immense heap is now ready for potatoes, which, I am informed, it produces uncommonly well; the collection of it is greatly neglected in many situations, that are greatly distressed for manure. Different opinions are entertained respecting the state, in which it is most beneficial;



ficial; I am not well enough acquainted with it to offer any thing on that head; but we may safely conclude that, as it has succeeded well, both in a fresh and putrid state, it is a valuable addition to the catalogue of manures. A further proof of its great value may be seen in the Dublin Society's Transactions, Vol. I. Part 1. under the article *Kelp*.

## CHAP. V.

## GENERAL SUBJECTS.

SECT. 2. *Number and size of Villages and Towns.*

1. DUBLIN.\*—We possess some very fine squares; Merrion-square, I am informed, is superior to any thing of

\* Having read many different explanations of the name of Dublin, and being ignorant of the Irish language, and of ancient Irish history, I applied to a gentleman skilled in the language and antiquities of this country, from whom I received the following explanation, which appears to be authentic.

The word *Ibb*, signifying a tribe of people, was often prefixed to the family names of the tribes, that inhabited certain districts in Ireland, to express the territory. (See *Ibb*, in O'Brien's Dictionary and General Vallancey's Prospectus.) as *Ibb-Laoghair*, now *Iveleary*, in the county of Cork, the country of the O'Learys; so in like manner, *Ibb-Conluach*—*Ibb-Mac Cuile*—*Ibb-Failge*—*Ibb-Neil*, &c. &c. &c.

O'Brien has enumerated twenty-two districts, with this prefix.—*Clann*, signifying a tribe, children, is synonymous, and was prefixed to family names, to express the territories they inhabited; as *Clann Breasail*, in the County of Armagh; *Clann aodh buidhe*, or *Clanaboy*, in the county of Antrim; *Clann Golmain*; *Clann Feargail*, &c. &c. &c.

*Laighean*, pronounced *Laihan*, was the family name of the people of the counties of *Dublin* and *Meath*; it is said they obtained

of the kind in London; but, indeed, the manner, in which it is planted and kept, does very little credit to the

obtained this name from being expert at throwing the *Laighean*, or spear: be that as it may, *Ibb-laihan* was the name of the territory they inhabited, which, with the word *Du*, a country, formed *Du-ibb-laihan*, i. e. *Dublin*, that is, the country of the tribe of *Laihan*, whence, with the affix *tir*, a country, is derived *Laihanstir*, or *Leinster*, the name of the province, of which Dublin is the metropolis. Hence the *Eblana* of Ptolemy. *Eblana*, the chief city of Ireland, hodié *Dublin* (Ainsworth).

*Eblaniens*, ancien peuple d'Irlande: ils occupoient ce que nous appellons aujourd'hui les comtez de Dublin et de Meath. *Eblanians*, an ancient people of Ireland: they possessed that part now called the counties of *Dublin* and *Meath*. (Le grand Dictionnaire Geographique, par Martiniere).

These *Lagenians* were so remarkable for their proceſs in war, they were called *Aos-cliahab*, the fighting caſt; whence Dublin was named *Aſcheled* by Ptolemy, who flouriſhed about the year 140. *Ath-cliatha* was a name well adapted to them, ſignifying warriors, that would *renew* the battle. *Ath* is uſed in Irish like *re* in Latin; as, *Ath-coghadh*, rebellion; *Ath-faſaim*, to grow again, a ſecond growth, &c. &c.; hence they obtained the name of *Sean-ghaing*, or ancient warriors, a name given by the poets to their territory *Leinſter*. *Claidhit ratha dhamſa* for *foirb ſean ghaing*, i. e. for *coigidh Chairbre*, i. e. *coigidh Laighean*, that is, “Let them erect a rath for me in the land of the ancient warriors,” that is, in the province of *Cairbre*, alias, the province of *Leinſter*; which ſhews they were as expert at the ſword or *battle-axe*, as at the ſpear; for *Cairb* ſignifies not only a ſword, but a battle-axe; it was the *Charba*, or *falcatus enſis*, Phœnicum inventum; itaque in Sanchoniathone Phœnicio ſcriptore vetuſtiſſimo, Saturnus ex ferro *Charba* (Jof. 13. 22.). Balaam occiſus fuiſſe fertur per *Chereb*, in Lingua Chaldæa per *Charba* (Bochart). It was an ancient weapon of the Irish, whence *Cairbre* became the name of ſeveral Irish warriors and princes, and was prefixed to the names of their territories, as *Cairbre Gabhra*, or Carbury, in the county of Meath—*Cairbre Aodhbha*, now *Kenry*, in the county of Limerick—*Cairbrecha*, in the weſt of the county



the managers: instead of keeping the *grafs constantly rolled and neatly mowed*, it is, like the ground of some poor charitable institution, *kept for hay, and sold to the highest bidder*, to help to defray the expences of the *poor inhabitants* of the square. The mode of laying it out was originally bad; it was done *by contract*, of course as little was expended on it as possible. As the soil, in which the trees are planted, was generally taken from the foundations of houses, and consequently very bad, none but the commonest and most hardy kinds have survived; they consist almost entirely of dogwoods, lilacs, thorns, and laburnums. If, on the contrary, this bad clay had been *exchanged* for about two feet of the fine vegetable mould, of which the lawn consists, it might have been planted with *evergreens*, which would certainly be more agreeable in winter than the above-mentioned deciduous kinds. The withered after-  
grafs

of Cork, extending from Bandon to Crookhaven, and to the river of Kenmare.

These names, which are historical, and can be well authenticated, have given room to numberless erroneous etymologies; as *Dubb-liun*, a muddy brook, and *Dub-leana*, the place of the black lake, though the waters of the Liffey are as clear and as pure as any in Ireland; and as *atb* signifies a ford, and *cliath* a hurdle, some idle authors have found out, that there was a ford here over the Liffey, covered with hurdles, not recollecting that such a passage is named *Togher* in Irish, and never *Cliath*, which is always applied to what we call *wattles* in English.

The author of this paragraph proposes to favour the public soon with a Geographical Dictionary of Ireland, wherein the ancient names of territories, mountains, rivers, &c. will be explained.

grafs is permitted to lie (I suppose *for manure for the meadow*) until covered by the fresh growth in spring, and helps to throw an air of gloominess over it at that dreary season. Indeed there would be an inconvenience in keeping it neat; *carpets could not be beaten in it*, nor could all the *dirty dogs of the town clean themselves so well as in the long withered grafs*; few people would be surpris'd if cows were taken in to graze by the week.

Seriously, it is astonishing that these things should be permitted by men of fortune and taste; surely, if the management has unfortunately got into hands, that will not improve it, or permit others to do so, why not apply to the Imperial parliament for redress?

Stephen's-green, in its present state, scarcely deserves mention; it is at once a disgrace to the city, and to those, who have it in their power to improve it. I understand some overtures were made some years since, but for what reason they failed is best known to the parties; if a reasonable compensation to the city will not induce them to conform to the wishes of the inhabitants, I imagine an application to parliament would relieve them; if, on the other hand, the inhabitants expected any unreasonable compliances, I should think there would be no more difficulty in adjusting the difference by a jury, than is every day experienced by the wide-street commissioners.

Mountjoy-



Mountjoy-square, it seems, is likely to be finished shortly; but I perceive they have committed the same error, of filling up hollows with rubbish of all sorts, where it is likely trees are to be planted, and which will cost the inhabitants no small sum to remove.

It is strange, that these affairs are committed to the random efforts of carters and labourers; and that some of the inhabitants, who, from having country houses, *are used to such affairs*, do not attend to it *in time*.

I have frequently heard it asserted, that the smoke of the town will prevent evergreens from living in any of our squares; this I know to be unfounded; and where they do not thrive, it is oftener caused by the badness of the soil (as in Merrion-square), than the badness of the air. Certainly some of the more tender kinds may not succeed, but all the common ones will, especially hollies, which have this further advantage, that they cannot be easily injured by handling.

The College-park is capable of, and wants improvement very much, which could be obtained by railing it in on the side next Nassau-street, and by a tasteful planting, of which it is totally destitute. Some improvements have lately been made, under the inspection of Messrs. Simpson of College-green, which shew what may be done, as they have converted that piece of ground opposite the House of Lords, which was a great nuisance, into a very agreeable object. It is to be hoped they will not stop here, but continue the improvements.

A handsome



A handsome iron gate might be erected in Park-street, instead of the old wooden one at present there; and, by taking in an old house or two, it could be made highly ornamental, and would have a fine effect when viewed from Merrion-square. It will be perhaps objected, that opening views to the street would disturb the contemplations of the students; from the noise of carriages, and the admittance of strangers at all hours of the day, I should with great deference imagine, that exercise, after studying in their chambers, is the only use the park is at present put to.

The Duke of Leinster's lawn is capable of great improvement; indeed the arrangement is by no means modern, and, as it is always in full view, requires some attention to make it correspond with so superb a mansion. I know not why it happens, that the gardens in Dublin are in general very badly laid out and kept; except that those, who have elegant country residences, are apt to despise their town gardens. The chief reason of want of success in these gardens is, the general practice of throwing out on them all the rubbish and bad earth from the foundation when the house was built, as practised at Merrion and Mountjoy squares; if this had been buried in the bottom, and the original good earth brought to the top, many trees would thrive, that are generally thought to be unfit for such situations.

St. Patrick's cathedral is permitted to be in a very ruinous state; possibly it is thought it would take from  
the

the antique look, if it was repaired. If this church and Christ-church were insulated and railed in, it would be a great improvement, and only paying a just tribute to their antiquity and grandeur.

If the Exchange-steps were cut away, and the entrance confined to the elegant one opposite Castle-street, it would not only give a breadth where it is much wanting, but this entrance is much easier of access, and it would likewise help to open the approach to the Castle, which is greatly wanting.

We were led to expect some years since, that Castle-market was to be made superior to any market in Europe, and that the present one was only temporary; I since understand, that the idea had no foundation, and that the present wretched ill-contrived one is to remain. I do not know, whether it is in the power of the wide-street commissioners to redress us; if it is, the same taste, spirit, and impartiality, that have hitherto directed their proceedings in the improvement of this city, will no doubt influence them to pay some attention to this affair.

New-market also possesses every defect of Castle-market. Patrick's-market is still worse, as the danger of floods is to be added. Some years since Sir Thomas Blackhall built a very convenient market in a more healthy situation; but, for what reason I cannot tell, the butchers seem to prefer their old dirty situation, and the new market is almost uninhabited.



The vegetable market, in Mary's-lane, is the most wretched and inconvenient one that can be conceived; it is kept in such a filthy state, and the size so very inadequate to the purpose, that few house-keepers attempt to go there. There is a piece of ground, very fit for this purpose, at the end of Dominick-street; it is at present, as all waste ground is, a very great nuisance, being a depot for all kinds of filth and rubbish, and a noted rendezvous for robbers: here a very commodious market might be built, that would at once be a great convenience and ornament to this part of the city; the expence would be trifling, and highly advantageous to the spirited proprietor. The fruit-market should also be placed here, but apart from that for vegetables; no person will deny that the present one, on the Coal-quay, is the most dirty, uncomfortable one, for both buyer and seller, that can be seen any where. A potatoe, egg, and fowl market might be also advantageously placed here, as the more they are connected, the more convenient for both buyer and seller.

The corn-market has been long complained of as very inadequate to this purpose; possibly this market might be also brought in contact with the markets I have mentioned above; at all events, in its present situation it is highly inconvenient, nor is the building at all large enough for the business transacted in it.\*

There

\* If this idea is adopted, the plan of the new market-house at Drogheda is worthy of great attention; it is the  
P. most



There is an uncommon convenience attending the situation I have pointed out; it can have at least four entrances, which, by dividing, would lessen the pressure at any one gate.

The new market, near Britain-street, is an exceedingly neat small market, and does the proprietor, Mr. Cash, great credit; it clearly shews what might be done in other markets, but has the defect of every other market, want of room.

Clarendon-market is also well designed, but half of it is untenanted.

Sarah-bridge is at once an ornament and reproach to the county; it appears as if the architect was only anxious to build a very superb bridge, which would form a very fine perspective view, without considering the approach to it; instead of either carrying the road on a level or an inclined plane, from Conyngham-road to the bridge, it dips about midway, and forms a receptacle for mud and water, that rendered it (until lately that an attempt has been made to mend it) almost impassable.

Had the entrance to the Phoenix-park been placed opposite to this bridge, and the road made to wind gradually to each side, it would have formed one of the most picturesque and bold objects perhaps in the county.

most elegant and commodious building for this purpose I believe in Europe.

county. I shall always feel great pleasure in explaining my ideas on this subject, and for the material improvement and ornament of the park, whenever I am called on.

Some years since there was an idea afloat, of removing all burying-grounds out of the city, which I hope to see revived again; they are certainly a great nuisance; the inconvenience attending the removal to the suburbs would be very trifling: our ideas are now, I trust, too much enlarged, to permit a veneration for old bones to counteract a proposal for the general health of the inhabitants.

Few cities, I believe, are better supplied with water than Dublin; and when the Royal canal company, from the extension of their line, will be able to grant a supply, there will be a still greater plenty.\* As the water in the Basin is in general very muddy, and comes clear to the houses, there must be a depolite somewhere; I imagine this might be prevented, by filtering *all the city water* through gravel, which could be very easily and cheaply effected. As timber for pipes

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\* It is very probable the stream, that supplies the city at present with water, might receive a considerable addition, by a little attention to the mountain streams, which perhaps could be easily diverted into its channel. It is also very probable that, by purchasing mills on some larger streams, any quantity necessary might be had on terms, that ought not to weigh a moment with the inhabitants of an opulent city.



is every day encreasing in price, and the expence and labour of renewing them very heavy and inconvenient to the inhabitants, I presume they might be made to last infinitely longer, by slightly burning or charring *both inside and outside*; it is a well established fact, that wood by this practice is rendered almost incorruptible; if it answers this purpose, an experiment could be easily tried at a trifling expence. As the pipe-water tax is, I understand, very inadequate to the expenditure, I presume a small addition would not be thought a grievance by the inhabitants, when they for a moment consider the great blessing of plenty of pure water. Many houses pay only ten shillings per annum for what would cost them at least twenty pounds, if they had not pipes. Doubtless, on application to parliament, a small extension of the annual tax would be granted, without which I understand it could not be encreased.\*

I do not know if it is possible to dock in the river Liffey; if vessels could be at all times water-borne, it would be a very great convenience; possibly the public sewers of the city might be injured, or possibly mountain floods might prevent the adoption of the idea; yet I imagine it might be contrived by means of ample overfalls, to prevent any danger on this head. I merely throw out the hint for the consideration of those

\* Since I wrote the above, I perceive this idea has been taken up, and is now before the Imperial parliament.



those better acquainted with such matters than I pretend to be; the inconvenience to the sewers might also be prevented by main sewers parallel to the river, which, by turning the river through them, would at all times be kept clean, as, from the contraction of the stream, the force would be augmented.

*Some Observations on the Growth and Increase of the City of Dublin.\**

WHOEVER takes the pains of comparing the two annexed maps, namely, one published by Mr. Speed in 1610, and the other by Mr. Wilson in 1798, will readily perceive the great growth and increase of the city of Dublin without the walls, since the former of these periods.† At that time the river Liffey was not imbanked by quays on the north side, and only a part of it on the south. The ground now called the Bachelor's-walk, the two Ormond-quays east and west of Essex-bridge, the Inns-quay, Arran-quay, and Back-quay, taking up in the whole an extent of ground of above 5000 feet, on which are many commodious, and some stately houses erected, was then covered with ouse, and overflowed by the tides, except a small part about the King's-inns, which had been a monastery of Dominican

\* These observations are taken principally from Harris's History of the City of Dublin.

† The part shaded red shews the city of Dublin in 1610 within the walls; the part shaded blue, the bounds of the city in 1763; the part beyond the blue, dotted and shaded black, the extent of the city in 1798.

Dominican friars. Mary's-abbey was then the extent of that part of the town (called Ostmantown, corruptly Oxman-town) to the east, and north-east from thence to the ship-buildings, containing Capel-street, Abbey-street, Mary's-street, Jervis-street, Stafford-street, Henry-street, Great Britain-street, Summer-hill, Marlborough-street, Henrietta-street, Bolton-street, Dominick-street, Dorset-street, Paradise-row, Eccles-street, Rutland-square, Great Denmark-street, Great George's-street, Mountjoy-square, Gardiner's-street, Beresford-place, Cumberland-street, Gloucester-street, Mecklenburgh-street, Earl-street, and Sackville-street. These, with a great number of other streets and lanes, have been since laid out in that quarter. On the other side, to the west, Michan's-church and Church-street (so called from thence) were for the most part the bounds, and all westward of them, as far as the Barracks and Montpelier-hill, taking in Bow-street, Smithfield, Haymarket, Tighe-street, Queen-street, Blackhall-street, N. King-street, Brunswick-street, Linen-hall-street, Anne-street, Lurgan-street, Coleraine-street, Beresford-street, and many other streets and lanes, have increased on this side. Grange-Gorman, Stonybatter, and Glasne-menoge, now united to the town, were then villages at some distance from it; in the latter of which places the sheriffs of Dublin have been known to hold their courts in the times of the plague, and particularly in the year 1575,\* as being remote from the city.



On the south side of the Liffey the city hath been likewise much enlarged since the year 1610. The space of ground now occupied by Crane-lane, Essex-street, the Custom-house, Sycamore-alley, Temple-bar, Fleet-street, Aston's-quay, Townsend-street, &c. &c. was then under the dominion of the water; and George's-quay, with a large tract of many acres extending to Ring's-end-bridge, has been recovered from that element. Dame-street contained then only a short range of buildings on the north side, and extended no farther than to the precincts of the Augustin monastery, not three hundred feet in length, opposite to the end of George's-lane. The dissolution of that religious house made room for enlarging the city eastward, the precincts whereof were first converted into gentlemens houses and gardens, such as the lord chancellor Eustace's, John Crow's, and others, which were again demolished, and converted into several streets, as Eustace-street, Crow-street, at the end of which, near Temple-bar, has been erected the new theatre-royal, on the place where the said monastery formerly stood, Fownes's-street, and others. The parts opposite to the then Dame-street were principally taken up by St. Andrew's church and church-yard, which at that time stood very near to Dame's-gate, and on a part of the site of that church and church-yard Castle-lane, now Palace-street, and the houses adjoining were laid out, and  
on



on the remainder the old Castle-market was built by Alderman William Fownes and Thomas Pooley, Esq. in the year 1704. The church of St. Andrew was before that time removed further eastward near the College, where it now stands. George's-lane was nearly the extent of the suburbs to the east, and was then but slenderly built, and thinly inhabited; though we are told by Mr. Stanihurst,\* "that it was antiently a place of more consequence; but that the inhabitants thereof, being daily and hourly molested and preyed on by their prowling mountain neighbours, were forced to suffer their buildings to fall into decay, and to embay themselves within the city walls." The same writer adds, "That a place therein (called at the time of his giving that account in 1586) Collet's-inns, was in ancient times the seat of the king's exchequer; but that once, the baron sitting in it solemnly and carelessly, the Irish laid hold of the opportunity, rushed in, surprized the unarmed multitude, slew all that fell under their power, and ranfacked the king's treasure; after which mishap the exchequer was removed from thence into a place of greater security." That author gives no account when this accident happened; but it appears from records, that the site of the old exchequer was on the 28th of July, 36 Edw. III. (1362) granted in custodium to the prior and friars of the Augustinian order in Dublin (which lay in the neighbourhood of it) for

\* Description of Ireland in Hollingshed, p. 23.

for the profits whereof they accounted in the 17th year of Richard II. (1393) as appears by a pipe roll of that year in Birmingham tower. The place, nevertheless, though abandoned as to its original use, retained the name of the Exchequer long after, which it communicated to a lane called Chequer-lane, built in the year 1610, and extending from George's-lane to Grafton-street. Stanihurst proceeds,\* "That there was in that lane (namely, George's-lane) a chappell dedicated to St. George, likely to have been founded by some worthy knight of the garter; that the mayor, with his brethren, was accustomed with great triumphs, and pageants yearlie on St. George's feast to repair to that chappell, and there to offer; but that the chappell had beene of late razed, and the stones thereof, by consent of the assemblie, turned to a common oven; converting the antient monument of a doutie, adventurous, and holie knight, to the coal-rake sweeping of a puf-loafe baker." This chapel was under the care and government of a master and wardens, and supported chiefly by oblations; for which reason the parliament thought proper to take it under their protection, and by a statute† provided, "That whatever person in the county of Dublin should make any prey upon the Irish enemies, exceeding forty cows, should deliver one cow, or five shillings in money, towards the reparation of

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St.

\* Description of Ireland in Holingshed, p. 23.

† Rot. Cancell. 36 Hen. VI. No. 19.



St. George's chappell in Dublin, and an action was given for the recovery of the same to the master and wardens thereof."

A village, called Hogges, lay withoutside the city walls, and eastward of George's-lane, in which a nunnery, under the invocation of the B. V. Mary, was founded by Dermod Mac-Morough, king of Leinster, about the year 1146, before the arrival of the English in this kingdom. It is not improbable, that the village took its rise as well as name from the nunnery; for *ogh* in the Irish language signifies a *virgin*; and, removing the aspirate, H, the word by an easy corruption may pass into *Hogges*, as much as to say, *the place of the virgins*. Be this as it may, the village is mentioned in several early charters, particularly in one made about the year 1200 by Sir Jeffery de Constantin to the abbey of Tristernagh\* in the county of Westmeath, whereby he grants to the said abbey one messuage without the walls of Dublin, near the village of Hogges; and Hoggin-green, whereon St. Andrew's church now stands, which took up a large space of ground extending to the river Liffey, is often mentioned by the Irish historians, as the common place for the execution of criminals, among whom, to give one instance, Adam Duff O'Toole was in the year 1327 burned here for heresy and

\* Archives of Tristernagh, MS. chart I,



and blasphemy.\* This village is now united to the city, and the whole green taken up by buildings; though at the period mentioned, scarce any thing but that little village, the sites of the said religious houses, a Bridewell for the reception of vagrants, and an hospital, where the parliament-house now stands, were to be seen. A place also on this green was anciently called Hoggen-butt, where the citizens had butts for their exercise in archery; and near them was a small range of buildings called Tib and Tom, where possibly the citizens amused themselves at leisure times by playing at keals or nine-pins. This practice seems to be hinted at by an old proverb, though not applied to this place, namely, *he struck at Tib and down fell Tom*. We find these buildings called Tib and Tom, mentioned in the will † of Richard the first earl of Cork, as mortgaged to him by Theodore lord Dockwra, and the lady Anne his mother, for three hundred pounds, and rented from the mortgagee by Sir Philip Percival, at twenty-four pounds per annum.

On the east and south of George's-lane (the churches of St. Peter and St. Stephen, and the College excepted) little was to be seen but enclosed fields. Stephen's-green was then so called, which took its name from the neighbourhood of the church of St. Stephen, and no

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improvements

\* *Campion's Hist. of Irel.* p. 86. *Chron. in Hollingsh.* p. 69.

† *Prerog. Office.*

improvements were on it; nor was there then any open street or passage from thence to the College but round through George's-lane. A part of Keivan's-street was indeed then built, and some residentiary houses of the prebendaries and canons of the cathedral of St. Patrick, together with the archbishop's palace. From hence the reader will have a just idea of the growth and increase of the city in these quarters, when he sees that Chequer-lane, William-street, Stephen-street, Clarendon-street, S. King-street, Grafton-street, Anne-street, Duke-street, Dawson-street, Moleworth-street, Kildare-street, Frederick-street, Merrion-square, Merrion-street, Leinster-street, Nassau-street, Clare-street, Holles-street, Baggot-street, Leeson-street, Harcourt-street, the buildings about Stephen's-green (which is one of the largest squares in Europe, being almost an English mile in circumference), York-street, Camden-street, Aungier-street, Peter-street, Cuffe-street, with many other streets and lanes, have been added to it since the period before-mentioned. The same thoughts will occur, when he views the west and south-west parts of the town, and sees what few streets or buildings then extended westward or southward of Newgate, except Francis-street, James's-street, and Thomas-street, and the precincts of churches and religious houses.

The Black-Rock is capable and worthy of great improvement; the leading one seems to be an increase of the



the supply of fresh water, with which, I understand, it is at present but scantily furnished. From viewing the ground (without taking the level) I imagine a fountain could be erected, where the pump formerly stood, and where the open pump-hole still remains a most dangerous and reproachful nuisance; it could be very easily ascertained, and, if practicable, executed at a small expence. The next improvement, that presents itself, would be paving the streets, and preventing the inhabitants from throwing dirt on the road or foot-path. The carriage-stand in the principal street is another very great nuisance, that could very easily be removed to the waste piece of ground near Mr. Kelly's new erected house of worship. As this is a very rising village, I am not a little surpris'd the proprietor or the inhabitants do not pay a more spirited attention to it; the many charming situations in its neighbourhood, and the contiguity to the sea, must always ensure it a preference to every other outlet. The Hibernian Magazine of March 1802 led me to view Montpelier parade, between the Rock and Monkstown church; it stands unrivalled in point of situation and prospect; in front a most extensive view of the Bay of Dublin is most agreeably broken by the Hill of Howth, Ireland's Eye, Lambay, and the country in the vicinity of Clontarf: in the rear nothing can be more picturesque; it includes a great range of the most delightful country, boldly terminated by the mountains. It is astonishing, that citizens would  
 prefer



prefer the noise and dust of the Rock to a situation like this, that unites the retirement of the country to all the advantages of the town, without any of its disadvantages. A few of the houses, I perceive, remain still unset; but when citizens reflect on the superior advantages they enjoy, and the rapid rise, that is likely to take place in the rents of this neighbourhood, I am convinced that Mr. Greene, the spirited proprietor, will be amply and quickly remunerated, and the tenants sufficiently recompensed for any money they may expend.

*Gentlemens Seats and Improvements.*

THIS is a subject, on which I feel a considerable difficulty. To find fault with a gentleman's demesne is to me an unpleasant task, and, as *I have found lately*, a dangerous task for a professional man. Yet it would certainly by no means answer the Society's views to have defects and beauties indiscriminately praised; if this were the case, improvement in any science could never be obtained; and I must conceive, that every person, writing for this purpose, ought to consider, that he is employed by *the nation*, and not to feed the vanity of individuals at the expence of sincerity. What opinion must foreigners have of our Surveys, if places are held up to public view, that have no one good point to re-

commend

commend them? I am convinced Mr. Archer has in this, as in many other things, been misinformed, or I am equally well convinced he would not have brought many places into notice, that do not deserve either public observation, or the very high encomiums he has bestowed on them. The following places come under either of the above descriptions—Curduff—Turvey—Bushy-park—Terrenure—Liffen-hall—Seafield—Portfield—Kilmacud (James Farrel, Esq.)—Mount-Sackville—Milltown—Drumcondra—Broomfield—Diswell's-town—and some others.

As I have ventured to find fault, I feel great pleasure in being able to point out some demerits, that do great credit to the taste of the proprietors; and at the same time I hope I will be permitted, without giving offence, to offer a few hints for their further improvement.

Abbeville, the seat of the Right Hon. John Beresford, I presume to think might be much improved, by removing the two hedges on each side of the road leading to Mr. Sayers's, and making a sunk fence, as adopted by Sir William Gleadowe Newcomen at Killester. If this was done, and as much of the plantation along this road cut away as would throw it into handsome clumps, it would not only give a very extensive view of the country, but would help to break that *line of uniformity*, which has been so frequently adopted in plantations. As the view is exceedingly confined on the south side, it is the more necessary to open it on  
this.



this. Had the gardens been originally made on the opposite side of the road, near the landry, it would have contributed greatly to the beauty of this fine demesne.

Belcamp, the seat of the Hon. Francis Hutchinson, possesses a valley capable of being made very beautiful, by removing the trees in the lowest part, and throwing the whole under water. It was intended by the late proprietor to make a number of *petty falls*, which it is hoped Mr. Hutchinson's good taste will reject.

Killester, the seat of Sir William Gleadowe Newcomen, is particularly happy in a situation for an entrance, and Sir William's fine taste has profited by it. The good effect of a sunk fence may be seen here along the road leading to Raheny. If I may presume to suggest an improvement, it would be to take away thirty or forty yards of the hedge on both sides of the road to the west of the entrance, and make a sunk fence; this would give an idea of extent much wanting here, as the thorn hedge too plainly marks the boundary; the ground on the opposite side belonging to Sir William, there can be little difficulty. In some part of this demesne, as well as in *every other*, the ruinous effect of neglecting to thin plantations *in time* may be seen, as the stems are bare in many places, and give a view through them, by no means agreeable at all times; but gentlemen are at length beginning to be convinced of the necessity of this operation at an early period, and

Sir



Sir William is too experienced a planter to be the last to profit by it. The gardens at Killester have long been pre-eminent, particularly for vines and pine-apples; they are deemed by all good judges to be equal, if not superior to any in the united kingdom.

Clontarf Castle is a very fine antique, and kept in high preservation by Mr. Vernon. An attempt was lately made to give it elevation, by taking away some of the earth in front; to make this either ornamental or useful, it should have originated at a considerable distance in Clontarf town, so as to have made it an inclined plane from the hall-door; this could be easily effected, and would make Clontarf castle one of the finest objects of the kind in the county; it would also materially serve the inhabitants of Clontarf town, as their houses are very much sunk, owing, I suppose, to injudicious road-making. If Mr. Vernon should ever be inclined to adopt this hint, it is hoped he will remove the dwarf battlements in front.

Marino, the seat of the Earl of Charlemont, was highly improved by the late Earl: from its contiguity to the city, and the great facility of viewing it, a description would be superfluous. It is in contemplation, I understand, to make a new entrance, which has been long wished for. This demesne has suffered severely by an ill-judged speculation in building a crescent of houses, that possess every inconvenience of a city residence, without any of the retirement or pleasures of

the country. It will scarcely be believed that, at the distance of two miles from the city, there are houses without either gardens or good water. Some attempt at improvement has been lately made, by throwing the road farther from the houses, and giving a small space for gardens in front. If all the divisions between these insignificant gardens were removed, and thrown into one lawn neatly mowed, dotted with a few hollies or other evergreens, and a skirting of evergreens along the paling next the road, I imagine it would have a more rural appearance than the present tasteless patches; and if only one entrance, and more in the centre, was made, it would make it more retired; at present it is made a thoroughfare very disagreeable to the inhabitants.

Holly-park, the seat of Jeffry Foot, Esq. possesses one of the most enchanting views in the neighbourhood of Dublin. It enjoys in the foreground all the beauties of Marly, and the distant prospect takes in a vast scope of improved country, finely relieved by the back-ground of the mountains, and a wide expanse of sea, agreeably broken by Howth, Ireland's Eye, Lambay, &c. In the Irish Agricultural Magazine, No. 3, page 279, I took the liberty of suggesting what I considered would be an improvement to Mr. Foot's demesne, that is, to remove the high hedge to the east of his entrance, and also, to remove his entrance further to the west. Although he has not thought proper to adopt it, I have  
had



had frequent opportunities, whilst engaged at Marly, of being convinced it could be easily accomplished, and would be a very material improvement.

Marly has obtained a very just eulogium from Mr. Archer's pen; it is indeed a truly elegant demesne; and as Mr. Latouche has become sensible of the necessity of thinning his plantations, those at Marly, contrary to plantations that are *not thinned*, will continue to increase in beauty and value every year, as in general they have been taken in time. I must caution those, who intend to thin their plantations, to do it *gradually*, otherwise, in exposed situations, much injury may ensue, and also to recollect that *cutting down timber*, and *thinning ornamental plantations*, are very different both in their design and effect, and by no means to be entrusted to the direction of the generality of planters or stewards. If I may venture to hint an improvement at Marly, it would be to restore the part of the rivulet next the house to nature, by taking away two small ill-contrived water-falls, and permitting the stream to take its natural course; this would be a fine contrast to the ornamented part of the stream, which at present, though very elegant, has rather too much sameness. I also presume to hint the necessity of a bridge over the rivulet, near the grand entrance, which, by bringing the approach to the east of the present one, would prevent the view of so much road from the gate, give a view of a fine plantation, and carry the approach  
more



more *on a level*; to the west of the bridge the water might be extended, and, at a small expence, made exceedingly beautiful, either seen from the bridge, or from the rustic cottage on the hill; the present stream only serves to put one in mind, that something is wanting, and does not by any means correspond with the elegance of the surrounding scenery.

It is no easy matter to say any thing of Stillorgan, it has been so completely cut up by the proprietor; every person of taste must regret, that so fine a demesne fell into such hands. The only thing, that looks like improvement, is a very beautiful new approach, executed by the late Mr. Leggatt, which appears to be useless at present. It is necessary to caution the inexperienced against a mode of planting adopted here; small holes are made in the top of four ditches, and the roots of trees squeezed into them; any suggestions for improvement would be useless.

Nothing can be more awkward than the approach to Mr. Ambrose Moore's house: by not originally advancing the house beyond the line of the garden wall, there is no opportunity of hiding the garden wall with trees, and this causes a steep disagreeable zigzag turn close to the house. This gentleman seems to despise all view of the bay, as he has planted large growing timber-trees along his wall in front of the house, which in a few years will shut out all prospect. If evergreens only had been planted to hide the wall, I imagine it would

have

have had a much better effect, and certainly at much less expence; this is an error gentlemen near Dublin are very apt to fall into.

The viceregal lodge in the Phoenix-park is capable of great improvement; but until a new approach is made, nothing to the purpose can be effected; the present one is the worst conducted in every respect, that can be seen any where. A very elegant one might be sketched out near Mrs. Talbot's house, superior, I presume to think, to any thing of the kind in this county, perhaps in the kingdom; one that would at the same time be suitable to the representative of majesty, do honour to the taste and liberality of the Irish nation, and be suitable to the elegance of the house.

Woodlands (formerly Luttrell's-town), the seat of Luke White, Esq. is a truly magnificent demesne; and the improvements daily making, added to its fine situation and great extent, must ensure it a superiority over every other demesne in the county. Nature has thrown the ground into the most delightful and undulating variety of surface; the views of the river Liffey are caught in her most enchanting points; the fore-ground, to which nature has been so very lavish, is broken in the most picturesque manner by the charming plantations of Edmunsbury, Woodville, Hermitage, &c. &c. and the distant prospect closed in the happiest manner by the mountains of Wicklow. The glen is particularly beautiful; it follows the course of a natural rivulet,  
flowing



flowing over a rocky bed between steep banks well wooded, forming a most agreeable solitude without gloom, and possessing infinite variety. This demesne contains upwards of four hundred acres, and is embellished with more and better full-grown timber than is to be found in any other in the county. Mr. White is annually adding to the plantations, and improving the soil; for this purpose the fine lake near the castle was laid dry in the summer of 1800, and upwards of 60,000 loads of choice manure raised from the bottom, which, after having been mixed with a large proportion of lime, was laid on the land, and has produced, as might be expected, the best effects. Some opinion may be formed of the spirit, with which improvements are carried on in this demesne, when it is known, that upwards of seventy people are employed through the year, beside many additional hands in harvest: this is the true method of relieving the poor, and must in a philanthropic mind give birth to sensations unknown to those many thoughtless landholders possessing thousands of uncultivated improveable acres, and surrounded by an unemployed tenantry; though at the same time, if they consulted their *interest only*, it is very evident, that every sixpence they expended in this manner would return with a large interest into their pocket in an increased rent-roll.

The castle has the appearance of antiquity; although the chief part of the building has been erected within  
these



these twenty years, yet uniformity as to its gothic appearance is preserved; and although a part of it is near six hundred years standing, the additions are so appropriately attached, that the whole has the appearance of having been built at the same time; and if it is not as splendid a residence as some in its neighbourhood, it certainly possesses all the conveniencies, that elegance and comfort can require. It was a grant from King John (who was in Ireland in the year 1210), and one of the apartments is still called *King John's chamber*.

The noble elm-tree near the old-mills, so long the glory of Luttrell's-town, and the admiration of every person of taste, was unfortunately broken off within about ten feet of the ground, by the great storm in January 1802. I have been favoured with the dimensions of this father of the forest, as taken by the Reverend Gilbert Austin.

	Feet. In.		
4 feet from the ground;	14	9	circumference.
15 —————;	4	9	diameter.
79 —————;	1	0	ditto.

Much to the honour of Mr. White, he intends to preserve this precious stump, which, it is probable, will shoot out again, and continue for many years to add to the picturesque beauties of its native spot. It is very difficult, from the transient view I have had of this demesne, to suggest any improvements, yet I imagine opens might be made with fine effect, as the castle  
seems

seems to be shut in; but this requires extreme caution, and a thorough acquaintance with the probable effects they might have, and possibly, on a more intimate knowledge of Woodlands, I might relinquish this idea.

SECT. 3. *Habitation, Fuel, Food, and Cloathing of the lower Rank—their general Cost.*

NOTHING can be a greater reproach to the landed proprietors, than the wretched appearance of labourers cottages. Covetousness, want of spirit, or carelessness, are the general causes. If a landholder builds a miserable hut, which costs him only ten pounds, he charges at least forty shillings per annum; some, as Mr. Archer says, the enormous rent of three or four pounds. It is asserted, that in many places labourers are accommodated with cabbins gratis; the truth in general is, that, although they pay no *money* for it, they pay labour, which is the same thing, as, in making an agreement, this is always brought into the account. It is surprizing, that any person of the least spirit can bear to see such wretched hovels near their houses, yet they are to be seen almost every where in the county. Sir Thomas Lighton has set an example near his house on Merrion-road, adjoining to Mr. Frank's lawn, by the erection of a range of cottages; they are at once comfortable to the tenants, and highly ornamental to the neighbourhood.



hood.\* Mr. Jackson, at Clonskeagh, has also erected very comfortable cottages for his workmen; some few others may be seen, but they are in general as I have stated. Want of elevation above the damp earth seems to be a great error even in the best constructed, as there is scarcely one but has a step *down into it*: this glaring, and, I must add, cruel defect, is in general to be seen in gentlemens entrance-lodges. Nothing would be more likely to attach a labourer to his employer, than his having what he would consider *a bargain*; when a man pays more than the value of his cabin, he becomes careless, as he thinks a change cannot be for the worse. If, on the contrary, a cabin that costs ten or twelve pounds is set to a labourer at twenty shillings a year conditionally, whilst he works with the proprietor, without stopping any thing *additional on this score* out of his weekly hire, it would tend to make this class of men more respectable, and then there would be such a struggle for it, that the proprietor would have an opportunity of picking and choosing men of the best character. Except in the immediate vicinity of Dublin, a labourer should have as much ground, at a very moderate rent, attached to his cabin, as would supply his family with potatoes and other vegetables, and grass for a cow; this would give employment to him after

his

\* The tenants by no means second his views, as the road before their doors is generally in a very filthy state, and the doors and windows very dirty.



his usual working hours, and tend to keep him from the whiskey-house, and it would also give constant employment to his wife and children. If labourers had these comforts, it would make them fond of home, and I hope we should shortly have many *Britton Abbots*\* in Ireland.

There is no part of the kingdom, in which the lower classes are so badly supplied with fuel as in this county; yet, as Mr. Archer very justly remarks, it is no easy matter to redress them; unless landlords would buy coals at first hand, and deal them out in small quantities at first cost, I know not what to advise. The operation of the canals in this case, either with respect to coals or turf, has but a very partial good effect; and until very small canals are made to ramify in every direction, this county will be little benefited by them.

I would wish to recommend strongly the mode adopted by the Right Hon. David Latouche at Marly. He has attached a grist-mill to his threshing machine, for the purpose of grinding meal for his labourers; this, with the best potatoes in small quantities at wholesale price, is a very comfortable addition to their wages, which are *not lower on this account*; it takes them out of the hands of huxters, and the apprehension of losing these benefits helps to make or keep them honest.

\* The name of a celebrated English labourer.

*Price of Wages, Labour, and Provisions.*

LABOURERS wages, during the late scarcity, were very inadequate to the price of provisions; and, as I have observed before, if it had not been for the meal-shops established by subscription, and the beneficence of individuals, many families would have literally perished; now indeed the great plenty of the necessaries of life enables a labourer to subsist tolerably well on his wages, which are in general from seven to eight shillings a week; frequently milk is added.

If labourers were paid on Saturday at dinner hour, I imagine it would be a good practice; it would enable their wives to provide in time for the ensuing week. It is too much the custom in many places to pay workmen late on Saturday night, or often on Sunday morning; if on Saturday night, they too often adjourn to the public house, and frequently are induced, although otherwise soberly inclined, to spend great part, often the whole of their week's wages; if on Sunday morning, it is a very improper day to buy provisions, and Monday is frequently broken into for this purpose. Whilst the distilleries were stopped, we scarcely ever saw a drunken man, but now they may be seen in every direction; and until the magistrates (assisted by landholders) root out private whiskey-houses (I wish I could say licenced



ones) we must never expect either sobriety or honesty amongst our labourers.

We were led to expect, that the establishment of friendly societies would have been effected before this; of their beneficial tendency there can remain little doubt; for, if conducted with prudence, they must ultimately tend to improve the morals and manners of the lower classes of the community. The society for ameliorating the condition of the poor, I understand, are most laudably occupied on this subject; from their influence and arrangements we may shortly expect the accomplishment of this very desirable institution.

Many complaints are daily made of the dishonesty of labourers; how can any other conduct be expected, when the usual question to a labourer, on asking for employment, is, "*Have you a spade?*" instead of "*Show me your discharge from your last employer,*" when perhaps he had just come from the perpetration of the most horrid crimes. If it was made a general rule through the kingdom to employ no labourer, that could not produce a satisfactory discharge, it would be a great check, and a stimulus to good behaviour. Farming societies I hope will take up this idea; and if associations for this purpose were entered into, it would redound more to the credit and advantage of landholders than those, that have been formed for settling the wages to be paid to their workmen; for, however grating and unpleasant it may be to their *acquired* feelings, I must beg



beg leave to think, a labourer has just as much right to take advantage of a scarcity of labour at market, or to expect a higher price for superior abilities, as a farmer has to expect a higher price for his corn in a scanty market, or for that of a superior sample. I must confess I never knew a merchant, farmer, or tradesman, that did not act in this manner. From men of enlarged ideas I have nothing to apprehend for this opinion; but many, I fear, will think it great presumption in a man so little known to attempt to dictate; I trust no person will be so uncandid as to imagine I would wish to palliate or countenance the laziness, frauds, and ingratitude of too many of the labouring class; I have too often experienced them myself to be an advocate for them; but I also know, that petulance and pride in employers very often cause the most amenable labourers to forget themselves.

SECT. 6. *Use of Beer and Spirits—whether either, or which is encreasing.*

THE apprehension of an encrease of drunkenness from the cheapness of whiskey, though in some measure it has taken place, yet by no means in that extreme degree we had reason to dread; this must certainly be attributed to the great improvement in malt liquors; and I venture to prognosticate that, if the brewers con-

tinue

tinue to improve the quality of their drink, the consumption of whiskey will gradually decline; for I am very well informed, that one of the most celebrated dram-shops in Dublin complains, that the lower class have very much abandoned the use of spirits in favour of malt liquor.

#### SECT. 7. *State of Roads, Bridges, &c.*

It is almost needless to expatiate on the utility or pleasure of good roads; it is the constant theme of every county of Dublin Grand jury; and, from the attention, that has been paid to the subject lately by men of fortune, one would naturally expect, that the roads leading to the metropolis would be the best in the kingdom; that this is not the case a very short ride will prove; it will appear the more extraordinary, when the great sums of money annually expended are known. Indiscriminate praise of our roads is no uncommon thing; if they are good, it must be only by a comparison with others; but I never can think a road good, that is either full of mud, or covered with large loose stones, or studded with large *fixed* ones like an ill-made pavement; nor can I ever deem a road made or kept as it ought to be, whilst a stone larger than a walnut rises on the surface. Many will doubtless be astonished at this assertion, and ask, how is this garden-like management



nagement to be applied to roads? simply, by sorting the gravel *in the pit*, by screens made for the purpose, and not by laying down *round smooth stones* as large as a man's head, and *fine sand* mixed together, as practised on the Black-rock road, and indeed on almost every other, and this frequently, I may say always, on the hard surface. Does it ever strike the makers of roads, that *round smooth stones laid on a hard surface can never unite*, more especially when the medium is fine sea or river sand? Surely a moment's thought must or ought to convince them, that they must remain just as we see the Black-rock road, the stones rolling about the road, and the sand flying in clouds with the least breath of wind: even if the road was picked (as every road ought previously to be), large round stones and sand can never sink equally under the pressure of heavy wheels; and, from their shape, round stones cannot remain firm, for every time a wheel stirs them in dry weather, the sand steals under them, and at length they are thrown out on the road, where they roll about, laming horses, and breaking the springs of carriages, until stopped by the ditch, or are scraped off in the mud. I have lately seen, on this and Donnybrook road, men employed to pick the loose stones off; how much easier would it be to prevent this, by screening in the pit? This defective management has arisen from a very general opinion, that gravel for roads could not be *too strong*, and from roads being made or repaired by the perch, without

limiting



limiting the size of the gravel. One of the bad effects of this injudicious mode is, that the roads are worn in either one or two tracks; if, on the contrary, it had been sheeted with fine gravel, it would be equally used in every part.

With the profusion of materials almost on the spot, and the great breadth of the Black-rock road, it might easily be made and kept the best road in Ireland; but before this can be accomplished, the system must be entirely changed, and the management committed to persons properly qualified, and not left to the discretion of ignorant and bigotted men, *who keep carts for hire*. The regulation for making the drivers of carriages keep at different sides of the road is a most excellent one, but is very seldom observed by any but hackney carriages. The mismanagement has also extended to the foot-path of this road, and to that of every road, except the Malahide road; it is covered with large gravel, without a particle of loam to bind it, and so rugged in summer, that it is exceedingly painful to walk on it; and in winter the level is so bad, it is generally full of pools of water. It is scarcely possible any person can be so infatuated or stubborn, as not to see and remedy this cruel neglect; well may those, who use them daily, say, "the trustees never walk;" if they did not think proper to screen the gravel, it might be very easily raked, and the coarse rakings laid in hollows in the road. If this had been done, I dare say it would re-

main

main firm and good for ten years or more, and be always dry in winter, and free from dust in summer. Many gentlemen have wished, that this road could be watered in summer; it could be accomplished at a very moderate expence, on this and every road in the county, which I will point out if applied to. Making roads very high in the middle is another very great and common error, from an opinion that water runs off more quickly; so it undoubtedly would, if the surface was always perfectly smooth and firm; but as most carriages wish to keep in the middle of these high roads, both for safety and ease, there is generally a deep rut worn in the middle, or if there is the least mud in the road, the indenture made by the wheels will cause the water to remain, let the declivity be ever so great, unless there is a *longitudinal* fall, as recommended in Vol. I. page 199, of the Communications to the Board of Agriculture, and which deserves great attention. Hedges, high walls, or plantations near roads, are more injurious than is generally imagined; it is not a little extraordinary, that there should be an act of parliament to enforce the cutting of hedges, and none, *I believe*, to prevent the erection of high walls, or planting trees, which are still more hurtful. Until an act of parliament is obtained, to oblige the proprietors to cut down these plantations adjoining roads, we never can expect them to be good.



When a better system of road-making is established, the enormous waste of the public money, that has taken place, will be truly astonishing; and I am convinced, until a *National Board of Roads* is established, we never can expect matters to mend; for then the grand cause, *grand jury jobbing*, will cease, and the conduct be thrown into the hands of scientific and practical road-makers.

Some time since I had an opportunity of observing the process of repairing a road near the metropolis; it was necessary to raise it in some places upwards of eighteen inches higher than the original level; instead of laying thin strata of earth at a time, until made firm by the wheels of the cars, the whole depth was laid on *at once*, and *immediately* covered with broken stones. By any person, not entirely ignorant of road-making, the consequence might have been easily foreseen; after the first rains, the stones, by the pressure of the wheels, sunk into the soft clay, which by degrees was all purged up to the surface, constantly scraped off, and more broken stones added, until they came in contact with the old firm surface; so that the public had to pay for an *additional* depth of eighteen inches of broken stone, besides paying for removing the mud; and that some judgment may be formed of this expence, I have frequently observed the labourers give from ten to fifteen blows of a hammer to one small stone, and very deliberately lift it off the ground each time; if a straw or  
 hay

hay rope had been coiled round the anvil-stone, with the assistance of a forked stick, more than one blow to a small stone need scarcely ever be given. I have seen a small boy on Mr. Ogilby's estate in the county of Derry, that, with a forked stick in one hand, and a hammer in the other, would break more stones in one day, than any of these labourers would in four. The idleness of forty or fifty men makes no small item in the expence of making a road. I feel great regret in being obliged to state these errors, as the gentlemen concerned deserve every praise for their *good intentions* to serve the public; no mens' private character can stand higher in public estimation; but they will, I hope, pardon me when I observe, that their general ignorance of rural affairs, especially of the subject before us, renders them very unfit for such undertakings, and totally unable to detect the faults or impositions of those they are necessarily obliged to employ.

If half of this road had been made at a time (as I have seen practised on Drumcondra road), and, when firm, the other half, it would have prevented all cause of complaint; but the eye of the Right Hon. John Foster was over Drumcondra road.

It has been always too much the custom of this county to gravel the roads on the old hard surface in *summer*, and not unfrequently with *water-worn* large gravel, and fine sand mixed; this is so preposterous, that I am astonished to see it permitted by men of un-  
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derstanding;



derstanding. Hollows should undoubtedly be filled up at all seasons ; but I must contend for it, that hollows should never be permitted in a *well attended* road, but instantly filled, if only requiring a shovel-full ; not indeed in the usual mode, by tumbling in a cart-load of large stones ; every carriage avoids them, and the road is worn unequally. If more attention was paid to what is passing *below the surface* of roads, much money would be saved ; for I imagine it must strike any person of common understanding, that tumbling round stones into a hole of water, or liquid mud, only hides the defect, but does not cure it. In some other parts of this county I have observed roads covered a foot deep *at once* with wet strand mud, and large round stones mixed ; such a body of so soft a material, laid on *at once*, is after the first rains converted into puddle, and scraped off, and thrown into heaps ; then a fresh supply of the same mud is laid on, and the same process continued. Other parts of this road are covered (I cannot say mended) with limestone *rocks*, without any covering of gravel, which, until the asperities are worn off, is a most dangerous nuisance. How very easy would it be to make this a fine road, by breaking the limestone small, and covering it with only two inches of gravel, or even the strand mud would answer for this purpose.

Great attention is paid by spirited individuals to roads ; I am convinced they only want a hint of the proper mode. Some parts of all the roads I have ventured

tured to condemn are, I allow, made with gravel of the right kind; but I hope I will not be accused of ill-nature, if I suspect it has been accidentally, as the person, who loaded it, happened to come to a good vein of gravel; if it had been intentional, why not make the whole road in the same manner? A remarkable instance of all the errors I have hinted at may be seen at the Green-hills, in the road to Tallagh, which *runs through gravel-pits.*

Nothing ruins roads so much as permitting mud to accumulate on the surface; on many roads it is upwards of six inches deep; no road, let it be ever so well constructed or made, can stand this great neglect. Men should be constantly employed by the trustees to scrape the roads, and it ought to be drawn away *immediately*, not permitted, as we frequently see, to lie for months a dangerous nuisance. If it was drawn to proper depots, and sold once a year by auction, I am well convinced it would pay all expences; whilst the cleaning of our roads is left to the caprice of individuals, we never can expect they will be properly attended to. Every exertion should be made to keep the road dry; this is a fundamental rule never to be departed from, unless they can be occasionally washed, as practised in some parts of England with the best effects.

It has often surprised me, that the managers of roads do not endeavour to save the great expence of picking  
roads



roads by men. From the result of an experiment I tried at Sir Thomas Lighton's, I do not entertain a doubt, that every road in Ireland could be *ploughed, harrowed, and rolled*, as easily as a garden walk; it is only proportioning the power to the resistance. When I was engaged at Merville Lodge, amongst other improvements, I changed the line of approach; during an absence occasioned by an accident, I found the men had given it a most extraordinary rise in the middle (I suppose to make it *strong*), where it was near eighteen inches deep, of very large and very hard gravel; it had been used for some time by very heavy carriages, and was extremely firm, insomuch that labourers with pickaxes performed very little work in a day; I suggested the practicability of ploughing it, and as Sir Thomas is ever ready to try experiments with great spirit, he agreed; it was accomplished in a very short time by a common plough (although a most wretched instrument for the purpose) and four weak mules, with the assistance of a man to hold down the beam of the plough; this is the strongest proof that can be adduced of its practicability, for if it had been tried with four steady bullocks, and a suitable plough, it could have been accomplished with the greatest ease; for the mules were so very unsteady, that frequently, when the plough met with any resistance, two of the mules would give back, and two plunge forward, a circumstance well known to those, who use unsteady horses; but

but trained bullocks stick to the draft without giving back : after being ploughed it was harrowed, the large stones picked off, levelled, and well rolled by a heavy metal roller. I am convinced nothing would contribute more to the goodness of our roads, than frequent rolling with a *very heavy roller*.

As there are many different opinions on the proper shape and mode of making roads, I beg leave to suggest, that an experiment to ascertain this is greatly wanting, which can only be done by making a few perches in every different form, and with different materials ; for this purpose I imagine about an hundred perches of road would be sufficient, and a road much frequented would certainly be the most eligible ; no road would answer this purpose better than the Black-rock road in every point of view : the materials are convenient ; it is very much used ; and almost every country gentleman, when he visits the city, takes a ride on this road, and, on his return to the country, can report the effects of the experiment to his neighbours at the assizes.

I will with great satisfaction conduct the experiment, if applied to by the Board of Works, Dublin Society, Farming Society of Ireland, or Trustees of Roads, who may have the *spirit* to accept the offer, *without any emolument whatever* ; and I hope by this means to be able to make a report, that can be referred to at any future period.

I understand



I understand Ross Mahon, Esq. has made an admirable road in the county of Roscommon, and also Mr. Rawson, near Athy, in the county of Kildare; as we may hope to have the process detailed in the Statistical Surveys of these counties, I barely mention them, that they may not be overlooked.

A road continued along the Liffey from Usher's-issland, through the Hospital-fields, and under Inchicore to Chapelizod, would be exceedingly convenient, as it is perfectly level the whole way.

Knockmaroon-hill, near Chapelizod, has been long complained of for its difficult ascent; I am convinced, from a view of the ground lately, that this could be easily prevented, by carrying the road through Mr. Nixon's ground along the river, and round the hill opposite Mr. Chambers's house. As this road is much frequented by gentlemen of fortune, I am surprised some attempt has not been made; indeed the whole of the low road from Chapelizod to Lucan wants alteration, widening, draining, and inclosing very much. The Man of War hill might receive the same improvement; also the road to Dundrum should be brought from the bridge near Tawney church along the hill belonging to Mr. Sherlock, until it meets its level on the hill of Dundrum. A road is much wanting from the Black-rock road to Donnybrook road near Merrion; this could be easily brought through Mrs. Nowlan's ground almost opposite Priest-house, where a communication

nication between the two roads would be a very great convenience, as in floods there is no communication nearer than Booterstown.

There is also a road greatly wanting from Rathgar road, to communicate with the new road through the commons of Crumlin, which runs near Mr. Grange's mills; a lane to the north of Mr. Shaw's demesne points out the direction it should take; this would give a ready communication with the great Naas road.

The present approach from the Circular road to Sarah-bridge is a very ill conducted one; if the hill opposite the Royal Hospital gate was lowered, and filled into the hollow opposite the artillery barrack, and into another hollow nearer to the bridge, it would not only ease the ascent, but in some measure amend the mistake the architect made in the level of the bridge; it would give an elevation to Kilmainham gaol, and prevent the accumulation of mud opposite the artillery barrack; if more earth is necessary, it can be had in plenty opposite the gaol, where it is at present worse than useless. A remarkable instance of neglect occurs daily on this road; a stream of water issues from St. John's-well, which, instead of being directed into the opposite ditch, is permitted to follow the direction of the wheels down the declivity, and keeps the road constantly in puddle; a man in *five minutes* would clear the passage. Another very great and dangerous neglect is, permitting the sinks opposite the barrack to re-



main uncovered. All these things tend to convince me of the necessity of establishing a *Board of Roads*.

If a road, continued from the road between Marly and the Little Dargle, was carried nearly *on a level*, until it met the Scalp road, it would be highly useful and ornamental, as it would shorten the road at least three miles, and afford one of the most charming rides in the county. Another very useful, and still more beautiful road, might be made considerably higher up the side of the mountains of Dublin, which, if carried *nearly on a level*, would intersect all the passes into these mountains from beyond Saggard to the Scalp, and form a communication greatly wanting; it would also connect these roads more intimately with the great military road now making in the county of Wicklow; it would be a very great means of improving these dreary wastes, for it would give an opportunity of seeing many situations highly improveable, that are at present only known to a few sportsmen, who go there to shoot; I am convinced, if this road was accomplished, citizens would be so struck with the charming prospect from it, that we should shortly see villas rise up in every direction, as the improvement of waste land is not of that difficult nature, that was formerly imagined. The three most material improvers of mountain, marle, limestone-gravel, and irrigation, are, as stated in the county of Wicklow and county of Dublin Statistical Surveys, to be had almost every where in these mountains.

Watering-

Watering-places on roads, for horses and cattle, are very necessary; for want of these horses are frequently watered near the city in dirty pools: there is no road where they might not be very easily constructed; there could be one erected on Donnybrook road, almost opposite Platanus, where a constant stream runs; another could be erected on the Rock road, near Merrion; another could be amply supplied from St. John's-well, near Sarah-bridge; in short there is no road, that would not afford many such situations. For this purpose stone-troughs, raised three feet from the ground, should be erected, by which means the water would be always pure, and carriage-horses could be watered without letting down the bearing-rein; the overflow might be caught in a receptacle of a *foot deep only*, which would answer for washing or cooling the feet of horses or cattle.

Crossing-places to the footpaths of roads are in general most shamefully neglected; a person has frequently to wade ankle deep for some distance through mud and water, as has been the case all through this winter, from Leeson-street to the late Judge Hellen's gate, on Donnybrook road; if a temporary paling had been erected, the scrapings of the road would have helped to make a path; and there is opposite to this, a large quantity to spare of hard stuff, that, with a covering of gravel, would have made a path; if the road had *even been scraped in time*, it would have been some alleviation, but



but no sort of notice seemed to be taken of it. Opposite to Lord Charlemont's demesne on the North Strand, another pregnant proof may be seen of this neglect; in fact it may be seen on *every road* in the county of Dublin.

Though not exactly under its proper head, I must express my surprize, that the stinking swamp between Gloucester-street and Aldborough-house has been so long permitted to annoy the neighbourhood of Summer-hill and the adjoining streets; in warm weather it is sufficient to breed a pestilence, and, if neglected, must annually encrease in its baneful effects. I have frequently viewed the ground, and do inform the inhabitants, that the nuisance could be removed and prevented for a very moderate sum of money.

#### SECT. 8. *State of Navigations and Navigable Rivers.*

As government have at length embraced the idea of inland navigation on an extensive scale, we may expect it will be executed with rapidity, and without partiality to the proprietors of land. I am convinced, when the value of irrigation is better known, the *annual rent* of water for this purpose will not be one of the least profitable branches of revenue; if the supply could be en-  
creased

creased (and doubtless it may), I should not be in the least surprised, if it exceeded the receipts for the tonnage of goods. When canal companies are prepared for this business, I will be able to lay before them a plan for encreasing their revenues very materially, with even their present supply of water; I presume I need scarcely advise them to be very cautious, how they part with water for mills or machinery of any kind.

Very small canals, branching out in every direction, as strongly recommended by Dr. Anderson in his Aberdeen Report, would be of infinite use, both for the transport of goods and for irrigation; the expence would be very trifling, as they could be considered merely as a large ditch.

I conceive a canal from Mallahide, carried under Liffenhall-bridge, and into the interior of the country, could be easily effected; if the transport of coals only could be accomplished, it would be highly advantageous; but another very material object is connected with it, the improvement of upwards of 1,500 acres of ground, chiefly the estate of Mr. Talbot; this could be executed with great ease, and at a comparatively small expence; from the nature of the strand, I am certain that, with the assistance of irrigation (which could be easily practised), the greater part of it might be made worth at least 4*l.* per acre, as it could be mostly converted into meadow ground.

A canal



A canal from Dalkey to the Grand canal docks, and another from Sutton,\* have been for some time spoken of as likely, at no very remote period, to be carried into execution; of their usefulness there can be probably but little difference of opinion; and, from the reports of very able engineers, we have every assurance of their practicability; every storm adds but too many melancholy testimonies of their necessity; although the sums necessary for this stupendous work must necessarily be large, yet surely it ought not to weigh a moment with a great commercial nation; they will be highly useful in bringing labour to a level, which the war has so long diverted out of its channel, and which, without something of this extensive nature to settle it, might subject us to all the evils attendant upon idleness.

If canal companies laid out a large piece of rich ground, for the purpose of training elm-trees to plant on their banks, they would find it very advantageous, as, with proper management, they would always have a sufficient quantity of their own; and by giving them room, they would be able to stand such exposed situations. The great value of the elm-trees now growing on the Grand canal near Dublin, ought to stimulate them to make some exertions for this purpose; had this

\* The idea of a canal from Sutton, or cutting through the isthmus at Howth, is not a new one; it was agitated upwards of sixty years ago.

this been pursued with spirit as fast as the banks were raised, what an *immense* property would have accumulated by this time?

SECT. 13. *State of Farming Societies.*

FARMING SOCIETY OF IRELAND.

NOTHING can more strongly mark the high opinion, that is generally entertained of this Society, than the daily accession of new members. The following regulation, proposed by their secretary, Mr. Hamilton, is likely to advance the knowledge of agriculture throughout Ireland, more than any other that could be devised. Mr. Hamilton attends every day from twelve to three o'clock, at the Society's rooms, No. 34, New Sackville-street, to give every information on agricultural subjects, to even the most ignorant farmer, and to receive and circulate the experiments and information communicated by agriculturists from every part of Ireland. As a strong proof that prejudices are greatly weakened, and that farmers view this regulation in the light intended by the Society, numberless applications are daily, nay hourly made for information; and it must be highly gratifying to the members, and to the community at large, to be assured that, amongst the subjects,

for



for which information is required, the most conspicuous are, a course of crops for recovering the fertility of land exhausted by too severe cropping; the most economical use of green winter and spring food; soiling in the house winter and summer; and irrigation.

Although the exertions of intelligent and spirited individuals of this Society, to improve the live stock of this country, have been crowned with every success they could wish, yet they have not always been rewarded with the praise they certainly merit; for the breeds they have selected, with so much expence and trouble, have been by ill-nature and prejudice called the *fashion of the day*; if it is a fashion, none, I presume, has so beneficial a tendency; but that there is something more than fashion in it, it is only necessary to observe that, of all the cattle and sheep that have received premiums, there has been scarcely one, but what have derived their perfections from the improved breeds; and as a still stronger proof, not only gentlemen, but professional graziers are emulous of crossing *their* best breeds with the new improved ones. On that question, which has been so often agitated, “Which is the long-horned new Leicester, or improved short-horned Tees-water cattle, the best breed?” it would be very great presumption in me to offer any thing, as it is a subject, which has divided the opinion of the most intelligent graziers of the united kingdom; but if I may venture to hint a wish, it is, to see the *improvement* of our native Kerry breed pursued  
by

by some *unprejudiced* spirited breeder; possibly by judicious crossing, or, more probably, by *selection*, a very valuable breed for some situations and purposes might be obtained.

The very spirited comparison made by Sir William Gleadowe Newcomen, in importing the most select heifers of the two most esteemed breeds in England, does him infinite honour, and must in a few years throw great light on a subject, which is not so clearly ascertained as the advocates for each breed would seem to think.

The establishment of farming societies in many parts of Ireland proves at once the high opinion, that is generally entertained of the great usefulness of this Society, and gives us every reason to expect, that the spirit of agricultural improvement, so completely roused, will ere long prompt us to take every advantage of the bounties of nature, for which our country is so remarkable.

This Society, in aid of the exertions of other societies, grants 10*l.* to those, whose subscriptions amount to 100*l.* and upwards; but an encrease of parliamentary aid will enable them to extend this to other not less useful societies, for I entertain a hope of seeing farming societies in every parish; and, as a consequence of this, I also entertain a strong presentiment that, at no very distant period, fallowing will give place to green crops; and, as a natural consequence, feeding



in the house the year through will follow, which, from every information I have been able to procure, no person ever abandoned that once practised it.

With great pleasure I seize this opportunity of congratulating the Castleknock Farming Society on the result of their ploughing match in June 1802. I was well satisfied, that ploughs with only two horses, without a driver, only wanted a fair trial to convince every unprejudiced person of their superiority; the very great neatness of the manner, in which the two-horse ploughs of Mr. Garnett and Mr. Roarke finished their work, seemed to strike every farmer present; I was highly gratified to find much of former prejudices wearing away fast. It is most earnestly hoped, that Mr. Troy, and the other gentlemen of the neighbourhood, will seriously reflect on the heavy loss they must sustain by their system of fallowing, and great waste of labour; for surely a moment's reflection must convince them there must be *something wrong* in that mode of tilling ground, that permits thistles and other weeds *two feet high* to grow, where vetches or other green crops would better answer *every purpose*; and that the form of the plough, that requires four or six horses or oxen to draw it, must be imperfect either in its form, or mode of setting; for though it was evident, that Mr. Garnett's two horses were less distressed than Mr. Doyle's four bullocks, yet the difference in the depth was by no means sufficient to account for it.

SECT. 16. *Plantations and Planting.*

THE list of registered trees given in the Survey does but little credit to the skill of the planters; it will be found on inspection that, of upwards of 70,000 trees, 3,904 larch *only* have been planted; whilst 4,495 mountain ash are registered, one gentleman alone has planted 300 larch, and 1,800 mountain ash! This surely needs no comment from me. Great numbers of the trees generally planted in this county are the very refuse of nurseries, or picked up *as bargains* from hawkers or jobbing gardeners; but as we may expect from this, and from unskilful planting and bad management, that very few of these trees will ever arrive to the state of timber, they are scarcely worth noticing, except to put those, who wish to be informed, on their guard.

I imagine, if a clause to limit the age was inserted in the act for registering trees, it would have a very beneficial tendency, and help to prevent the numberless miserable plantations, that citizens, unacquainted with such affairs, are *prompted* by interested people to make.

Nothing has injured the plantations of this country more than the universal neglect of timely thinning; and I conceive that, if a premium, tending to effect this purpose, was offered by the Dublin Society, it would be of infinite use; for if it had even no other effect, it



would point the attention to this most necessary and neglected operation. The Society should at the same time, by limiting the distance, at which the trees should stand at each cutting, prevent the mischief, that would attend a too sudden exposure, as I have observed before in section 2. This is an operation, that requires more taste and judgment than may perhaps be generally imagined, and by no means to be entrusted to the generality of planters; as cutting down trees for timber, and thinning plantations for ornament, require very different abilities. I cannot too severely reprobate the common mode of a *total extirpation* of wood, that very generally prevails through Ireland; if, on the contrary, a tasteful selection was made, the receipts would be little diminished, and the appearance of woodiness still preserved.

If larch-trees of three or four years old were planted thick, suppose one foot asunder, I imagine they would be found one of the most useful trees we possess for hoops, as they possess a durability, when cut at an early age, superior to most trees; at this distance they rush up with great rapidity, and would be nearly of the same dimensions their whole length; as the roots always take an horizontal direction near the surface, they are with the greatest use stubbed up, which in a thick plantation is of great consequence: if, when they are fit for small hoops, they are judiciously thinned, a sufficient quantity may be left to grow for hop-poles,

or

or for many domestic purposes, for which they are peculiarly fit; and when *these* are cut down, a sufficient quantity may be left for timber. There is one advantage attending these trees, that grass growing under them seems to be of a more *kind* nature than that, which grows under the drip of any other tree. I beg to refer my readers to Doctor Anderson's Essays for a fuller account of this most useful and truly elegant tree, than is consistent with the nature of this work; there is one proof of its great durability, which I do not recollect to have seen in his essays; the ancient Romans called it "*immortale lignum.*"

SECT. 18. *State of Nurseries within the County, and  
Extent of Sales.*

THE sales, until lately, were very trifling; but now that gentlemen are making up for their lost time, the nurseries are again stocking with young trees. Mr. Simpson's nursery at Inchicore is now trenching, and completely stocking with seedling trees of all sorts; from its elevated situation, there is every reason to conclude, that trees removed from it will succeed in exposed situations, where those from close nurseries must generally perish, or at least merely exist. As Mr. Simpson, assisted by his younger son, has given up the whole of his attention to the nursery business, there  
can



can be little doubt it will be carried on with spirit ; and that the same candour, which has always so strongly marked their dealings, will still continue to be exerted.

SECT. 20. *Quantity of Bog and Waste Ground.*

WE must add to the quantity of waste ground, mentioned by Mr. Archer, all that extensive strand, belonging to Lord Fitzwilliam and others, between the Light-house and the Black-rock on the south side ; and another extensive strand, partly the estate of Mr. Vernon, between the Light-house and Clontarf on the north side. These wastes are all reclaimable ; we may see, by what has been done on the North strand, of what they are capable, although the lots have by no means received the improvement they might have done, if in the hands of a man of spirit. That part of this strand, near Ballybough-bridge, purchased some time ago by the late Marcus Beresford, Esq. might have been long since under meadow, but for the very erroneous method of laying the floor of the arch of Annesley-bridge, which has been made so much higher than it need be, or than the level of the strand at low-water, that it is kept constantly filled with water ; had that gentleman lived, doubtless he would not have permitted his property to be thus injured.

It must be the sincere wish of every person, that an act of the Imperial parliament will be obtained to reclaim our commons from the state of worse than waste; for, as Mr. Archer very justly says, they are not only receptacles for poverty and idleness, but when any thing is pilfered from the neighbouring farmers, it is always traced to the next commons. But it must be hoped also, that a comprehensive act will prevent the expensive and vexatious necessity of separate acts for every little patch of common. If these commons were reclaimed (which they might easily be), and, after compensation made to those who are interested in them, the surplus was devoted to the establishment of one or more experimental farms, or for premiums to improve agriculture, or any other purpose thought necessary; it would be a new and glorious æra in agriculture, that would at once be highly beneficial to the community in general, and even to the wretched beings, who subsist by plundering their neighbours; I am convinced there is not a farmer in the vicinity of commons, that would not wish to see them reclaimed, as, in their present state, exclusive of the numberless thefts committed on them, they serve only to rot his sheep, or starve his young cattle.



SECT. 21. *Possibility and means of improving them.*

It is a melancholy reflection that, in the neighbourhood of an opulent city, not less than 34,000 acres of land remains an almost barren waste, and yet only a very small portion of this is beyond the reach of improvement; for we are given to understand, that marle or limestone-gravel are to be found in abundance in almost every direction; but the manure of all others, that presents itself in every direction, is *water*, which, if made to flow over the surface, would, in a very short time, at a very moderate expence, change the appearance of these dreary wastes to a charming verdure, and give abundant meadows where they now, as Counsellor Caldbeck very justly remarks, “only serve to starve a few young cattle and goats.”

Planting is the next improvement, that requires attention. There is scarcely any part of these mountains, that could not be planted with great profit: the heath forms one of the greatest advantages attending this situation, as it affords a shelter greatly wanting in these elevated situations. I mention this, because heath, as well as furze and other underwood, are too often cut down, previous to planting, by injudicious planters.

Scarcely any thing could contribute more to the improvement of these mountains than good roads; I am  
perfectly

perfectly convinced that, if this was effected, improvement would make rapid advances. In the section on roads I have enlarged on this subject, as indeed a most necessary one.

Burning the surface, if covered with heath, and other useless and strong growing plants, is a very necessary preparatory operation before the introduction of the plough; but I must caution improvers against ploughing deep for this purpose in *shallow moors*, as it is only necessary to get rid of plants, that would prevent cohesion in this moory soil, and that, from their astringent property, would with great difficulty be made to rot. If land of this description is set in small tenements, it will be necessary to prevent burning, unless for this purpose; and also to confine the tenants, *for their own sakes*, to alternate green and corn crops. Indeed I conceive, that potatoes and green crops would be the most advantageous on these mountains, until alternate exposure to the atmosphere, and the *shade* caused by green crops, brings the soil to the state necessary for the production of corn crops. The cultivation of potatoes, cabbages, turnips, borecole, &c. for cattle, would be uncommonly advantageous to the cultivators, as they possess at all times a ready means of disposing of any redundancy, on good terms, in Dublin market.

It is almost needless to observe, that draining must precede all other improvements. The considerable declivities of these mountains, and great abundance of



stones almost every where to be met with, renders this a very easy operation; but much of this expence may be saved, by boring with an augre to let up the springs, or, in some few cases, to let them down, according to the nature of the different strata.\* Many extensive tracts of these mountains may be drained effectually in this manner, at a very trifling expence; but, to prevent disappointment, it may be necessary to premise, that in many cases boring will be of no use; I mention this, because I am aware, that many imagine the augre is possessed of almost the power of Moses's rod.

The immense quantity of bog, that is annually wasted for unnecessary purposes, requires more attention than has been generally paid to it. I have mentioned this to several proprietors, but have either been laughed at, or answered very frequently, "there is more than will last an hundred years;" to an individual this is a long period; but to a nation, that has every reason to look forward to an encrease of population, or to a man, who regards his posterity, a very short one: but there are many bogs that, at the present rate of consumption, without

\* In viewing Collon about four years ago, I observed a very disagreeable swamp near the entrance, which had been attempted to be drained in a very injudicious and expensive manner. I desired the person, who shewed me the improvements (Mr. Patterson), to inform Mr. Foster, that I imagined *one drain* and a few augre-holes would effectually drain it, and I pointed out to him the direction of the drain; but I understand it has remained since in the same state, for the exercise of Mr. Elkington's abilities, who, I am informed, is engaged for this purpose.

without adverting to an encreased population, will not last perhaps fifty years, or the distance will become so great, as to raise the price very considerably. I am far from wishing to deprive the poor of one of the greatest comforts of life; but the enormous waste they and their children commit calls loudly for a timely attention.

SECT. 22. *Obstacles to them, and the best means of removing them.*

THE obstacles mentioned by Mr. Archer would no longer exist, if the cultivation of green winter food became general. We seldom hear of potatoes having been stolen, for they are no rarity; if every landholder bestowed a very small quantity of seeds, or a few thousands of plants, in small quantities, to their poorer neighbours, it would not only save their fields from pilfering, but they would have the satisfaction of contributing to the comforts of the poor, who would in a short time become so attached to the cultivation of these plants, that, for their own sakes, they would keep off all marauders, and it would also take away all pretext for pilfering: an ounce of cabbage-seed, value sixpence, will produce upwards of a thousand plants, and other seeds are proportionably cheaper. If a few trees were planted around every cottage, and strict charge given for their preservation at setting the tenement, the com-  
plaints



plaint on this head would no longer have any foundation; and, except during the late disturbed state of the country, I cannot hear of any complaints worth noticing. I am well convinced, that a few young trees, cut down by unthinking boys, have in many instances been magnified into *plantations destroyed*, and a dozen or two of turnips have been also magnified into *whole fields carried away*, and by no means call for those sanguinary laws, that have been too often proposed.

Much expectation has been formed, that Luke White, Esq. will set an example on an estate he has lately purchased in these mountains; I understand the situation is peculiarly favourable for the improvements I have before suggested. When we add to this gentleman's opulence, the great taste and spirit he has evinced at Luttrell's-town (now Woodlands), we have every reason to expect he will exert them on the improvement of this estate; and, at the same time that he is encreasing his income, he will have the exquisite pleasure he must have often enjoyed, of contributing in the best manner to the support of the numerous poor—*by giving them employment.*

Great part of the Hill of Howth comes under the description of these mountains in every respect; the same course of improvement, with the addition of sea-sand and sea-wrack, would soon make a great change in its appearance, as I understand it possesses every means of improvement enjoyed by the others. It is  
hoped

hoped the present Earl of Howth will take advantage of the new lights, which science has thrown on agricultural subjects; it will at once contribute to the encrease of his income, and to the amelioration of the condition of his tenantry.

It must be exceedingly gratifying to every lover of his country to be informed, that at length the great value of our bogs and other waste lands is beginning to be known; I understand some companies for their improvement have been lately proposed; and there cannot remain the shadow of a doubt that, if they are conducted with spirit and judgment, they must return a very ample interest for any sum, however extensive, much greater than can be obtained by any other mode of *honest* speculation; but I must confess, from what I fell from a gentleman very active in this business, I entertain very great doubts that *spirit* will be wanting; for, on his stating some of the probable expences, he mentioned the *enormous* sum of *fifty pounds a year*, to be given to a person capable of conducting a business of this magnitude. If this idea actuates Waste-land companies, I venture to predict they will experience nothing but disappointment and loss, and had better turn their money to some other purpose; an undertaking of this extensive nature requires a knowledge very superior to that requisite to *keep labourers accounts*.

When the immense quantity of improveable ground in Ireland is adverted to, it will be thought astonishing, that



that any proprietor, with a guinea in his pocket, could keep it unemployed; yet there are numbers of men, possessing large sums of money, for which they do not receive more than 5 per cent. interest, very often much less, that have *many thousand acres* of land of this description, which, I will venture to assert, would return from 10 to 50 per cent. per annum; but monied men are too apt to encrease their acres, instead of improving what they already possess. It may be necessary to observe, that money for improving lands of this nature *is not sunk*, for the first crop very frequently pays more than *all the expences*.

I have been informed by a respectable farmer, that he has received upwards of thirty guineas for the produce of an acre of moory ground, which cost him only about fifty shillings to reclaim.

SECT. 27. *Whether the County has been actually surveyed, &c.*

It is not a little extraordinary, that no map of the county has been published for many years (I believe none since that published by Rocque in 1762); but we may expect shortly to see this very desirable object accomplished, as the Grand jury have taken up the business; it is to be wished, that it may be on a scale sufficiently large to mark gentlemens' seats, and  
even

even every farm if possible, and all the bye-roads, as it would be a means of suggesting many communications and improvements, that are greatly wanting. If Messrs. Sherrard and Brassington could be prevailed on to undertake it, we should have every reason to expect these hints would be observed, as their maps possess uncommon accuracy, and elegance of execution. If sections of the ground, and the levels, are added to this map, they would make it still more extensively useful.\*

SECT. 29. *The Weight or Measure, by which Grain, Flour, Potatoes, &c. are sold.*

The Board of Agriculture in England have long wished to equalize the weights and measures through the united kingdom, but as yet the Herculean labour has not been accomplished; it is not so easy a matter, as speculative men in their studies may think, to change old customs, as we have not only to learn a new lesson, but, what is much more difficult, we have to forget the old; if this could be accomplished, it would be extremely desirable, as scarcely any two counties use the same

\* Since I wrote the above, I understand Mr. Sherrard has sent proposals to the Grand jury; also Mr. James Lynch, professor of natural and experimental philosophy to the Dublin Society, proposes to undertake it; his professional acquirements are long well known; and his lectures prove most unequivocally, that there could scarcely be found a person more capable of accomplishing it with accuracy.



same weights and measures. How ridiculous is it that, in our own market, rough tallow is sold at 15lb. to the stone, and wool 16lb. to the stone, and seven stone to the hundred; and, in many parts of Ireland, the barrel of potatoes is from 20 to upwards of 120 stone; without adverting very particularly to these differences, the Statistical Surveys will not convey that information, that the Dublin Society and the public so much wish for. If the legislature would take up the business with spirit, and give, suppose a year's notice, that, on a certain day, the weights and measures would be of a certain standard, and these standards previously dispersed through every part of the united kingdom, every description of people would have time to be prepared for this adoption; and a little perseverance, and a forfeiture of the old measures after that day, would, in all probability, accomplish this long wished for measure.

#### IRRIGATION.

THIS improvement having at length received some attention from the landed proprietors of Ireland (but by no means what it deserves), a few hints in aid of it will not, it is hoped, be deemed unseasonable or unuseful. I did intend to have brought into one view all the passages in different authors illustrative of this subject, but it would not only extend this article beyond the

the necessary limits, but I find it much more ably executed by Mr. Tatham, in his Treatise on National Irrigation, lately published, and sold by Mr. Archer in Dame-street, which I cannot too warmly recommend to the perusal of every landholder.

With some few exceptions, irrigation in Ireland is of very recent date; for the random efforts of ingenious and spirited individuals, conducted by handy labourers, can by no means be considered as *perfect irrigation*. Frequently we see ground partially watered, by letting in the stream at the highest part of the ground, and permitting it to run uncontrouled down the declivity; \* consequently, as no ground is an exact inclined plane, the water runs naturally into the hollows, and, if it cannot escape, does much injury, besides leaving every little eminence untouched by it. In ground, that has been watered in this defective manner, the brown colour of the grass in spots easily shews it, whilst the hollows are the most perfect green (if the water is not stagnant) all through the winter.

Many are possessed with an idea, that ground for this purpose must be perfectly flat, and that *all hollows* must be filled up; this is by no means necessary in ground, that has a considerable inclination, as *hollows only, that retain water like a dish*, need be filled up. One

of

\* Some gentlemen know so little of the subject, as to call this "watering," and say it can be executed for a few shillings per acre!



of the bad effects, attending this indiscriminate leveling, would be, the laying bare, frequently, banks of very bad clay, gravel, or perhaps rocks. Where hollows must be filled, the fods and earth from the levels and other parts of the work are very often more than sufficient.

Raising a bank of earth for conducting the water, instead of cutting *into the fod*, is another very usual and erroneous method; by this means not only the level is lost, and not near the quantity of ground watered that might have been, but the water is thrown back on the higher part of the ground, and much grass destroyed, by the water remaining on it too long; it also occasions a great waste of ground, which the scythe cannot touch. I have seen this last method practised at his Grace the Duke of Leinster's at Carton, whose demesne possesses great capability for irrigation; for independent of the supply from the canal (which is not conducted over the twentieth part of the ground it might), I believe, from a transient view, a level might be taken from the Rye river, which would water a good portion of the demesne; for it possibly may be in this, as in almost every place I have viewed; much more ground may be watered than the eye can direct.

I have seen many attempts at watering, by *lines* drawn diagonally across the declivity; except the supply, no other part can be cut by a line, as the water is the only level, that

that can be relied on; and when I see different kinds of levels recommended by authors for this purpose, I must conclude they know little of *catch-work watering*, which is the kind I here allude to. I have seen some of this kind of watering near Rathcool, in the county of Dublin; it must have been badly conducted, or little understood, as the surface of the ground, when I saw it in December, instead of being a fine green colour, was quite brown; I imagine from this, and from some conversation with a neighbouring farmer, it could be only considered as the old practice of flooding, that is, permitting the water to stagnate long enough on the land to deposit its sediment.

However, all these defective methods still prove the great benefit of irrigation, as they have all effected a great improvement, but *infinitely short* of that to be obtained by a more scientific mode.

It is presumed there are few countries in the world better adapted to irrigation than Ireland; for, let us turn our eyes where we will, rills of water are seen running down every hill; *there is scarcely a gentleman's demesne in Ireland, that cannot in the whole or in part be watered*; and there are few farms in the vicinity of the metropolis, to which the proprietors are daily drawing dung at the expence of at least twenty guineas an acre, that have not a sufficiency of water for doing the whole, or at least a part; there does not remain a doubt, that ground under this improvement *is in every respect*



*superior in produce*, and can be generally made so at a fourth part of the expence, and kept in this productive state *for ever*, for a few shillings per acre per annum.

Most of the writers on this subject have given directions for watering grass-lands only; but it will be found that, when the practice and inestimable value of this species of improvement is better known, every kind of crop, both in fields, gardens, orchards, &c. will, if possible, receive more benefit than grass-land.

Amongst the many advantages attending this process, it is not one of the least, that no manure of any kind is wanting, which leaves the dunghill for manuring ground, that cannot be watered, and which, most probably but for this, would never have received any.

I have heard many exclaim against the expence, and some, who are daily drawing manure from Dublin, at an expence of at least twenty guineas an acre, are of this number. Now let me ask any of these *cautious* gentlemen, would they not jump at an offer to manure their ground highly for *five guineas an acre*, and keep it so, or rather improve it annually for a few shillings an acre? yet this is really the fact; for I have seen very few situations, that I would not undertake to irrigate in the most perfect manner for this sum, finding every material, and in many places for much less. As the strongest proof, that I would do it on these terms, I offered to irrigate as much of Marly as could be accomplished (indeed nearly the whole demesne could be done),

done), for five guineas an acre, besides thinning the plantations, or otherwise improving or ornamenting the demesne, without any *additional* charge.

Flooding land, by permitting the water to stagnate and deposit its sediment, has been long practised, and, where the water can be brought under any controul, effects a great improvement; yet the value and management is very inferior to irrigation, where the water can be brought quickly on and off at pleasure.

Mr. Young, in his most useful *Annals of Agriculture*, Vol. 20, page 360, in very strong language endeavours to turn the minds of Irish landholders to irrigation; yet such was the ignorance or carelessness of those, to whom it was addressed, that scarcely any notice has been taken of it, although many years have elapsed, since it was first published. One would have naturally expected that, when Mr. Young had so very plainly pointed out the very great advantages and easiness of the practice, it would have circulated like wildfire; and that every *landlord*, with his paper in his hand, would have been constantly amongst his tenantry, pointing out the proper situations, and endeavouring to teach them the best method; but so far from this being the case, they did not make any attempt, even on their own demesnes. Where Mr. Young's voice failed, I have little hopes my feeble one will be heard.

I have frequently, with the greatest regret, observed the finest situations for this improvement totally neglected;



glected; situations that, in their present wretched state, are not worth sixpence per acre, yet might at a very moderate expence be raised to the yearly value of from *two to five pounds* an acre. Possibly it may astonish those, who have not turned their thoughts to this subject, to be informed that I consider the Fews mountains, between Dundalk and Armagh, and the mountains near Dungiven, in the county of Derry, to be of this description; yet there does not remain a doubt on my mind, that the greater part could be made as productive as the above statement at a moderate expence. Mr. Frazer, in his very admirable Statistical Survey of the County of Wicklow, supports my assertion very strongly, by pointing out the capability of ground, at least to appearance equally unpromising as the mountains, which I have selected for this purpose, because they are usually mentioned as *totally irreclaimable*, and condemned to remain for ever a *dreary waste*.

To the account of the irrigation I conducted for the Right Hon. David Latouche at Marly (page 270, of the Statistical Survey), it may be necessary to add, that part of the expence stated by Mr. Archer (about five guineas an acre), for making the watered meadows, was caused by the necessity of filling up the cuts, that had been formerly made in the most unscientific manner; and also, that the expence was greatly encreased by being obliged to bring the water a considerable distance through Captain Southwell's demesne; for this  
reason

reason it was necessary to use a *stone and brick shore, covered with mountain flags*; if this could have been carried in the usual manner, in an open drain, a much less sum would have been necessary; and as I made no additional charge for thinning the plantations, it made the acreable expence still less, as certainly something should be deducted on that account. Mr. Archer might have extended the quantity of ground capable of this improvement; for I imagine upwards of 150 to 200 acres could be covered, as water from other sources might be obtained; even the water at present used could be extended to nearly the quantity I have mentioned; in short this demesne possesses more capability for this improvement, than any other of the same extent in this county; and as the grounds capable of being watered lie mostly in view of the mansion-house, they will be at all seasons, from their fine green colour, a most charming object, and infinitely the most profitable part of the demesne of Marly, as the first expence is the only one, and, contrary to all other manures, time, instead of diminishing, will encrease their value.

#### HORTICULTURE.

MR. Grierson has great merit in his attempt to introduce the plough into the garden, instead of the spade. Contrary to the general opinion, I agree with

Mr.



Mr. Archer, that the ploughing more effectually and easily subverts and pulverises the soil, than the usual mode of digging. If ground is dug by the perch, the labourers turn it up in large lumps, and will not stop to break it properly, by which means, when it is planted, it sinks unequally, and the roots of trees or plants are injured by the admission of drying winds, frost, &c.; if they dig it by the day, it is probable they will not do half as much as they ought. It is not easy to account for the neglect of this method by kitchen-gardeners; they always complain, and justly, of the great expence of labour; and as few are without horses for the purpose of drawing the produce of their gardens to market, or bringing home dung, they could very easily accomplish it, particularly as their ground, from large quantities of manure, and frequent cultivation, is always in so friable a state, that two horses, and often one, would be fully sufficient; and by sowing and landing with the plough, their advantages would be still encreased.

I am well convinced, that if a person or company, with a good capital and competent skill, would take a large farm on the banks of either of the canals, and practise the above method with spirit, and on an *extensive scale*, a very handsome fortune might be made, as to the usual routine of the kitchen-garden might be added the sowing of feeds, cultivation of green lucerne, sainfoin, vetches, clover, &c. for Dublin market, early potatoes,

potatoes, fruit, and a long etcetera, which experience and taste would add to the catalogue. If we reflect for an instant on the ignorance, small capital, and trifling quantity of ground occupied in this branch of business in general, and, at the same time, take into the account the support of very often a large family, and too often the large sums expended in whiskey and porter, very little argument is necessary to convince us, that I am not too sanguine in my proposal. I by no means intend this as a general stigma on kitchen-gardeners; many may be very justly ranked amongst the most industrious, sober, and hard-working classes of the community; but I fear the reverse of the picture is too often as I have drawn it.

### *Burning Plants for Ashes.*

THIS is a branch of rural economy, that has had but little attention paid to it; yet that it is a matter of some moment may be concluded, from the great amount of foreign ashes imported in the last seven years, upwards of 810,250 cwt. What has been obtained in this country is generally from weeds of all sorts indiscriminately, and too often mixed with clay and other substances. I am informed, that the ashes produced from wormwood are superior to those from any other kind of plant; as it thrives in very sandy soils, it might



become a very valuable article in situations near the seashore. From some small trials I have made some years since, I am very much inclined to think, that an acre of the best ground would pay as much for this purpose, as under a crop of corn; besides, it is an occupation for women and children, and would not interfere with the harvest.

### *Saving Seeds.*

As prejudices are wearing away fast, that, which has been so long entertained against the possibility of saving seeds in Ireland, will, it is to be hoped, not be one of the last. From many trials made by many persons, and from those I have for many years made, I am persuaded there are very few kinds we could not save in this country, with the superior advantage, that we could, by viewing them in a growing state, be certain that they were true in their kinds, and that no other variety of the same species were permitted to flower near them; a want of this very necessary caution has tended to bring seeds saved in Ireland into disrepute; and I am convinced, where they have failed, it has more frequently been from carelessness, than from the moistness of our climate. As some corroboration of this, there are now at the Dublin Society's Repository, in Hawkins's-street, samples of red clover, saved last season by Valentine Flood and Andrew Maguire near  
Swords;

Swords; and I have other samples equally good, saved by Charles Mulvaney and Henry Brien at Lispopel in Fingal, which I think are nearly as good as the very best imported feeds. These men have been for some years in the habit of saving clover-seeds, and, as they are very small farmers, deserve every encouragement; they are no small reproach to some great farmers in their neighbourhood, who buy clover-feed from these very men.

	A.	B.	P.	
In 1800, Charles Mulvaney had on	1	0	2	- 8 cwt.
1801, - - - - -	1	3	10	- 6 cwt.
1800, Henry Brien had on - -	2	0	9	- 9½ cwt.

This, at the present price of good feed (six guineas per cwt.), leaves an uncommonly great profit, and helps to throw a strong light on the heavy loss sustained by the fallowing system.



AN  
EXTRACT

FROM

THOUGHTS AND DETAILS ON SCARCITY.

BY THE LATE RIGHT. HON. EDMUND BURKE.

I INSERT the following extract, as I think it will be an admirable lesson to some of my fellow-citizens, and may be a means of preventing, in future, a repetition of those monstrous stretches of power we have seen exercised over farmers bringing their goods to market.

“ The cry of the people in cities and towns, though unfortunately (from a fear of their multitude and combination) the most regarded, ought in *fact* to be the *least* attended to upon this subject; for citizens are in a state of utter ignorance of the means, by which they are to be fed; and they contribute little or nothing, except in an infinitely circuitous manner, to their own maintenance; they are truly “*fruges consumere nati*,” they are to be heard with great respect and attention upon

upon matters within their province, that is, on trades and manufactures; but on any thing, that relates to agriculture, they are to be listened to with the same *reverence*, which we pay to the dogmas of other ignorant and presumptuous men. If any one were to tell *them*, that they were to give in an account of all the stock in their shops; that attempts would be made to limit their profits, or raise the price of the labouring manufacturers upon them; or recommend to government, out of a capital from the public revenues, to set up a shop of the same commodities, in order to rival them, and keep them to reasonable dealing; they would very soon see the *impudence*, *injustice*, and *oppression* of such a measure; they would not be mistaken. But they are of opinion, that agriculture is to be subject to other laws, and governed by other principles. A greater and more ruinous mistake cannot be fallen into, than that the trades of agriculture and grazing can be conducted upon any other than the common principle of commerce; namely, that the producer should be permitted, and even expected, to look to all possible profit, which without fraud or violence he can make; to turn plenty or scarcity to the best advantage he can; to keep back or bring forward his commodity at his pleasure; to account to no one for his stock or for his gain. On any other terms, he is the slave of the consumer; and that he should be so, is of no benefit to the consumer. No slave was ever so beneficial to the  
master,



master, as a freeman, that deals with him on an equal footing, by convention, formed on the rules and principles of contending interests and comprized advantages. The consumer, if he were suffered, would in the end always be the dupe of his own tyranny and injustice. *The landed gentleman is never to forget, that the farmer is his representative."*

## APPENDIX.

EXTRACTS

APPENDIX.



EXTRACTS

FROM

*DOCTOR RUTTY'S ESSAY*

TOWARDS A

NATURAL HISTORY

OF

THE COUNTY OF DUBLIN,

PRINTED IN THE YEAR 1772.



# EXTRACTS

FROM

*DOCTOR RUTTY'S ESSAY,*

*&c. &c. &c.*

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## SECT. 1. *Of Marle.*

THE word Marle was formerly used in a very vague sense, and of consequence it must sometimes happen, that what was affirmed of one species of it did not hold in another.

I shall therefore here adopt the definition of marle given us by the two best late writers on fossils, viz. Hill, and Emanuel Mendez de Costa, viz.

“ Earths are but slightly coherent, not ductile, stiff or viscid while moist, most easily diffusible in and disunited by water, and by it reduced to a soft, loose, incoherent mass.

Walerius indeed and some others add, as a characteristic of marle, that it makes an effervescence with acids; but both the above-named authors agree in

ranking many earths under the denomination of marles, which make no effervescence with aqua-fortis; v. g. the *Marga columbina Plinii*, being a stony bluish marle of Hill, so long celebrated as a manure, makes no ebullition with acids, as neither do several of the red marles of the same authors, nor several green and black marles mentioned by Hill, nor two of the blue sort mentioned by De Costa, and yet several of these are found to make excellent manures for clayey stiff soils, and the leaner ploughed lands.

I have not yet met with any marles in this neighbourhood, which do not make an ebullition with acids: for, though the county of Dublin affords great plenty, and a considerable variety of this useful manure; as the white and chalky, which whiten the hands, and acquire the taste of lime by calcination; the grey, the blue, the yellowish, the reddish, the brown, and the black, and some shelly, some stony and flaty, yet all these effervesce with acids, and no wonder, since our soil abounds with limestone and calcareous earth; and the differently coloured marles above-mentioned for the most part are no more than the calcareous earth, combined with a little mineral oil, clay, and sometimes a little ochre or iron.

Markham condemns the use of marle in general on a stiff, wet, cold clay: nevertheless, by its swelling and bursting in water, it shews a fitness to loosen a soil too stiff and adhesive; and so it has by experience been found



found to mend a clayey soil; yet on the other hand it has been observed to stiffen a too light and sandy soil, and the sandy loam; for as it has a certain degree of cohesion, it brings ground, that has less than itself, to a due degree of consistence; and I have seen the good effects of the blue marle on a sharp, gravelly, mountainous soil.

Thus far the operation of marle may be illustrated upon mechanical principles; but moreover, it is said to be also useful in all sorts of soils, commonly meliorating the earth, making barren lands fruitful, and increasing the crops of corn fourfold, and causing it to produce trefoil instead of quichgrass or dyer's weed, and wheat instead of rye.

It will, however, be worth while to consider the several species of marle, as a further means of illustrating and distinguishing its operations.

Some have made three divisions of it, viz. 1. The shelly. 2. The stiff or clayey. 3. The flaty; to which I must beg leave to add a fourth, viz. the sandy marle, being frequent in this county, and therefore I shall subjoin a particular account of it.

1. The shelly marle improves clayey grounds, which the stiff sort does not. It is also sooner ameliorated by the air, and therefore it produces as good a crop the first year after it has been laid on, as it does in any of the subsequent.

2. The

2. The clayey or stiffer marle improves a sandy soil, and agrees to clay in producing fertility slowly, not having its effect generally till the third year, though quicker than clay, but less lasting.

2. Slate marle, which is still more slow in its operation than the clayey sort, spending more slowly, but lasts longer, and loosens the stiffest clay.

To this class may be referred that, which is called *rotten limestone*, being proper for manure, and not for building, and is a marle, according to Hill, falling off in scales gradually year after year.

Akin to these seems to be the rock-marle, of which see an account hereafter among the mineral petrifications.

4. Sandy marle. This is either peculiar to us, or at least far more frequent than in England. It is here commonly called limestone-sand, but more properly *sandy marle*, having commonly some small degree of tenacity, and agrees to the *marga arenacea* of Cæsalpinus de Metallicis, and to the *marga arenosa lutea friabilis* of De Costa, with this difference, that I found none in this county but what effervesces with acids; and ours varies in its colour, having, from slight extraneous mixture, been found sometimes brownish, blue, and black.

There are frequent pits and quarries of this sand, or rather marle, and often accompanied with what is called limestone-gravel in this county, v. g. near Rath-farnham



farnham bridge, near Tallow, at Green-hills, at Monk's-town, at Kilmasheoge, at Hunt's-town, near Roger's-town, at Glasamucky, Coliagh's-town, and Bornabriny.

In all experiments it proves an excellent manure in clayey soils, mellowing the stiff clay, advancing the rent of the lands, by producing clover where quick-grass grew before, and yielding good crops of bere, barley, and wheat.

I made an analysis of it by an easy process, thus: Water poured on it, and shook up, exhibited three different substances. 1. Of sand properly so called, as a kind of gem, being untouched by acids. 2. Of an unctuous substance. 3. Of a calcareous sand, which effervesces with and is dissolved by aqua-fortis; though of this, in one specimen, there was not quite one-third of the whole.

A singular species of this marle may perhaps merit a particular account, viz. At St. Marnock's old church, near Carrick-hill, is a black sand, consisting of a fine black mould incorporated with sand, which has proved an excellent manure in the neighbouring clayey soil, increasing greatly the crops of wheat, and used with great success by B. Hoffsleger in his flower-garden at Feltrim. It sparkled a little on the red-hot iron, and excited a considerable ebullition with aqua-fortis. The sand separated from the earth effervesced considerably with aqua-fortis, so that the sand contains some calcareous matter, but the earth separated from the sand is quiet with nitrous acid.

Thus



Thus it abundantly appears, that this fossil is not to be considered only mechanically as a manure, viz. as a sharp matter proper to correct and divide a tough clay, but as such a sharp matter combined with an *unctuous substance* and a *calcareous earth*.\*

Agaric mineral is another fossil, of which I shall here annex some account, as being by some of our best writers reduced to the class of marles. It seems to be no more than a plain calcareous earth, though its whiteness seems to indicate it to be one of the purest.

It is very frequent in this county; v. g. at the Greenhills are streaks of it as white as milk, running across the gravel pits, and lining some of the cavities in the banks; and at a quarry near Lucan, the grey building stone was covered with it; and at a quarry near Oxmantown-green, at the depth of two and five feet from the surface, were streaks of it, of a thickness of  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch, mostly running parallel to the horizon, sometimes intersecting each other at right angles; and in several other different parts of the county, in pits of limestone-gravel.

It makes a strong ebullition not only with the mineral acids, aqua-fortis, and spirit of vitriol, but even with vinegar, and stronger than limestone-gravel did upon the comparison. It scours brass and silver very well.

SECT.

\* In the *Edinburgh Essays, physical and literary*, published in 1771, in which the clay-marle, the shell-marle, and the stone-marle are minutely examined and analysed, none of them appear to contain above four-fifths of calcareous earth; the rest is clay and sand, and sometimes iron, in different proportions.

SECT. 2. *Of Sand, and its Varieties and Uses in Agriculture, and for Mechanical Purposes, &c.*

THIS city abounds with shells, from our great use of shell-fish.

Shells are an excellent manure, even unburnt, in boggy, heathy, wet, clay, or stiff land, especially where the surface is turf, but not in sandy ground. They seem to give the land a sort of ferment, as barm doth to bread, opening and loosening the clods, and by that means making way for the roots to penetrate, and the moisture to enter into the fibres of the roots.

This manure continues very long; the shells mouldering a little every year until they be spent, and wearing down more slowly, last longer than lime.

Now as sand is frequently found mixed with shells, and particularly sea-sand, a very useful manure is supplied from it, v. g. the sand from Howth, which has a mixture of shells in it, and effervesces with spirit of vitriol, and whitens water more than Wicklow sand, as does also the sand of the Dodder near Templeoge, and the sand at Booterstown, having minute fragments of shells in it; and near Skerries, where it is used for a manure, I found it full of broken shells, and, when dry, it made a strong ebullition with spirit of vitriol; and it is found to be an excellent manure on rye-land,



or that which is called sour, cold, barren clay, which bears sorrel and heath, and no oats, which by this manure is so far meliorated as to bear wheat and barley, and the rent hereby is advanced from 2*s.* 6*d.* to 12 or 14*s.* per acre.

Moreover, the sea-sand is found also to improve even some of the sandy soils, viz. by bringing a better sand to a worse.

### *Of Sea-Sand as a Manure.*

It is but of late years introduced here as a manure, on the coast near Rush, Skerries, Balruddery, and Gormanstown, where it is greatly used, and experienced to be better than marle in their clayey, stiff soils, and a particular excellency of it is known to gardeners and florists in killing grubs.

Now, as the good effects of sea-sand are evidently owing to the ingredients composing it, viz. 1<sup>st</sup>, to the sand strictly so called; 2<sup>dly</sup>, to the salt of the sea combined with it; 3<sup>dly</sup>, to the shells, and sometimes to the fragments of limestone or spar mixed with it.

Nevertheless it is to be noted, that sand is also to be admitted as a manure, without either salt, shells, or any calcareous or sparry mixture. For, near Garristown is a yellow sand, having also shining or micaceous particles interspersed, and which does not effervesce with spirit of vitriol, and consequently has no mixture  
of



of either shells or any calcareous matter, as neither has it of salt, but some mixture of iron, as appearing by its reddening, and in some parts yielding to the magnet on calcination.

Now this sand, thrown on their lands in that neighbourhood, has improved their rye-land (i. e. spewy, moist, and clayey soil) to wheat-land. The reader may see this confirmed in Smith's History of the County of Cork, p. 385, by the like good effects of a yellowish *faburra* or grit, and a sand of the like kind as a manure in stiff soils.

We have other sands specifically different from this, v. g.

1. That which is called the white freestone-sand, from the mountains near Ballynascorney, which is brought to Dublin to strew on the floors in gentlemens houses, being white and shining, and not imbibing the moisture of the air like sea-sand.

2. A white sand of an impalpable grit, and withal shining, as from what we call fire-stone, more thoroughly rotten, or most minutely pulverized. It scoured brass and silver well. It was found in a bank near the breaks of Glassamucky, and with us should be called firestone-sand, but, technically speaking, it is the *arena micacea* of Hill, or sand, properly so called, intermixed with the *mica*.

3. Near a-kin to this is what we here commonly call freestone, or rotten fire-stone, being another of the mountain commodities brought to Dublin for cleansing and whitening wood. It differs from the English

freestone,\* which is a *lapis arenarius*, though the dust of this last has the same effect in scouring boards and wooden vessels as our rotten fire-stone above mentioned.

Several specimens of this fossil occur, and it is used for the same purpose, but differs from several of the *saxa arenaria* in De Costa's history, being not calcinable, nor causing any effervescence with acids, as at the bottom of the mountains near King's-town and Titnock, on the road going from Bell-alley to Milltown, and near Kilmasheoge hill. Some of these whitened the fingers; and in a cave on the shore S. E. from Dalkey, and at the breaks of Glassamucky, and at Glancullen, and several places in that neighbourhood; but particularly, on the lands of the Man of War is an excellent sort of this our freestone, and in great quantity. It is sandy, but of a finer grain than the common, has a tincture of yellow, does not effervesce with acids, when fresh dug is somewhat unctuous, and used with lime for coarse plaistering; but its chief use is for scouring boards with warm water; it takes grease out of them better than soap, and leaves them polished.

4. Next, that for the use of the founder deserves mention, as requiring a particular constitution, v g. the *arena crassior, lutea hebes*, p. 557, 558, of Hill's History of

\* I met with one instance of a freestone like the Portland-stone, and which was truly a *saxum arenarium flavescens*, being found in a wall, and probably supplied from a neighbouring quarry at Milltown.



of Fossils, which leaves a little yellow muddiness in water, and is proper for casting sheet-lead; “for coarser would make the surface of the sheet-lead too rough and unequal, and a finer would be discomposed and driven into heaps before the running mass.”\*

Of this sand several specimens were found in this county, as at Milltown being smooth, and having some degree of a cementing quality; another from Lazer’s-hill, which last and the first are said to be advantageously mixed for this purpose, one being more, the other less binding; and at Knockmaroon is a little pit of it, and in the deer-park near Dublin, and on the banks of the Dodder near Rathfarnham bridge.

I am moreover informed of another important use of the sand called founder’s sand, viz. that it vitrifies the lead, by which means it makes a fine paste for glazing earthen-ware, being mixed in the proportion of one part of this sand to two of calcined lead, and thus it gives a reddish cast, and lessens the expence, by rendering a less quantity of lead necessary.

### SECT. 3. *Of Clay.*

CLAY simply is also applicable as a manure to sharp, sandy, or gravelly soils, especially the yellow and white clay; and where other manures are scarce, it is burned in kilns for this purpose, a species of husbandry practised

\* Hill.

tised in the county of Cork. Brick-clay will answer the purpose; it must not be burned too much, but be reduced to a reddish powder.

Potters' earth also in sandy ground, and such as does not hold water, binds and stiffens it.

At Rush and near it, where they have no dung (having no cattle), they apply sea-sand to their clay, and to their sand add straw cut small and sea-weed rotted together: and at Rogan's-town for the same reason, viz. on account of their having no dung, they use for manure straw steeped and rotted in water. But to return to clay, its mechanical uses next deserve consideration:

1st. For making bricks. The bricks manufactured here are generally bad, being far inferior to the English, which are redder, more compact and durable, whereas many of the present buildings made of ours must necessarily soon tumble down; for our brick-clay, as well as some of our potters'-clay, has frequently a mixture of calcareous earth, called lime-wash, which after burning slackens on moisture, and spoils the manufacture; and another reason for the badness of our bricks is, their being wrought up too hastily, or not suffered to lie long enough to grow close, as they do on being kept.

This matter is now happily explained by the diligent researches of modern naturalists, particularly those of Woodward and Emanuel de Costa, who observe, that the brick-clays in England are always dug up and exposed



posed to the air nine months before they are used, by reason that the pyrites being found in great quantities in them, especially those of Surry, Kent, and Middlesex, the said clays are ever full of the vitriolic salts of that mineral, which they drain or clear from them by exposing them to the air and weather, that the bricks may be more firm and durable; otherwise, if the salts were not drawn forth before the clay was baked, they hinder its setting in well in the kiln, and are apt to liquefy afterwards, and so make the bricks and tiles moulder and decay; so that the neglect of a proper attention to this is one cause of the badness of our bricks, as their mixture with calcareous earth is another.

Another subdivision of clay, distinct from the former, is that, which serves for the use of the potter and tile-maker, which having less sand than the brick-clay, and being tougher, bends more easily to any shape, as in making pantiles.

A. D. 1745. The Baldoyle clay for this use was but of a few years discovery, our potters' clay having been supplied from Merrion and Clontarf; and the clay of Merrion and Baldoyle have been mixed for making pitchers, and the composition was reckoned an advantage.

There is a good manufacture of this clay at Mullynahack, in Dublin, viz. of excellent black crocks, pantiles, ridge-tiles, flooring tiles, flower-pots, sugar-moulds and drip-pots for sugar-bakers.

Clay for pantiles was formerly got at Castle-kelly and at Old Bawne.

The imperfection of our pots made of these clays, however, compared to the English, is acknowledged: ours indeed, if properly seasoned, and brought gradually to the fire, will boil water well, but do not bear the naked fire, though, according to my informers, there is no doubt but our pots might be made as good as the English, if more encouragement were given them, which is the more necessary by reason of the dearth of coals here and of lead, an article essential to vitrification; the quantity of which they are stinted in by reason of its price.

### *Limestone-gravel.*

THERE yet remains an article among our manures, which demands a particular consideration, viz. limestone-gravel. It consists of masses of stones, pebbles, and sometimes slate and ragstone cemented or conglutinated together as by mortar. It deserves a particular consideration, as it abounds with us, and particularly in this county, even in all parts of it, v. g. at the Greenhills near Dublin, where some of the roads are like terras-walks by means of this gravel, whose excellency is in its binding, cementing quality, and at or near Newcastle is said to be one of the most binding gravels in



in the kingdom; and at Dunleary are large rocks of it. It hardens in the air like the *osteocolla*.

In the Complete Body of Husbandry, lately published, mention is made of a marley loam mixed with pebbles, supplying gravel to walks, and useful as a manure in clayey soils, which comes near to my present account of our limestone-gravel, which, as I am informed, is found in Derbyshire, and some of the northern neighbouring counties, but very rare in other parts of England, insomuch that their gravel has so little of the cementing quality, that they are frequently obliged to mix loam with it.

Our limestone-gravel always makes an ebullition with acids. The first specimen I got of this gravel in this county had a fine, thin, white, saline crust on it; to obtain which it is necessary that it be laid out to be exposed to the air, else it fails in its good effects;\* for  
beside

\* Dr. Ainslie, author of the article on marle, in the *Edinburgh Essays, physical and literary*, published in 1771, opposes the vulgar notion of ascribing the fertilizing quality of marle to the nitrous salt formed by its attraction of an acid from the air; and indeed to ascribe this principle hereunto, were attributing too much to it; as, on the contrary, the excluding it from any share herein were attributing too little to it.

Certain it is that saline efflorescences, even by the author's own testimony, are found upon marle, and, by my own observation, upon limestone-gravel: now rain-water or dew passing over these will become saturated with their solution, and thereby be improved in their fertilizing quality.

Modern experiments have determined, that plants grow and blossom in meer rain water, and that, when set in earth, this last loses nothing of its weight upon the plants having grown

beside the use of it on account of its binding quality in gravel-walks in gardens and in the high-roads, it is also of great and important use as a manure; and this appears to have been an ancient practice revived to a very good purpose of late; for near Glassamucky are the remains of old pits, that have been formerly dug for it.

Its use as a manure, is chiefly in the stiff clayey soils: it has indeed in the too loose, sandy, and gravelly soils, also succeeded better than dung; but it is more eminent for improving mountainous, boggy, and clayey ground, and wet bottoms, the water being previously drained from them, and proves a better and more lasting manure than marle, mellows the stiff clay, correcting the tenacity of the clay, meliorating the juices of the earth, and producing the white and purple trefoil, where four grafs grew before, and excellent corn, and doubling the crop. So in the mountainous, boggy, and clayey ground near Rathcool, the lower part of their mountains, by means of this manure, bears barley, wheat, and peas, which else would not grow here, requiring a richer land, and so by means hereof their rye land is turned to wheat land: but that it may answer these  
good

to perfection, the rain-water being not a meer vehicle, but furnishing matter for the growth of vegetables, supplying them with the calcareous nitre, and absorbent earth, and a phlogistic or oily matter; and as dew in all experiments affords a greater quantity of solid contents than rain-water, its superior fertilizing quality is hence accounted for; and this will be still further improved by the additional impregnation of the aerial nitre.



good purposes, it must be ploughed in with the fallow, and with it exposed to the summer sun; for if it be not laid out so as to have the benefit of the air, it fails in its good effects. For a further account of the operation of the air in promoting vegetation, I refer to *Home's Principles of Agriculture and Vegetation*, printed in Dublin, 1759.

### *Of the Gypsum.*

It is mentioned here because it is sold in Dublin, being brought from Mullikartan near Lisburn, where it is found in great quantities.

It runs in long white striæ parallel to each other; it makes excellent plaister, bubbling and boiling up in the pot over the fire, as the plaister of Paris, and accordingly is used in stucco-work, in which it is found to be excellent, and even superior to that, which comes from France, being not liable to crack as that, and gives a cement much more durable under water, as George Sempill, architect, assured me.

It has been sold by our druggists for scouring silver.\*

\* There is also a reddish sort beyond Carrickfergus, and some of it has a bluish cast.

SECT. 4. *Of Rotten Stones, with an Analysis of them.*

As the preceding article, viz. gypsum, has been of use in scouring of metals, it will be no unnatural transition to consider next the stones called rotten stones, the *terra cariosa* of Woodward, the use of which stones is to polish brass, iron, copper, silver, wood, and stones, after the use of other rougher materials, as the emery and the skin of the dog-fish; and sometimes they are previously burnt for this use to advantage.

The English has hitherto been preferred for those uses, especially scouring of silver, to any yet found in Ireland; but from the following observations it appears, that we may not only be supplied with this article at home, but even that it may be exported to advantage.

We have a great number and variety of these stones in this county, and of different colours, as pale brown, dark brown with red streaks, snuff-coloured, yellow, and black, v. g. the *Tripela fusca levis*, Light brown *Tripoli* of Hill, near Kilmasheoge, very frequent there, and which has been exported to London in great quantities to advantage. Others by the river side from Rathfarnham to Old Bawne, on the road from the deer-park to Castleknock, in a quarry at Oxmantown-green, at Cloghran, on the shore near Baldoyle and Malahide,



Malahide, and many other places, and particularly in the bay of the lower Corballis, which is much exposed to the N. W. winds.

I confess the above account of our rotten stones is different not only from those of Hill, but likewise seems to contradict the sentiment of Cronstedt in his late system of mineralogy, who deems the Tripoli to be a mouldered siliceous earth: however, the experiments I made on ours are faithfully related, and may serve to establish a variety in the stones passing under this denomination.

#### *Of the Lapis Hibernicus.*

THERE is yet another species of rotten stone, the consideration of which will properly succeed that before-mentioned, but of a very different nature, although the corrosion of both may be owing to the same general cause. The action of the atmosphere by sulphur and ferruginous matter forms the martial vitriol: of which last species of rotten stone is our celebrated Irish slate, being a kind of decomposed or mouldered pyrites.

I met with a specimen of this on the south side of Garistown, and on the road to the spa, which is there. Having been exposed some months in my closet, it was infused in water, which infusion gave a purple tincture with galls; and after being kept in a bag nine months,  
it

it exhibited a white efflorescence of a strong vitriolic appearance.

Moreover, on the S. E. coast of Loughshinny, between Rush and Skerries, are large rocks of the Irish slate; some rotten, others not; some of them very mild, and scarce sensibly acid, others acid and austere; and in this place several of them yield vitriolic efflorescences.

In the neighbourhood of the foregoing, viz. in the hole of the copper-mine at Loughshinny, was found a stone of the same kind, but very austere, and strongly vitriolic to the taste, and water poured on it struck blue with galls, and milk boiled with it was evidently coagulated. Upon calcination it appeared to be more strongly ferruginous than the former; and moreover, a yellow, vitriolic efflorescence was found on it, very acrid and caustic.

I made several experiments in order to investigate the real contents of the lapis Hibernicus, as a possible and very probable ingredient in our waters called chalybeate; the result of which was, that it consisted of a bolar earth, sulphur, a martial vitriol, and some pitance of copper; \* of these the martial vitriol seemed to be the principal or most active ingredient, as in the above-mentioned rotten grey stones.

Dr. Hill, however, in his excellent treatise on fossils, thinks alum to be the principal salt impregnating it.

It

\* Methodical Synopsis of Mineral Waters.



It must, however, be acknowledged, as I have elsewhere and here, that there is a considerable latitude and variety in the nature or qualities of the stone passing under this denomination, both with respect to the different degrees of acidity and astringency, and with respect to the predominant salt contained, whether vitriol or alum; and indeed that this last is also sometimes an ingredient, and sometimes a predominant one of our Irish slate, and sometimes combined with the martial vitriol, I am abundantly convinced by later observations, and the rather, as they may give a hint (in pursuance of the noble and beneficent designs of the Dublin Society) which may be prosecuted by persons of more leisure, to their own advantage and that of the public. Sir William Petty speaks of alum works in this kingdom, and the learned Lister (a person well acquainted with fossils) affirms, that he received an alum glebe from Ireland, out of which true capillary alum did shoot, even as vitriol from the pyrites. But though those works are long since dropped, I apprehend it to be no way impossible that they may be revived.

A. D. 1750, I visited the coast near Rush a third time, and found several of these rotten stones, which gave strong indications of alum, and of martial vitriol combined with alum.

The following appears to be an instance of a predominant alum with very little mixture of any thing vitriolic or ferruginous, viz.

In

In the glyn of Knockbragg, near Holywood, are found rotten, slaty stones, partly black, and partly of the colour of yellow ochre, some pieces of which were of an austere taste, some subacid, yet acid enough to curdle milk slightly. The infusion in water had no effect on galls as the foregoing, but it extracted a deep cherry colour from logwood, and when calcined it struck a crimson colour with logwood, but had no effect on galls, which is one indication of alum, without the mixture of vitriol.

There are moreover other substances a-kin to this, but which seem to indicate a composition of vitriol and alum, on which I made several experiments.

The first of those substances was a black earth, found near the top or surface of a quarry of our black building stone at Glassnevin (of which hereafter), and on the north side of it.

2dly. There is another black earth, called by Hill *argilla nigrescens friabilis levis*, *killow*; by Emanuel Mendez de Costa, black ore; and by Walerius, *humus nigra pictoria*, or *atramentum scissile*; having derived its name from its resemblance to the smut on the backs of chimnies, which is called *kollow* (as this is called *killow*) in the north of England. It leaves a dark line rubbed on paper, and is used for writing and designing, and has been used in marking sheep, and sometimes in painting.



I met with two varieties of this fossil on the coast near Loughshinny, one grey, another as black as coal: this last rubbed on paper leaves a line of a black, the other leaves a line of a leaden colour: they are both of an austere acid taste, more or less, and both, when diluted with water, are smooth to the touch.

The above-named authors, indeed, have not given any hint of alum being an ingredient in their composition; however, I shall shew that they exhibit two indications of alum being contained in them; viz. 1st. the taste of alum; and 2dly, the red and crimson colour extracted by them from logwood. But the *black* sort is more strongly impregnated with these salts, being of a taste more strongly acid, austere, and plainly aluminous, and the evidences of alum combined with vitriol in it are much stronger: for 1. In a simple infusion of it in distilled water, logwood gave a red tincture in the upper part of the mixture, but galls gave very little tincture. 2. In two other experiments on a strong decoction, this combination appeared by the blue tincture with galls, and the crimson with logwood. 3. In another specimen, a strong decoction gave more manifest tokens of alum than of vitriol; for it struck a lasting bright crimson with logwood, before it struck the ink colour with galls, otherwise than in the two last experiments.

This reasoning is farther illustrated and confirmed by Doctor Hill's testimony concerning the *Lapis Hiernicus*,

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who affirms, that he procured one-ninth part weight of alum in some of the best pieces of it, as likewise by the account elsewhere \* given of the *aluminoso vitriolic* water of Ballycastle; and I would adventure to recommend to persons of more leisure a further search for alum in the stones and earths above specified, and found in this county: such a combination of alum and vitriol, we are assured by the accurate Macquer, in his *Elements of Chymistry*, is frequent; and Lister affirms, that in England scarce any alum mine is found without a mixture of the pyrites; and Macquer moreover gives the method of separating them in these words: "Alum is almost always accompanied with a certain quantity of vitriol, which renders it impure, and obstructs its crystallization; for which reason an alkaline lye is added to the solution of this impure alum, which, having a greater affinity with the acid, precipitates the iron basis, and so the alum is left pure and crystallizes."

#### *Of Ochres and painting Earths.*

OCHRE is an article of importance for painting, and for colouring gloves and skins yellow and brown, with which we have hitherto been supplied from England; but by the following enumeration it will appear, that we might be easily supplied from home; and mills might

\* Methodical Synopsis of Mineral Waters, Book IV.



might be erected here as well as there for washing our ochres, and separating them from sand and dirt. In the county of Wicklow they have lately extracted silver from some species of the ochre.

Doctor Hill and Emanuel de Costa reckon up no small number and variety of ochres, and of different colours, as yellow, red, brown, black, blue, and green; and even in this small county, I have found the yellow, red, brown, and black.

1. A. D. 1745, in a lead mine lately opened at Castleknock, was found a very dark-coloured ochre, approaching to umber, being darker than brown ochre, and less dark than umber. It is fine and impalpable, and said to make a very good dark paint.

2. A yellow reddish ochre near Dolphin's-barn, which caused no ebullition with spirit of vitriol, and appeared to be chiefly a ferruginous earth; for it calcined of a deep red, and then fled almost wholly to the magnet.

3. From the neighbourhood of Rush, a very pale ochre, answering to the *ochra levissima friabilis, pallidissime flavescens*, of Hill's History of Fossils, p. 51. which also made no ebullition with acids.

4. A pale brown ochre, of which there is a small bed at Augh Farrel (where also is a chalybeate spring). This also made no ebullition with spirit of vitriol: it reddened on calcination, was not attracted by the magnet crude, nor but obscurely when calcined.

But I found several other ochres in this county, which excited a manifest ebullition with acids, v. g.

1. In the lead-mine above-mentioned at Castleknock, in the neighbourhood of that above described,\* and which I found at the same time; it was a black earth, with a shade of purple of an intermediate colour, between umber and Cullen's earth. It was tried by a painter, and pronounced an excellent colour, as it dried with linseed-oil in twelve hours only, being a much shorter time than ordinary colours do.

2. On the road to Ballynascorney a dark brown rotten stone, almost globular, somewhat gritty, and it effervesced with some of the acids. In its crude state it was scarcely attracted by the magnet, but when calcined it became black, and was greatly attracted.†

3. A hard, yellow, reddish ochry substance in a quarry at Dolphin's-barn, which made a strong ebullition

\* I have seen a yellowish ochre, which was brought from Summer-hill in the county of Meath, and but about twenty miles from Dublin, where it is said there are many tons of it, for which reasons I add it here, and because it makes an excellent brown paint upon trial, and dries very readily. It is impalpable, does not effervesce with spirit of vitriol; but it yields very strongly to the magnet, even crude, and calcines to a brown red. It is very like Hill's *ochra levissima flava friabilis*, which is frequently thrown out of the mouths of chalybeate springs; and this our ochre is also said to be situated near such a spring.

† Emanuel Mendez de Costa mentions an *ochra Indica saxea purpureo rubra*; which is brought from the East Indies, and of great use among the painters, being a very valuable colour, and by them called *Indian-stone red*, but is not acted upon by acids.



lition with acids, both in its crude state, and when calcined.\*

On the road from Castlekelly to Old Bawne, are frequent appearances of ochre; particularly near Glassamucky, a brown one to a great depth, which in its crude state was not attracted by the magnet, but upon calcination reddened, and then was a little attracted: but

In the neighbourhood of the chalybeate water in or near Holywood-glynn, were found the three following ochres richly ferruginous:

1. One as red as brick, and blackish within, of an empyreumatic smell, and flies almost wholly to the magnet, even in its crude state.

2. A brown yellowish one, which to the eye appears to be mixed with iron.

3. A dark brown one: both this and the second in their crude state are but very little attracted by the magnet; but on calcination they both become red, and then fly almost wholly to it.

Those may be deemed iron ores, and therefore the transition from them to iron stones or iron ores will be easy.

\* So the ochre, called Spanish brown, makes a violent effervescence with aqua-fortis.

*Iron Stones and Iron Ores.*

It hath been justly remarked, to the glory of Divine Providence, that, as iron is the most useful, so it is found in far greater abundance than any other metal; and accordingly iron stones are very plentifully scattered both on our coasts, and in the inland parts of this county. And the two following aphorisms seem proper to be premised to an account of these stones, viz.

1. The red and yellow earths or stones generally owe their colour to an admixture of iron.\*

2. All earths, that are naturally red, or acquire that colour by calcination, are ferruginous.†

On our coast, proceeding from Raheny, was found a black, reddish, ponderous stone, of an iron colour within, which struck fire with steel, made an ebullition with spirit of vitriol, and the powder of it crude was strongly attracted by the magnet. And on the coast near Baldoyle are many of these iron stones, some of an ash-colour, some red, some olive-coloured, others ochre-coloured, or having ochreous striæ, some sandy, many of which yielded to the magnet, even in their crude state, and several made an ebullition with spirit of vitriol, though others did not.

In

\* Lewis.

† Macquer's Elements of Chymistry.



In our journey to Howth was found a stone, part of a rock, covered with a red rust (ferrugo) like meal, which made no ebullition with spirit of vitriol, but was attracted by the magnet, even in its crude state; and an experienced miner assures me, that pure malleable copper was obtained from an ochry matter found upon Sutton-land, between Baldoyle and Howth.

A red mill-stone from Ireland's Eye; it struck fire with steel, and the crude powder was attracted by the magnet, as was an ochre-coloured and rotten stone found in plenty on the N. E. side of Lambay island, and when calcined became of a deep red, and was strongly attracted, and emitted a bluish flame.

Another of these stones, on the coast between Swords and Rush, had veins as red as blood, especially when moistened. And on the coast from Rush to Skerries and Balruddery, besides plenty of iron mine, I saw several varieties of the iron-stone, which were attracted by the magnet in their crude state; and on Holmpatrick are reddish slaty stones, which are partly ferruginous.

Near Loughshinny (where is also copper and vitriol), a brown rotten stone, which made a strong ebullition with spirit of vitriol, burnt blue, and on calcination was strongly attracted by the magnet, being a composition of spar, iron, and sulphur.

I observed these stones to be frequent, particularly in the neighbourhood of several of our chalybeate springs (something like these being undoubtedly the matter

matter impregnating them), as near Curtlagh, near Augh Farrel, Kilmasheoge, and Holywood, which also owned the magnet in their crude state.

A great number and variety of these stones, as red, pale-red, pale-brown, iron-grey, occurred in the more inland parts, as in our walk to Rathmines, Kilgobbin, Rathfarnham, Grange, and Bell-alley : and

On the lands of Mulahoo a red ponderous stone is found in plenty, which caused no ebullition with spirit of vitriol, and in its crude state was but little attracted by the magnet, but strongly when calcined, and emitted a deep blue purplish flame, indicating iron and sulphur.

But the following substance appears to be much less rich of the metal, than any of the foregoing, viz.

In a limestone quarry at Howth, are found small roundish *nodules* of a brown yellow colour, as big as a walnut, but of a stony hardness : they effervesced strongly with spirit of vitriol, and being roasted became as red as brick, but were very little attracted by the magnet, containing only a small proportion of iron blended with a sparry matter. They seem to belong to the *siderorchita* (sparry iron ore), or *crustated ferruginous bodies*, minutely described in Hill's History of Fossils.

It is said that iron-works were formerly erected in this county, though none subsist at present ; and on the west side of the Hill of Howth iron mine is found ; and on the shore near Rush, and at Loughshinny on the surface



surface of the ground, particularly a species of the Hæmatites or Blood-stone, a red stone described to have botryoid protuberances on the surface, which was attracted by the magnet even in its crude state.\*

### *Of Vitriol.*

I have before shewn the presence of this vitriol in the account given of our Irish slate, but there it seems to be sometimes combined with alum; but I am now to consider it in its simplicity, in which indeed it seems to exist in most of our bogs; for it is observed, that the roots, bodies, and branches of oak, alder, and other forest trees, though soft when first raised, when dry become useful timber, but always black, a distinguishing mark of the ferruginous vitriol.

Also, the native green vitriol is frequently found about the mines in the county of Wicklow, and at the lead-mine at Cloghran in this county, where also copper was found.

I shall here annex some few observations, which may serve at least to illustrate the gradual process of nature in the generation of the martial vitriol.

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\* This stone is found in great plenty about Whitehaven, and is one of the richest of the iron ores, yielding it is said  $\frac{1}{2}$  parts of iron; and Smith, in his Natural and Civil History of the County of Kerry, remarks, that in the bloomeries they use about one-sixth part of the English red mine to one of our poorer ores, in order to render it less brittle or more malleable than our ore would be, if used alone.

At Loughshinny near Rush, and on the strand, besides iron-mine in plenty on the surface of the ground, is found copper ore, and a work for it was begun by Benedict Arthur, Esq. but not prosecuted; and on the coast N. E. from Loughshinny we discovered

1. In a neighbouring shaft opened for the copper-mine, a white efflorescence, partly like snow, and partly in the shape of *stirix* crystals or icicles, which evidently appears to be true martial vitriol; for it was of a sweet inky taste, and the solution of it turned presently of a deep blue with galls, but green with spirit of sal ammoniac, so that this efflorescence has plainly the marks of mature martial vitriol.

2. A. D. 1748, I revisited this coast, and examined a certain yellow efflorescence exuding from a species of the Lapis Hibernicus (a black rotten stone) which efflorescence was of a strongly acid taste, and caustic on the tongue, resembling a composition of vitriol and alum (see the account of the Lapis Hibernicus above).

### *Spars, Petrifications, Crystals, and Bostard Gems.*

#### 1. OF SPARS.

Varieties of this body, some pellucid, others white, some yellowish, some tinged with green spots, some brown, some rhomboidal, others shot into crystals like nitre, occurred in several quarries, and about the lead-mines,



mines, and on the shores in this county, a minute description of which would be of little use: it shall suffice to refer to Walerius's Mineralogy, and Hill's History of Fossils, for the description and figures of a variety of them.

## 2. OF PETRIFICATIONS, CRYSTALS, AND BASTARD GEMS.

As these are matters rather of curiosity than real use, my account of them shall be but short.

Among the VEGETABLE PETRIFICATIONS, which occurred in this county, were the following:

1. Moss petrified from some springs of waters slowly dribbling down.

2. *Lapides Fungoides*; or *Lapides Fungiti*; or *mushroom stones*: a fossil coral, according to Hill. See the figure, History of Fossils, page 642.

3. *Coralloides Stalagmites*; it is near a-kin to the *osteocolla* before described; and Hill remarks, that all the crustaceous spars are some time or other found emulating the form of *osteocolla*. It is found in large rocks by the river side, between Castlekelly and Old Bawne, and used as ornamental to the walls and door-cases of several of the ancient churches. See a further account of the above under *Osteocolla*.

4. *Lapis Stelechites*; a stone resembling the roots of trees. It is plainly a species of the *osteocolla*.

5. *Lapis Vermicularis*, according to some, as having the appearance of worms petrified, but the *Tubulares* of Hill, according to whom they are corals composed of longitudinal pieces of the figures of so many worms ranged parallel to one another in a mass.

6. A petrification resembling a bundle of asparagus petrified, delineated in Hill's History of Fossils, under the denomination of *Junci lapidei*.

7. Petrifications having the branches of plants delineated on them. In our journey to Corballis the lower,

Among the ANIMAL PETRIFICATIONS were the following :

*Asteria*, } Star-stones.  
*Astroites*, }

*Belemnites*, or the thunderbolt (though some place this among minerals).

*Buccinitæ* : petrified whilks.

*Ammonites lapis*, *Cornu ammonis*, vulgo, serpent-stones.

*Cochlea petrificata* : snail petrified.

*Echinus marinus petrificatus* : sea hedge-hog petrified.

*Entrochi* : see Hill and Walerius, being reckoned to have been the joints of the star-fish.

*Lapis Judaicus*, said to have been found in a quarry at Raheny, being supposed to be the spines of the *Echinus marinus* petrified.

*Lapis Mytulites* : the muscle petrified ; one on Howth shore. It did not effervesce with acids.

*Lapis*

*Lapis ostracites*: oyster-shell petrified. This also did not effervesce with acids.

*Patella petrificata*: the limpet petrified.

*Lapis pectinites*; the scallop petrified.

*Pectunculus petrificatus*: the cockle petrified.

*Perla*: pearls, found in Poolbeg oysters.

*Trochita*: so called from their resemblance to a boy's top, and said to be articulations detached from the vertebræ of the back of a sort of sea-worms, in the form of a wheel, hollow in the centre.

Among the MINERAL PETRIFICATIONS are,

1. Limestone-gravel, which hath been considered above, under the article of manures.

2. Mill-stones.

3. A kind of rock-marle, or a petrification resembling an artificial plaister, but harder on the N. side of the Liffey, on the side of a bank near Knockmaroon, and on the banks of the Dodder. It broke white within, effervesced strongly with acids, and burnt to a lime.

I received two other specimens like these from the county of Armagh, and near it, where it was used as a rich manure.

4. Petrifications or stony incrustations of vast extent, formed by water dribbling along the rocks upon the stones, in a cave on the shore near Portrane, where is a petrifying spring. From the same rocks were collected white stony incrustations, with a tincture of green;



green; they effervesced strongly with acids, and were reduced to a strong lime in half an hour, previously burning blue and purple from the sulphur, to which the greenish cast seemed to be owing.

*Lapides Stalactitii*: stony icicles, or drop-stones, or, according to Woodward, spar formed in the shape of icicles. At a quarry near Lucan, and in the two different caves on the north-west shore of the Hill of Howth, and one formed by the dropping petrifying spring on the east side of that hill.

A clear illustration of the recent formation of these, even from a calcareous matter, suspended in water, and deposited on stagnation, occurs very frequently in icicles like these, formed on the under side of arches, from the rain-water slowly transuding through the limy cement.

The greater part of the petrifications above enumerated are of the calcareous kind, making an ebullition with acids, and being reducible to lime; but there are many instances of petrifications altogether of another kind, viz. which resist the operation both of acids and of the fire. So the *lapis mytulites* and *ostracites* above mentioned make no ebullition with acids; the last was of an iron colour, and consisted of a considerable portion of iron, burning to a dark red colour, and then yielded greatly to the magnet; and to these we add

Several flinty bodies, or at least stones, which struck fire with steel, and excited no ebullition with acids, from our shore, one of which had ramifications as of  
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the spines of some fish; another had the shape of a screw inscribed on it.

Many of the petrifications \* above-mentioned are found in places, where the water has no influence in forming them, even in places remote from either springs, the river, or sea; and consequently, such petrifications seem rather to have been effected by mineral streams.

That which is called a transmutation of iron into copper, in some copper mines, particularly one of ours in the county of Wicklow (but which is no more than a precipitation of the copper, in the room of the iron, taken up by the menstruum, from its superior attraction or affinity to the iron), is a beautiful illustration of the transformation of vegetables and animals into stone, assuming the shape of the vegetables and animals, either immersed in petrifying waters, or exposed to mineral steams, impregnated with sparry or other particles, which are precipitated, and occupy the place of the petrified bodies.

\* Those petrifications, where the pyrites is the most considerable ingredient, are another instance to the same purpose; and so is our Lough Neagh stone, which also resists both acids and fire, and lost nothing of its weight when kept seven hours in a red-hot crucible; and, when kept in the greatest fire, that a wind-furnace could give, for eight hours, which vitrified the crucible, it was not changed.



### *Of Crystals.*

CRYSTALS are hard, pellucid, and naturally colourless bodies, striking fire with steel, not effervescing with acids, nor reducible to lime by the fire as spars, but many of them vitrifying in a violent degree of heat; though Neuman observes, that they are more difficultly fusible than sand, and require about an equal weight of alkali for the vitrification.

The Kerry stone is of this species of fossils, and we have several of them in this county, as at Loughshinny, where it is called rock-crystal, hexagonal, and of other figures; and at a lead-mine opened at Castleknock, and in a quarry at Raheny, hexagonal and octangular in a ploughed field at Rob's-walls.

They have been formed into sleeve-buttons, seals, covers of snuff-boxes, set in rings and buckles, and have been often sold for real gems; for whereas crystals, as well as spars, frequently receive various tinctures from the metals combined with them; and as the real gems have frequently the hexangular figure and colour of crystals, these last are frequently mistaken for them even by jewellers, *v. g.* the crystal, accidentally tinged with green, is sold under the name of the occidental emerald;\* and most of the topazes worn in  
rings

\* The little pains that have hitherto been bestowed on enquiring into the fossils of this country considered, it is no wonder



rings are, according to my author, Doctor Hill, of this kind.

### *Of Limestone.*

THIS is an article of very extensive use and importance, even to builders, soap-boilers, tanners, skimmers, in agriculture as a manure, and even in medicine.

Dublin is very happily situated in respect to the great plenty of it in its neighbourhood, and consequently the cheap carriage of it. It supplies a better lime, and stronger cement, than that in London made of chalk,

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found

wonder, that very few instances of real gems, found here, should have appeared; however, discoveries even of these, ought not to be despaired of; for Smith's History of the Co. of Kerry mentions the amethyst, and we have good authority for another, in an account published of the Giant's Causeway, in the Philosophical Transactions, by Dr. Pocock, viz. that among the stones of the said causeway a certain rough pebble was found, which, when polished, proved to be a white carnelian.

☞ Since the above was committed to the press, there was shewn me a fossil, brought from a quarry of our black building-stone near Dunsink, under the denomination of a spar, to the character of which it in no wise answers, but is of a far superior hardness and brightness, being a thin incrustation, consisting of minute fleaky bodies, strictly adhering to one another, and to the subjacent stone, of a bright white, like silver, but much more glittering, and is used as an ornament in buttons, ear-rings, and snuff-boxes. There is indeed a sparry opaque matter interspersed, but the brilliant parts strike fire plentifully with steel, emit a sulphureous flame in burning, and leave a dark red powder, so that it appears to be a marcasite, and is accurately described by Hill, in his History of Fossils, p. 610, under the denomination of *marcasita argentea*, or silver-coloured marcasite.

which makes a weaker lime; and hence our buildings are firmer, and less liable to be injured by fire. It is found on every side of the town on the low lands, even to the extremities of the county, v. g.

On the south side, near Miltown-bridge, was formerly one of the best quarries in the county; and more lately, on the road to Miltown, a black limestone, beginning to rot, and impalpable.

Near Killikee a rotting one.

Going to Rathfarnham, a quarry worn out.

Near Smith's mills, famous for the building-stone (of which hereafter), is a quarry.

It abounds on the river-side from Ringsend up to Rathfarnham, Templeoge, &c.

On the west side, a blue rotten one at Dolphin's-barn, in the neighbourhood of the lead-mine.

At Ashtown, Shoulder of Mutton, Blue-bell, Cap-pock, Dunsink, and Diswel's-town, are quarries.

In the road to Lucan, a quarry of limestone and calp.

Between Lucan and Esker.

On the north side of the Liffey, opposite to Hermitage.

Near Luttrell's-town, a quarry of building-stone and limestone.

Between Clondalkin and Dublin, quarries.

Near St. Catherine's.

At or near Newcastle, quarries; and north of Rath-cool; and from Rathcool to Clondalkin.

On the road going to Blessingtoun, near Saggard.

At Crumlin, and from thence a vein of it is extended to Saggard.

On the north side, near upper Corballis and Cloghran church; and at the other Cloghran, northerly, is a quarry of a softer kind, fit for plaistering.

Near St. Margaret's, where is a tepid water.

At Swords.

At Chinkwell.

Near Portrane, and near Rush.

Near Argillam; and

Excellent about Skerries.

On the North coast.

At Naul good, and the very pavement consists of it; and Oldtown consists of rocks of it.

Feltrim-hill and Carrick-hill are all limestone.

On the east side, in plenty at Raheny.

Near the lower part of the Hill of Howth, and on the coast of Howth, are quarries.

From Raheny to Baldoyle, a quarry.

On the coast from Portmarnock to Malahide, grey rocks of it.

On the shores going to Dunleary, Bullock, and Mountown.

At Kilcragh, near Donnabate, a quarry.

Next, it is worth while to attend to the variety there is in the texture and composition of parts in different limestones, and in the uses they are proper to be applied to.



The greater number are of the grey sort; the white sparry sort are not so valuable, for reasons to be hereafter assigned. Some few are chalky.

Several of those at Raheny, at Sutton, at the Hill of Howth, and at Swords, bear a polish approaching to marble.

*Vice versa*, at Dolphin's-barn, near the lead-mine, is a blue rotten limestone.

We have also in this county a grey limestone, cap with flint, and strata of flint incorporated with limestone.

Many of them exfoliate or rot in the air, throwing off scales year after year, and by this means become a good manure. Some become black, and some ochre-coloured on their rotting; the last seems to be from some contained iron, and this decomposition may be owing to the oxygene of the air first changing the iron into vitriol, and then leaving the ochre.

N. B. Neuman shews the presence of the marine acid in limestone, both crude and calcined; and it is certain the calcareous earth, thus combined, attracts the moisture of the air.

Some contain the delineations of cockles, muscles, leaves of trees, moss, worms, and other things; v. g. at Howth, at Crumlin, and at Cloghran church, where the limestone is softer, and fitter for burning; but at Raheny, the vein extending from Cloghran to Feltrim, Raheny, and Howth, is more solid and hard, and fitter for building.

I found a yellowish and almost pellucid one at the Danish mount, near Forest; and near Corballis, one whose external coat was grey, the interior part brown and rotten: the external part was calcined to lime; the interior, applied to the like degree of fire, yielded much to the magnet, so that here is a combination of iron. In another near St. Margaret's, wherein there is an intermixture of an ochre-colour, something ferruginous is betrayed, but in a less degree.

Some of them are bespangled with yellow, shining, pyritical bodies, some of which, beside their sulphur, shew copper by the blue tincture they give to spirit of sal ammoniac. Some are marked with black spots as from ink, as on the shore of lower Corballis, which smelt remarkably sulphureous on collision, and sparkled a little on the red-hot iron, the black colour being allowed to be owing to the phlogiston. And, as to the position of their strata, there is not less variety with respect to their inclination to the horizon; some perpendicular, some parallel, others of various intermediate degrees.

And lastly, with respect to the uses of the different sorts, the rotten sort is of use as a manure, and I have known it to scour brass well.

The harder sort is fitter for building; *v. g.* that from Sutton, approaching to marble, and makes a stronger cement, like terras, and enduring under water as gypsum: the softer and white sparry sort serves for  
plaistering,

plaistering, and for burning for manure, but does not make so strong a cement as the grey sort generally does.\*

It is also worth considering as an article of commerce: *Non omnis fert omnia tellus*, is verified in this instance; for Arklow, and some parts of the county of Wicklow, having none of this article, are supplied from Howth, and lately by a black sort from the county of Carlow, one of the best limestones in the kingdom; and I am informed, that the Dutch are so well acquainted with the excellency of our Irish lime, as to have imported it from hence.

### *Of Marbles.*

THEY are a subdivision of limestone, and defined to be stones forming continued strata, bright and beautiful, of very lively colours, and of a constitution so fine, that they will readily take a good polish: they are moderately hard, and do not give fire with steel, excite an ebullition with acids, and burn to lime with a slight fire.

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\* So Doctor Short remarks, that the dark-brown, grey, blackish, and jet-black limestone, though difficult and expensive to burn, is seldom used but for building bridges or churches, because it presently turns hard after burning, and is of perpetual duration, even more lasting than the stone itself, neither air, time, nor weather weakening its cement.



The quantity of marble in this county is not very considerable; nor is it remarkable for that variety of colours, which adorns those of some other counties. We are not, however, destitute of it; for among the limestones at Howth and Raheny, are some that bear the polish; and at Kinsely is said to be a bed of excellent marble, and at Loughshinny a quarry, where some of the marbles are said to have petrified shells incorporated with them; also, marble is found at Kilcragh, near Donnabate, on the estate of Maurice Keating, Esq., and on a bank east of Clonskeagh-bridge; but particularly at the rocks called the landing-rocks, near Rob's-walls, on the coast going from Portmarnock to Malahide, is a large vein of black and some white marble, consisting of huge rocks, like Kilkenny marble, and in it are here and there representations of white shells; and Richard Talbot, Esq. shewed me a sample of black marble, variegated with white, from a large quarry of it at Malahide, which takes a fine polish, and is little or not at all inferior to the Kilkenny marble.

I observed in the hollow of some of the rocks above-mentioned, what appeared to me to be the rudiments of such petrifications, viz. divers shells and small stones, which were so strongly agglutinated to the rocks, that it required a great force to separate them.

As an encouragement to the prosecution of works of this kind, it has been observed, that the lower one goes down, the better the stone.

*Of the Basanite, or Touchstone.*

It is a black stone, even harder than marble, for it strikes fire with steel, which very few of the marbles do, nor does it effervesce with acids, which all marbles do; this was found on the river side, going to Old Bawne.

It receives the colours of gold, silver, copper, and brass rubbed on it; the gold colour not being destroyed by any thing but aqua-regia, whereas the colour of the other metals is instantly destroyed by aquafortis, so that by this means counterfeit money is detected.

*Of Slate, and the Building-stone of Dublin, a Sympexium  
or Rock-stone of Hill.*

THE situation of the city of Dublin, with regard to the last of these stones, is not less happy than what it has been observed to be with regard to the limestone, there being quarries of it on every side of the town, as will appear in the following enumeration, and with it, also, divers other stones a-kin to it, and of great use in the furniture of our houses, and otherwise.

These stones, as to their internal constitution, may be ranked as of a middle class, between the *sympexia* or  
rock-

rock-stones, and the *Stegania* of Hill, or, in more vulgar language, between the limestone and slate, having more calcareous matter than the last, and less than the first.

The first, or rock-stones, are defined to be “Stones forming continued strata, of a close, solid, smooth texture, or composed of no visible grit, and generally destitute of brightness, though in some degree capable of a polish.”\*

The second, viz. slates, are described to be “Stones of a close, compact texture, of a laminated structure, splitting into plates, which easily vitrify, and do not strike fire with steel.”

Our building-stone and limestone are frequently found in the same quarry, as are likewise the limestone and slaty stones; and many of our building-stones (though not of the best sort) are flakey, mouldering into laminæ or scales in the air, and do not burn into lime.

These stones then, occupying a middle place, between the limestone and slate, and an account of the limestone having been already given, it seems not to be out of method to premise some account of the state of the *slates* and *slaty stones* of this county. As to the *Lapis Hibernicus*, or Irish slate, as it is chiefly to be considered as a vitriolic ore, it shall suffice here to refer to the account above given of it as such (being,

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as

\* See Hill, and Emanuel de Costa's History of Fossils, and Walerius.



as to its internal constitution, entirely different from other stones of the same general denomination), and to give a transient view of the slates and slaty rocks in this county, whether of any, or no value, for the purpose of covering houses, as tiles.

On the mountains S. and S. W. of Rathfarnham, slates are the prevailing stone, and it is said that the whole tract, extending from thence to Blessington, is chiefly slaty; and even at Rathcool their firestone chimney pieces are not supplied from their own neighbourhood, but from that of Blessington; and on the mountains S. W. of Rathcool, slaty rocks are the most remarkable; and in a mountain near that town is a quarry of slate, but not wrought, being not very good; from all which appears the absurdity of appropriating the appellation of mountain-stone to our firestone or granite (of which hereafter).

On Barneslingan-hill is a heavy slate, and not so fissile as that from Blessington, yet capable of being split; and, for want of better, some cover their houses with it. At Friarstown some slates are brought from the mountains adjacent.

At Ballyman is a red slate, which on calcination turns redder, and is then a little attracted by the magnet; and in our journey to Bullock and Dalkey were found bad slates: near O'Farrel are said to be better, and capable of splitting, and serving for the purpose of tiles in covering houses.

On

On the south side of the Hill of Howth is a bad slate, too heavy for that purpose. At Ireland's Eye is a red and grey slaty stone; and beyond Portrane, viz. on the shore opposite to Ireland's Eye, are grey and red slaty rocks.

Between Palmerstown and Hermitage is a quarry of a black slaty stone.

Thus it appears, that there are few or no good slates yet discovered in the county, the goodness of which, viz. for the purpose of covering houses, is proved: 1st, by the sound; 2dly, by weighing and soaking six or eight hours in water, and, if it weighs heavier, it will not long endure without rotting the laths or timber.\*

What answers this character, being the *ardesia vulgaris, lapis fissilis, durus, caerulescens, clangosus, ardesia tegularis Walerii, Mineralogie*, is supplied to us from Wales; and what makes the nearest approach to it is brought from the neighbourhood of Dunlavin and Blessington in the county of Wicklow; and the best are said to be found at Dowding's-town on the borders of the county of Dublin† and Kildare.‡

g 2

Rag-

\* Emanuel de Costa's Nat. Hist. of Fossils.

† Linnæus gives an excellent hint concerning the origin of the *lapides schisti*, viz. *Ex humo palustri originem ducere lapidem schistum suadent vegetabilia, quæ huic sæpius inclusa reperiuntur.*

‡ It is a great mistake in the Natural and Civil History of the County of Waterford, that rag-stones were called black building-stone in Dublin, as will abundantly appear in the sequel.

Rag-stones merit a place here, by reason of their affinity to slate, being placed among the *lapides schisti* by Emanuel de Costa, being a useful stone, viz. for giving a smooth edge to iron tools, after being ground on rougher stones. We are supplied with this stone from Wales, but it seems not improbable, that further searches might discover as good here; for these stones abound on the shore of the river Dodder, particularly from Old Bawne to Castle-kelly, being a glossy stone, consisting of straight striæ, mostly grey, rarely of a dusky red, and often appear as if cut off like a chip of wood, being the *schistus viridi-cinereus* of Emanuel de Costa; and some few on this shore are found upon trial to be good for sharpening knives and shoemakers awls.

They are also found scattered in other places, as at Tara-hill near the paper-mills, and near Ballynascorney; and a bluish and fleaky one was found in our walk to Dunsink; and at Stag's-town, in the parish of Rathfarnham, a brown one, like petrified wood.

#### *Of the Building-stone of the County of Dublin.*

I return now to give some account of our building-stone, and others agreeing to it in their internal fabric, in which there is a considerable variety with respect to colour, hardness, and solidity: they are generally



rally darker coloured than limestone, containing more carbon, and less calcareous matter, and for this reason make less ebullition with acids than the limestone; and their strata in different quarries differ greatly with regard to their position to the horizon, as will appear in the following enumeration.

On the east side of the city, near Stephen's-green, is a quarry, which (A. D. 1763) has been opened twelve years, and has enriched its proprietor, consisting of a grey stone like that of Cursis-stream (of which hereafter), being the *saxum durissimum caruleum* of Emanuel de Costa;\* the strata are almost parallel to the horizon. Here are also flags and hearth-stones; and under the above-named is a layer of limestone.

At Cabragh were found two quarries of a grey sort.

N. B. As the present enquiry has been of some years standing, some of the quarries, once opened, will not now be found.

At Glasnevin a quarry of the black sort, somewhat resembling that at Cursis-stream; the strata were perpendicular to the horizon; the stone made but little ebullition with spirit of vitriol.

Near Finglafs bridge two quarries, the position of the strata whereof was nearly perpendicular to the horizon.

Near Finglafs, and east from it, a good black sort, some of the layers of which were eighteen inches thick,

\* Nat. Hist. of Fossils.

thick, and in an inclined position of about 45 degrees. The worse sort mouldered in scales.

At Curduff bridge, a quarry of this and of limestone, where the position of the strata is horizontal.

Near Clonee, a quarry of the black sort, and all along Tullagheen river to Admiral Rowley's.

Near Artane, a quarry formerly wrought, of a bluish and somewhat flakey stone: it made some ebullition with spirit of vitriol, but not so much as limestone, nor did it burn to lime.

Beyond Coolock, another flakey stone, more rotten, and which made a stronger ebullition with spirit of vitriol, and smelt sulphureous on collision.

At Field's-town, a quarry of flag-stones, which may be reckoned a subdivision of this stone, often splitting into laminæ, and making an ebullition with aquafortis.

At Forest and Stradbally are flag-stones.

About Knocksedan, a quarry of hard stones in large pieces, some of six or eight feet long, four broad, and two thick; and a grey one there, not so good, but subject to be rotten.

At Kilsoghan, a small quarry of a hard, blue sort, which made no ebullition with spirit of vitriol, nor burnt to lime.

At Ward, a quarry of good stone, though a little flaty; it made but a little ebullition with spirit of vitriol, and did not burn to lime.

Near

Near Brazeel, and near Rathbeale, quarries of the black sort: at Brazeel a quarry of a greyish blue, and some of the stones large: one was a foot deep, two feet broad, and seven feet long.

At Chapel-midway, a small quarry of the like stone.

At Graliagh another.

On the lands of Mullahoo another quarry: some of these stones are rotten, others sound, but both excited an ebullition with spirit of vitriol, and in so doing emitted a fetid smell, residing in, and thus manifesting the phlogistic (not to say sulphureous) matter, disengaged from the calcareous earth dissolved by the acid.

At Swords, a quarry of this stone; and the like frequency of quarries of this stone is observable on every side of the city, *v. g.*

At Crumlin, a grey sort, in plenty.

At Dolphin's-barn, a blackish sort, and supplies hearth-stones, flags, and head-stones: it is not affected by spirit of vitriol, so strongly as the limestone of Crumlin, nor reducible to lime. The strata dip at an angle of 45 degrees.

At Madden's, opposite to Clondalkin, a fine quarry of black flag-stones.

At Luttrell's-town, a quarry of building-stone and limestone.

Near Palmerstown, a quarry of a firmer sort than that at Cursis-stream, being less scaly, and having stood good in the great house at Palmerstown eighty years.

At



At Lucan two quarries of a good sort.

At Blue-bell several quarries of a grey sort, and extended here and there to Clondalkin.

At Dunsink, a blue and flaky sort: it made but little ebullition with spirit of vitriol.

But the most noted quarry in the county is of a dark grey, or black sort of stone, though not much used for building, except of walls, at Cursis-stream:\* some parts of it are slaty, but these are rejected. It is wrought into beautiful chimney-pieces, smooth, and not inferior to marble, except a little in gloss and hardness. It excites an ebullition with spirit of vitriol, but less than limestone. Kept ten hours in the fire, lost its black colour, but did not slacken with water, nor acquire the taste of lime. Some odd pieces carry a natural polish on their surface, like coal or jet. It also supplies black flags for flooring, hearth-stones, stones for piers, head-stones, and tomb-stones: all these effervesce with aqua-fortis diluted, but less than limestone; all which are smoothened on the spot, with Wicklow sand and water. One of these stones has stood an hundred years in Michan's church, Dublin, without scaling.

Some of these stones have spars and crystals adhering to them, in their interstices, as in limestone; and some the small brass-coloured pyritical bodies interspersed

\* It is what Mr. Kirwan calls calp, and is peculiar to this county.

spersed upon them here and there, which last is a mark of their being more sulphureous, and known and pronounced as such, even by the workmen; and some have the *mica argentea* interspersed; all evidences of the sparry, crystalline, sulphureous, and sometimes micaeous matter, entering into the composition of this stone.

At Smith's mills, situate on Stubbin's land, by the river Dodder, about half a mile to the south-west of the city, is a very ancient quarry, of a hard, black, and, as it were, flinty kind of building-stone, and described by Hill under the denomination of *sympexium siliceum*. This has less sparry matter than the common building-stone, being less affected by acids, is deemed the hardest of any in the county of Dublin, being so hard as to strike fire with steel, harder than many marbles, and acquiring an additional hardness by the weather; and the old spire of St. Patrick's in Dublin is said to have been built of it. It is not a marble, for it does not admit of a polish, but only of being smoothened by sand. Its hardness is so great, that, when long exposed, it can scarcely be cut at all, which is one discouragement to its use. On the contrary, the stones of several of the quarries near it soon moulder into scales with the weather, and should be used only for inside work. This has not always been attended to by the overseers of our public edifices, where we frequently see these last mouldering in a few years;

however, partly from their easiness to be cut, and partly by the situation of some of these stones nearer at hand, and consequently the cheapness of carriage, they are used in preference to the other more solid and durable stone, even in those parts of the building, which are most exposed to the weather: but such persons build for themselves, and not for posterity.

To the like purposes it may not be useless here to subjoin a useful document, with regard to the distinct and respective use of different stones in building. At the Red Cow near Dublin, where are quarries of these stones, the workmen, in their language, distinguish one sort of stone by the name of *Waller* or *Waller*; and I found, upon trial, that these were such as consisted more of a flinty than a calcareous matter; that they struck fire with steel, and made no ebullition with acids; such stones bearing the weather, and therefore being fit for building of walls where they last long, quite otherwise than the flaky sort, and even than ordinary limestone, both which moulder in the air, and are rather fit for the insides of buildings, where they are not exposed to the air. This stone, on its ebullition with spirit of vitriol, stinks for the reason given.

This quarry also supplies head-stones, tomb-stones, hearth-stones, and flags; and the steps going up to Paul's church, London, are said to be made of these last. The four last named stones do all make an ebul-  
lition



lition with spirit of vitriol, but less than limestone, nor are they reducible to lime by calcination: they acquire a degree of polish by rubbing with Wicklow sand and water, on the spot, as those of Cursis-stream.

There is also a black sort of the building-stone on the north of the Dodder at Milltown; and in one of the walls adjacent to the quarry there frequently occurs a stone, which is flinty in the centre, concreted to a calcareous matter surrounding it. The like occurs at Crumlin.

Lastly, in travelling to the east, one meets with frequent quarries of this stone, v. g. near the gallows beyond Stephen's-green, a dark grey sort, and very good, and, by reason of its situation near the town, very profitable to the proprietor.

At Clontarf, a quarry of a bluish sort, scaling in the air, but not much: and on the road going to Killester were those formerly called the Black quarries, by reason of the blackness of the stone. Some of the stones of the last named quarries are almost as hard as flint (and so like those above of Smith's mills), and some strata of them have a bed of black flint in their centre, of half an inch thick, the upper and under stratum of the same stone being the matter of the common building-stone.

In the same quarry were also found flag-stones, often split into laminæ or scales, which are affected by acids, but less than the common building-stone.

On the strand near Booter's-town is a grey fort; and on the south side of the Hill of Howth this stone is found in great plenty, and of a good sort, although neglected.

*Observations on Calp, by the Hon. George Knox, M.R.I.A.*

“As the Academy has evinced a desire to promote mineralogical enquiries in the county of Dublin, I take the liberty of submitting to it the analysis of a mineral, which abounds in the neighbourhood of the metropolis, and which our celebrated president has distinguished by the name of Calp. (Vid .Kirwan's Elements of Mineralogy, Vol. I. p. 233.)

Calp, or black quarry stone of Dublin, is placed, in Mr. Kirwan's Elements of Mineralogy, under the argillaceous genus; being a substance, which possesses the distinctive characters of that earth more than any other. For, although it effervesces with acids, and scratches glass, it neither burns to lime, nor gives fire with steel; whilst on the other hand it emits, when breathed upon, the smell peculiar to argillaceous earth.

The quantity of argill, however, which its chemical analysis discovers, would scarcely, were its internal properties to determine its class, entitle it to rank in that, which Mr. Kirwan has assigned to it.

The

The external characters and leading properties of the specimen, which I used, were the following:

Colour—Greyish black, inclining to blue.

Lustre—o

Transparency—o

Hardness—Scratched glass with difficulty, crumbling at the same time.—Did not give fire with steel.

Fracture—Lateral fracture imperfectly conchoidal—Transverse fracture flaty, passing into the coarse-grained earthy.

Gave a white streak.

Effervesced with acids.

Gave an earthy smell when breathed on.

When calcined did not flake.

Colour, when calcined, a yellowish grey.

Cracked, and flew into thin slates, when exposed to a low heat in an open fire.

Specific gravity, at the temperature of 66 Fahrenheit, 2. 68.

#### CHEMICAL ANALYSIS.

One hundred parts contain the following substances, in nearly the proportions annexed:

Carbonate of lime,	-	-	-	68
Oxyd of iron,	-	-	-	2
Argill,	-	-	-	7½
Silex, -	-	-	-	18
Carbon and bitumen,	-	-	-	3
Water,	-	-	-	1½

The



The process, by which a mineral substance, of the nature of that which is the subject of this paper, is analysed, is so simple, and well known, as almost to render any detail of the operation unnecessary. More than one analysis was made; the muriatic and acetic acids were severally used to take up the carbonate of lime; but the former dissolved the iron also. The metal was precipitated from the muriatic solution by prussiate of pot-ash, and the lime separated from each by carbonate of potash. The argill was extricated with difficulty, by long digestion and boiling in sulphuric acid, and precipitated by carbonate of soda.— Besides the general analysis, each ingredient was separately collected from distinct portions, of an hundred grains each, of the specimen.

The following are my reasons for supposing, that the iron was in the state of an oxyd, and that the principal colouring matter was composed of carbon and bitumen.

With a view of discovering, whether the iron was in its metallic state, or otherwise, in the stone, a large quantity of it, amounting to several hundred grains, was treated with muriatic acid, and the gas, which was extricated, was passed through water, and caught in a pneumatic apparatus.

The same process was repeated, with the substitution of the sulphuric for the muriatic acid. In both cases  
the

the result was the same; no hydrogen gas could be collected; but, when the whole of the carbonic acid had been imbibed by the water, there remained, in the vessel, a small quantity of azotic gas.

That the dark colour of the stone could not be produced merely by the oxyd of iron, I was naturally led to suspect, from the change produced in it by calcination. I therefore satisfied myself on that point, by carefully separating from a portion of the stone every particle of the metal, a process which produced no change in its colour.

As it appeared now pretty evident, that the calp contained some inflammable matter, to which it was indebted for its dark colour, I endeavoured to estimate its proportion by the following process:

Thirty grains, from which all the carbonate of lime and oxyd of iron had been previously extracted, were dried in a close vessel, and in such a heat as seemed sufficient to expel the water, and afterwards calcined. By the calcination the powder was rendered white, and lost that proportion of its weight, which I assign, in the result of the analysis, to the carbon and bitumen.

Still, however, it remained to determine in what state, whether of carbon or of bitumen singly, or whether of a mixture of both, the inflammable colouring matter existed in the mineral.

On the supposition, that it was merely carbon in a state of extreme division, it was boiled (the lime, argill, and iron having been previously separated) in concentrated nitrous acid. By this treatment the intensity of the colour was somewhat diminished, and a small quantity of nitrous air was produced.

The next attempt was to separate the bitumen, supposing that it contained any. To effect this, a large quantity of the powdered calp was boiled in caustic pot-ash, filtered, andedulcorated; but as the residuum on the filtre retained the original colour, it consequently could not have been entirely produced by bituminous matter.

That it contained, however, *some* bitumen, seems pretty evident; for, having evaporated the filtered solution to dryness, and dissolved the dried residuum in muriatic acid, an oily matter floated on the surface of the liquor.

From these experiments I have ventured to assert, that the colouring matter is composed, in proportions which I have not been able to ascertain, of a mixture of bitumen and carbon.

With respect to the azot, I am unable to form any satisfactory conjectures on its origin. Might it not have proceeded from the body of the animal, whose shell had contributed the carbonate of lime to the formation of the mass?

The



The following facts may assist enquiries upon this subject :

Calp is found in great quantities in the neighbourhood of Lucan ; and the quarries, from which it is dug, generally exhibit the following appearance :

Immediately under the vegetable mould is a thin bed of limestone-gravel ; beneath which, to a considerable depth, are strata of dark limestone, separated from each other by beds or layers of argillaceous shistus. The deeper the quarry is dug, the nearer the limestone seems to approach to the nature of calp ; to which it at length arrives, by a gradual and scarcely perceptible transition.

In the grounds of Edmondsbury, scarcely one mile from Lucan, there is a spring, called by the common people the boiling well, which is of a somewhat higher temperature than the neighbouring springs, and from the bottom of which are continually rising large bubbles of pure azotic gas.

In an analysis, which I sometime since attempted, of the Lucan water, I found that azotic as well as hydrogen gas escaped from it at a boiling heat ; a circumstance, which could hardly have been occasioned by the decomposition of atmospheric air held in solution in the water, as no sulphuric or sulphureous acid was produced, as was to be expected from the simultaneous decomposition of sulphurated hydrogen gas and atmospheric air.

It may also be worth observing, by persons who are desirous of prosecuting this enquiry farther, that in most of the limestone in that neighbourhood, which contains shells, is to be found sulphurated hydrogen. And likewise that, after evaporating the Lucan water to dryness, a small quantity of a fetid bituminous matter, soluble in alcohol, remains mixed with the earths and salts.

On these few facts I shall not presume to form a theory; neither do I offer them as subjects for speculation, but as an encouragement to further and more accurate researches.

*Note.*—As I believe, that my analysis of the Lucan water is a nearer approximation to the truth than any hitherto published, and perhaps sufficiently accurate for medical purposes, I shall here subjoin it. To those, who are acquainted with the difficulties attending the investigation of the ingredients of an hepatic water, it will not afford any surprise, that I should offer the result of mine with diffidence.

#### LUCAN WATER, TWO GALLONS.

			GRAINS.
Carbonate of magnesia,	-	-	1½
Carbonate of lime,	-	-	23
Carbonate of soda,	-	-	39
Muriate of soda,	-	-	4
Sulphur,	-	-	16
Bitumen,	-	-	-

The

The carbonate of lime is held in solution by an excess of carbonic acid, amounting to about 32 cubic inches in two gallons of the water. The sulphur is in the state of sulphurated hydrogen."

*Of Flints, and other Stones akin to them.*

Our shores, particularly from Laughlinstown to Bray, abound with pebbles of all colours, and often beautifully variegated, so that they might contend with the Egyptian. They all strike fire with steel, and cause no ebullition with acids. They bear the polish, and serve for making the tops of snuff-boxes, seals, heads of canes, sleeve-buttons, and handles of knives.

*Of Porphyry.*

We find in several places, even in the neighbourhood of Dublin, stones which very nearly correspond to the characters of porphyry; particularly on the Hill of Howth are large rocks, white and red, shining like marble, and to a superficial view appearing like white and red marble, bearing a natural polish (as the red one did an artificial), but much harder than marble, for this stone cut an iron pestle when struck



on it, nor did it bear the saw : it struck fire copiously with steel, and smelt sulphureous on collision. It made only a just sensible ebullition with oil of vitriol ; scarce any with spirit of salt or aquafortis. Kept ten hours in a pipe-maker's furnace, it was not softened, but harder, and still struck fire with steel.

On Ireland's Eye are found more rocks of the same kind of stone, having a natural polish, breaking opaque and purple, and of several colours, and, when kept ten hours in a reverbatory furnace, it was still hard, although more brittle, but still struck fire with steel.

*Of the Granite, vulgarly called Firestone.*

The granites\* are stones composed of separate and very large concretions, rudely compacted together, giving fire with steel, not fermenting with acids, and slowly and imperfectly calcinable in a large fire.† Now our firestone agrees almost in every particular (except in bearing a polish, which ours does not, save in its shining from the great quantity of mica, with which some of these abound) to the *Granita alba durissima nigro-variegata, quæ incolis Cornubiensibus*, Moore-stone of the same author, who affirms, that a strict analysis and

\* Hill's History of Fossils.

† Tournefort, in his voyage to the Levant, calls the granite a white or greyish marble, naturally petrified together with small pieces of talc, and that almost all the islands in the Archipelago are covered with this granite.

and examination of these stones shew them to be a mixture of pure mica, true crystal, and an earth not unlike field-spar; and he says that it is found in immense strata in some parts of Ireland, but is disregarded there, and never brought into use; but this, with divers other improvements, within these thirty years is introduced, and greatly used and esteemed in our buildings in the city of Dublin (in the neighbourhood of which it abounds, even in almost all the mountains to the \* south, extending to the neighbouring counties of Wicklow and Wexford), insomuch as to have in some measure supplanted the use of Portland-stone; for though it is not capable of being cut into the finer figures of architecture as that, yet it may be cut into any shape, and bears the weather better. It is cut at the quarry (where it is softer, but hardens in the air) into all shapes by the chisel, mallet, and hammer (like the freestone, than which it is harder), as into window-jaumbs, stools of windows, lintels and jaumbs of doors, pillars, troughs, mortars, and chimney-pieces. The spire of the present steeple of St. Patrick, in Dublin, is built of it, and part of Essex-bridge, and the piers of Wicklow, and at Dunleary.

\* Near Dunleary and Bullock some of these stones have been found, which bear a polish (being cut with emery), but not a beautiful one; they are building their piers at Dunleary with it.

### *Of Mill-stones.*

THESE demand a distinct consideration from the foregoing stones; those, which occurred to me in this county, were for the most part red, and contained some portion of ferruginous matter; being altogether distinct from the *saxum arenarium*, *lapis molaris dictum eos molaris* of Walerius, which has spar combined, and sometimes effervesces with acids, which ours does not, or but little. A specimen of ours, found on the shore between Raheny and Malahide, being powdered, fled to the magnet swiftly, and is one of the *lithozugia* or pudding-stones,\* in Hill's History of Fossils, p. 557, who says it is used in some parts of England for cutting into snuff-boxes and other such toys; and indeed some of these are naturally polished.

And in a glyn called Millstone-glyn, between Rathfarnham and Carrickmayne, is a stone like the preceding, being a petrification of gravel, iron-stone, &c. Of this one ounce, two drachms, and fifty grains, kept eleven hours in a naked coal-fire, lost scarce one grain, but still retained its hardness, and struck fire with steel.

On

\* In Cronstedt's System of Mineralogy, it is called *Saxum silicibus amorphis materia Jaspidea conglutinatis*, *Anglice*, *plumb-pudding-stone*.



On Ireland's Eye, and on the road between Newcastle and Rathcool, is a red stone of the same kind.

On the lands of Donnabate are large rocks called millstones, consisting of pebbles and flint cemented together, of various colours, red and pale, and which struck fire with steel, and made no ebullition with spirit of vitriol.

N. B. Thomas Covey, an ingenious architect, has made some remarks on some of these stones in the county of Wexford, which I shall insert in his own words. "They poole or cleave these rocks with wedges, and bring them to the form of millstones, with picks and pick-hammers (for no chizel will cut them), and they are very sound, and grind corn clean and well; and I have known good walls to have been built of this stone; for they dress tolerably well with the hammer, and bind hard in their mortar."

#### *Of Lead Ore.*

IN a manuscript in the College library, is the following paragraph: "In the city of Dublin, between New-row and New-street, as you go to Roper's-rest, within sixty yards of the river, is a lead-mine, poor in silver, but yielding one ounce of lead from three of the ore, as John Powel, a miner, found upon a trial of it, made at the request of Sir George Hamilton."

Lead

Lead ore has been found at the quarry near Stephen's-green, on the road to the Black-rock, being on the east side of the city; and at old Jones's quarry at Dolphin's-barn, being the west side; half an ounce whereof, being fluxed with equal parts of potashes, gave a drachm and a half of pure lead.

This quarry was formerly wrought upon, and a smelting furnace was erected in the neighbourhood.

And at another quarry adjoining the Commons of Kilmainham, called Fleming's quarry, higher up the road than Jones's quarry, there were raised, in the years 1767 and 1768, in the space of about eighteen months, sixty or seventy tons of lead ore, which yielded about twelve hundred of lead from each ton of ore, and about twenty-four ounces of silver from each ton of lead: the workmen wrought here to the depth of about thirty yards; but, as the ore raised at this depth came too dear, on account of the great expence of keeping the work free of water, it was dropped.—There are two or three veins of lead ore in the quarry, all of them seeming to take their course into the said commons; upon one of these veins in the commons, some miners in the year 1769 were at work, and raised upwards of ten tons of ore, which they disposed of, when washed, to those who smelt it, and the workmen made good wages; they found it within three feet of the surface of the ground, and did not work deeper than about twenty-eight feet, on account  
of

of the obstruction by water. It is supposed, that the ore they then raised would produce the same quantity of lead and silver, as the ore raised in Fleming's quarry above. One of these veins seems to take its course across the road to Andrews's house, near the wall of the court of the said house, where the ore has appeared, and probably takes its course towards the mountains.

I am informed that, unless lead will produce thirteen ounces of silver in the ton of lead, it won't bear the cost of refining, the loss of lead being from two to three hundred weight in the operation. Lead ore has been also found at Kilmainham, being probably a continuation of the same vein from Dolphin's-barn. And in the deer-park near Castleknock, there was found lead ore and copper ore; and also near the old castle of Castleknock, and north-east from it, there was a lead-mine opened in the year 1744, by Edward Ford, Esq. and on some of the stones were green spots, indicating a mixture of copper. Likewise at or near Dubber, and at Dunsink, is found both lead and copper ore, and some very rich ore at Cloghran's church, where two mines were formerly wrought upon, but the work was dropped.

Near Rob's-walls, in the rocks, lead ore is seen disposed in ramifications; and crystals resembling Kerry stones are found there, which is an encouragement to make a search there. Also, lead ore is found on the



Hill of Howth, and a vein of it on the shore, about midway between Lord Howth's house and the Lighthouse.

On the North strand, almost opposite to an old quarry near Clontarf town, are two or three veins of lead ore; one whereof, at the distance of about eighty yards from the shore, was wrought upon in the year 1768, by some miners, who raised there upwards of fourteen tons of ore, which afforded them good wages. On the surface appeared a kind of yellowish ochre; they would not sink deeper than about thirty feet, nor could they make large openings, as their pits were filled every tide with the sea-water, which they were obliged to pump and lade out, so that they could not work at raising the ore more than two or three hours every tide; this ore produced, when smelted, about twelve hundred of lead in each ton of ore; and some silver was found in the lead upon assaying it, but not worth refining.

A lead course near Crab-lough, was formerly wrought upon by Captain Vernon, whose estate it was; but he desisted working it, as it did not answer his expectations.

I am informed that, on the estate of Lord Fitzwilliam, under Lady Arabella Denny's garden, a vein of lead ore hath lately been observed, of some inches thick, by Patrick Hyland, miner.

Near

Near Dalkey is a lead mine, where it is said that some hundred tons of ore have been raised. I got forty-two grains of lead from ninety grains of it, fluxed with equal parts of salt of tartar.

In Killeny Bay, on the estate of John Malpas, Esq. a work was begun in the year 1751; the ore was said to be rich, and to contain a considerable quantity of silver.

On the demesnes of St. Catharine's, a lead vein was discovered, and formerly wrought upon for a short time by the owner, Sir Samuel Cooke.

Upon some lands belonging to the city of Dublin, near Hunt's-town, and adjoining to the public road, leading from Dublin to Ratoath, by the way of Cardiff's-bridge, there appears a lead vein, which has not yet been wrought upon, though it seems to give a promising prospect.

#### *Copper Ore,*

OCCURS not unfrequently in this county; but though some attempts have been made in raising it, nothing of moment hitherto has been done.

Near the river, about a mile west from Knockmaroon-hill, is a vein of copper ore.

At or near Dubber is a yellow, green, and shining copper ore.

120. Near Cloghran church, a marcasite of copper and lead mixed.

121. Crystals, some of which have green spots interspersed (an indication of copper), were found near what they call the Diamond Rock (being a collection of crystals) at Loughshinny, where Benedict Arthur, of Seafield, Esq. raised some copper ore, but dropt it, the vein, though sometimes affording large lumps, proving thready and small.

122. In a quarry of limestone and building-stone, the property of Hamilton Gorges, Esq. of Rathbeal, copper ore was found in the form of a crystalline stone, variegated with green, yellow, and brown colours, speedily imparting a blue tincture to spirit of sal ammoniac.

123. In the parish of Castleknock, near Diswel's-townhouse, on the estate of Thomas Kennan, Esq. copper ore was found mixed with spar, and which appeared to be rich, but, after sinking some yards, the work was dropt; and on the same estate, in a quarry, there appeared a copper-course, which was wrought upon for a few months, but the ore raised there did not defray the expence; and as the course seemed to lead into the estate of Simon Luttrell, Esq. which was nearly adjoining to it, and the undertaker had no mining lease, the work was dropped.



*A short Account of the first Series of Minerals, consisting of an hundred Specimens, collected and presented by Robert Blake, M. D. to the Dublin Society; which are to be hereafter differently and more accurately arranged, for an Outline of the Mineralogy of the County of Dublin and its Vicinity.*

- No. 1. Exhibits the general appearance of the granite, of which the principal mountains in the county of Dublin are formed, from the quarries beyond Kilgobbin. Its colour is generally milk-white, but in some places it is greyish or ochre-yellow.
2. A specimen of ditto, from the same place, with a perfect hexagonal crystal of silvery white mica.
3. From the same place; the grains of felspar are much larger than in the former specimens; it contains garnets.
4. From Kilmacud, with crystals of shorl, and garnets.
5. From ditto, with large masses of remarkably white felspar; the quartz is very distinct in this specimen.
6. An uncommon specimen from the same place; the colour of the felspar being nearly flesh-red.
7. From Rathfarnham, with brownish black mica.
8. From ditto, rather uncommon; it consists chiefly of greenish grey mica.
9. Granite, from the same place, consisting of finer grains than any of the former specimens, with garnets.

- No. 10. & 11. From the banks of the river Dodder at Rathfarnham-bridge; still finer grained, with crystals of shorl.
12. Remarkably fine-grained granite, with garnets and hornstone, the latter being of a pearly grey colour; from the fields of Oden, near Rathfarnham.
13. Fine-grained granite, passing into white quartz, from the mountains of Shankill, beyond Ballynascorney.
14. Ditto, ditto, ditto.
15. Granite, of an ochre-yellow colour, found near Dalkey, with a vein of very fine white-grained granite passing through it.
16. A finer specimen of ditto, from the same place.
17. Gneiss, or stratified granite, from Kilmacud.
18. One of ditto, almost slaty, from Carrickmines-hill.
19. Micaceous schistus, with veins of fine-grained granite passing through it, from Ballynascorney.
20. A specimen of coarse-grained granite, from the mines near Dalkey.
21. A specimen of very pure white foliated barosclenite; a vein of which passes through the granite at Dalkey, and resembles in colour and lustre the felspar of the specimen No. 20.
22. A large mass of the barosclenite, to shew the thickness of the vein; the surfaces, which were in contact with the granite, are covered with mica.
23. One of ditto, ditto, from the same place.

- No. 24. Coarse-grained porcelain rock, from the mines at Dalkey.
25. A finer-grained specimen of ditto.
26. Much finer-grained ditto.
27. Remarkably fine-grained ditto.
28. In the state of coarse powder.
29. Some of the porcelain powder or kaolin, washed and separated from the grains of quartz &c.
30. Pearl-grey-coloured hornstone from the same place.
31. Porcelain rock, with veins of hornstone passing through it; the hornstone approaches nearly to calcedony.
32. Hornstone curiously crystallized, with galena do.
33. A more perfect specimen of do. do.; this specimen approaches very near to calcedony.
34. Ditto, ditto, ditto, with martial pyrites and brownish blende.
35. A specimen of steel-grained lead ore from the same place.
36. A specimen of granitell, consisting of white quartz and hornblende, from Shankill, beyond Ballynascorney.
37. Bluish grey compact limestone, with yellowish white calcareous spar, and yellow blende, from the quarries near Milltown.
38. Ditto, ditto, with veins of white calcareous spar, from the great quarries near Clonskeagh bridge.
39. Ditto,



- No. 39. Ditto, ditto, beautifully veined with very white calcareous spar, from the quarries on the banks of the Royal canal, near Kirkpatrick bridge.
40. Ditto, ditto, with vermiform impressions from the same place; this species of petrification I believe is peculiar to Ireland; I have observed it on the sea shore at Howth, and also amongst the Kilkenny marble.
41. One of ditto from the same place, with yellow blende.
42. One of ditto from ditto much less compact; the vermiform impressions, being white, are beautifully distinct.
43. Light-grey compact limestone, with a narrow vein of basanite, or the lydian stone of Werner, passing through it, of a greyish black colour, from the quarries at Milltown.
44. One of ditto ditto, with a larger vein of basanite and illinations of white quartz, from the same place.
45. One of ditto ditto, with a much larger vein of basanite passing through it, and intersected with veins of white quartz, from ditto.
46. Light grey limestone, with a large vein of basanite, from the banks of the river Dodder near Rathfarnham.
47. Ditto ditto, with a pentagonal mass of basanite adhering to it, from ditto.

48. A mass of basanite of an hexagonal figure, intersected with veins of an ochre-yellow calcareous earth, from ditto.
49. Basanite of a slaty nature, intersected with numerous veins of yellowish calcareous earth, from do.
50. An argillaceous sand-stone, surrounded with thin veins of basanite from Ballynascorney.
51. Remarkably white calcareous spar, intermixed with bluish-grey compact limestone, from the quarries near Kirkpatrick-bridge, Royal canal.
52. Yellowish white calcareous spar, from the same place, which, if placed on a hot iron, becomes beautifully luminous in the dark.
53. Honey-yellow striated calcareous spar; the striæ diverging from a common centre, and terminating in rhombs, with granular limestone from the same place.
54. One of ditto, ditto, the striæ terminating in much larger rhombs, from ditto.
55. Yellowish white calcareous spar, with rhomboidal crystals, very uncommon, from the same place.
56. White striated calcareous spar, the striæ of which are nearly parallel, very uncommon, from the gravel-pits at Borenebreene.
57. Flesh-red calcareous spar, with bluish-grey limestone, from a quarry near the twelfth lock, Royal canal.

No. 58. Singularly accumulated rhomboidal crystals of ditto, of an Isabella yellow, in a nodule of sidero-calcite or pearl-spar, from the Royal canal, Kirkpatrick-bridge.

59. Bituminous marlite, with a considerable appearance of compact bitumen and martial pyrites, from the parapet-wall, at the left hand side, near the Pigeon-house. As several of these stones are in the wall alluded to, it might be of considerable consequence to discover where they were quarried.

60. A compact specimen of sidero-calcite, of a reddish white colour, from near Kirkpatrick-bridge, Royal canal.

61. A less compact specimen of ditto, with calcareous spar, from ditto.

62. A remarkably fine specimen of compact sidero-calcite, of a reddish white colour, with uncommonly large lenticular crystals of ditto, from ditto.

63. A group of smaller lenticular crystals of ditto, of a brownish yellow colour; their lustre metallic, and intermixed with bluish grey compact limestone; from ditto.

64. A specimen of ditto, ditto, with smaller crystals.

65. Ditto, ditto, of a pearly white colour, from ditto; very rare at this place.

66. A specimen of ditto; the colour of the crystals less white, with honey-yellow calcareous spar, and light-grey limestone; from ditto.



- No. 67. Very small crystals of ditto, nearly rhomboidal, of a brownish yellow colour, cellular, and intermixed with bluish grey compact limestone; from ditto.
68. General appearance of the crystals of ditto, intermixed with calcareous crystals.
69. An uncommon mass of ditto, with calcareous crystals of a wine-yellow colour, from ditto.
70. Sidero-calcite, calcareous crystals, and iron ochre.
71. Ditto, with small lenticular calcareous crystals, and bluish grey limestone.
72. Ditto, intermixed with white calcareous spar, siliceous crystals, and a crystal of purple fluor, on bluish grey limestone, from ditto.
73. A vein of sidero-calcite, passing through dark grey limestone; from the quarries at Dolphin's-barn.
74. A specimen of sidero-calcite, from Sligo.
75. Ditto, ditto, with light-grey limestone; great masses of which I observed near the marble-mills in the county of Kilkenny, in the year 1797.
76. A crystal of purple fluor, imbedded in white calcareous spar, on compact limestone, with yellow blende, from near Nevill-bridge, Royal canal.
77. Light smoke-grey crystallized quartz, with white ditto, and partly coated with yellow iron ochre; from near Kirkpatrick-bridge, ditto.
78. Cellular quartz, with crystals of quartz and malachite; from ditto.

- No. 79. Round, cellular, or nearly reniform quartz, with crystals of ditto, from the same place: the under surface of this specimen is uncommonly cristated.
80. Small reniform crystals of white quartz, on hornstone; from ditto.
81. A drusy of quartz crystals, in some places radiating from a common centre, on a basis apparently of tripoli; of a pale yellowish grey colour, with petrifications; from ditto.
82. Very white quartz, crystallized in hexangular prisms, surmounted at both ends with hexagonal pyramids; the prisms appear as if sprinkled over with minute crystals of ditto, and arranged on cellular quartz; from ditto.
83. Yellow crystals of quartz, on hornstone, very uncommon, from ditto.
84. White quartz, with copper pyrites, fibrous malachite, and iron ochre, from near Neville-bridge, ditto.
85. Tolerably rich copper pyrites, and fibrous malachite, from ditto.
86. & 87. Indeterminate masses of white quartz, very common on the banks of the river Dodder, which, when rubbed together, emits light, even under water.
88. A porphyry, from Bray shore, with a basis apparently of clove-brown jasper, with greenish felspar.



- No. 89. An argillaceous porphyry, with a basis of dark-green hornblende, passing into greenish actynolite, with some adhering quartz; colour of the felspar yellowish; from the brakes of Ballynascorney
90. Shistose mica, of an undulating fracture, very beautiful; from ditto.
91. Part of the same specimen, split in a different place where the fracture is less undulating.
92. A specimen of ditto, ditto, of a silvery grey colour, from ditto.
93. Ditto, ditto, ditto; its fracture straight foliated.
94. One of ditto, ditto; its lustre almost pearly; from ditto.
95. A very uncommon shistose mica, from the shore at Killiney Bay; it appears stellated: part of the mountains in that neighbourhood are formed of it, which shall afterwards be noticed.
96. Shistose mica, passing into chlorite, and curiously intersected with veins of quartz; from the brakes of Ballynascorney.
97. Iron-stone, intermixed with iron ochre, from near Neville-bridge.
98. An uncommon mass of cellular iron-stone, partly brown, and partly ochre-yellow; from ditto.
99. A specimen somewhat similar of ditto.
100. A specimen of ditto, ditto, one of the cells of which is filled by infiltration with siliceous crystals.



## A LIST

OF

## ARTICLES DEPENDANT ON AGRICULTURE,

*Imported into Ireland within the last seven years.*

	Apples.	Ashes.	Beans & Peas.	Oats.
	<i>Busbels.</i>	<i>cwt. qr. lb.</i>	<i>Busbels.</i>	<i>Barrels.</i>
1795,	1830 $\frac{1}{2}$	88,709 3	1615	559
1796,	536	172,513 1	1908	—
1797,	2780	106,549 3 7	1434 $\frac{1}{2}$	261
1798,	361 $\frac{3}{4}$	54,974	1052	17
1799,	23	117,243 1	1299	28
1800,	527	159,580 3 14	1407 $\frac{1}{2}$	40
1801,	2897	110,689	1565 $\frac{1}{2}$	816 $\frac{1}{2}$
	Barley & Malt.	Wheat.	Flax-feed.	Hemp-feed.
	<i>Barrels.</i>	<i>Barrels.</i>	<i>Hbds.</i>	<i>Hbds.</i>
1795,	—	96,294	46924	—
1796,	26	13	25052	114
1797,	7056	155	42796	104
1798,	52	611	36009	104
1799,	3237	85	40387	134 $\frac{1}{2}$
1800,	44898	18,588	64547	131
1801,	288 $\frac{1}{2}$	42,994	33862	152 $\frac{1}{2}$
	Hops.	Flour.	Garden-seeds.	Grass-seeds.
	<i>cwt. qr. lb.</i>	<i>cwt. qr. lb.</i>	<i>lb.</i>	<i>cwt. qr. lb.</i>
1795,	18,340 1	11,496	58295	890 3 7
1796,	18,175 2 21	—	47788	1161 3 14
1797,	12,606	—	40185	1482 2 21
1798,	25,054	—	40445	1597 2 7
1799,	11,693 2 14	—	33894	235 1 7
1800,	9,998	360 3 14	43780	361 2 14
1801,	9,759 2	42,352	51144	399 2 14

	Starch.	Tallow.	Spanish Wool.	Worsted Yarn.	Clover.
	<i>cwt. gr. lb.</i>	<i>cwt. gr. lb.</i>	<i>cwt. gr. lb.</i>	<i>lb.</i>	<i>cwt. gr. lb.</i>
1795,		4913 2 7	362 0 14	1472	4413 1 14
1796,	177 2 21	6864 2	215 3 7	525	1765 0 0
1797,	131 1 14	12757 3 21	230 1 14	1440	3125 3 0
1798,	11	2240 1	221 0 0	990	3540 3 0
1799,	79 3 14	7758	244 3 0	2213	3201 3 0
1800,	125 2	9259	758 3 14	2438	3205 2 14
1801,	2107 2 14	19441	683 3 0	1935	2688 0 0

In the article of clover-feed I am not a little surprised to find a decrease in the quantity imported; for in the seven years, ending 1770, the average was 3349 cwt.; in the next seven years, the average was 3927 cwt.; but in the seven years ending 1801, the average is only 3134 cwt. If a large quantity has not been saved in Ireland, it helps to prove, that we have not improved in our system of cropping. Though our Statistical Reports are generally silent on this head, there certainly has been some saved, but I fear not enough to account for the defalcation in the imports.

In many places, where clover has been sowed, it has not been as part of a course, but merely as a random crop for soiling or (too often) for grazing: even in this mode its inestimable value ought long since to have brought it into general use. Whatever prejudice may dictate, it will be found, that scarcely any article in the list cannot be produced in Ireland in great perfection.

It

It will be a difficult matter to ascertain the quantity of clover imported since the duties were taken off, as I understand it has become a practice with some importers, from a ridiculous ostentation, to enter a much greater quantity than they really import, which may help to mislead in any future calculations.

## IRRIGATION.



*IRRIGATION,*

## BY MEANS OF WARPING.

THE following extract from Mr. Tatham's Treatise on National Irrigation, will, I hope, be deemed worth attention, as we possess vast tracts of ground in many parts of Ireland, that are capable of this improvement, particularly that great tract of strand between the Light-house and Booterstown, and between the same Light-house and Clontarf. I have frequently viewed these two strands, and am perfectly well convinced they could be easily reclaimed, and made capable of admitting the improvement suggested in the following extract. If Lord Fitzwilliam or Mr. Vernon were sensible of the ease, with which this could be executed, and the great addition it would make to their income, I imagine the suggestions of those unacquainted with such affairs would have little weight; for the sneers of ignorance have often prevented many improvements from being adopted, or even proposed, and may justly be added to the list of obstacles to the improvement of waste land. I have frequently pointed out the practicability of this improvement, and have been answered, more than once, that 100,000*l.* would not build a wall sufficiently strong to keep out the sea. I hesitate not

to declare that, except for a sluice, *a single stone is not wanting*; and also that, if this idea had been originally adopted, the Ballast-office wall, that cost such immense sums, need not have been erected, and the greater part of the strand might have been long since in meadow, which would have added some thousands a year to Lord Fitzwilliam's and Mr. Vernon's rent-roll.

“The word *warping* is applied in agriculture to describe that species of irrigation, which deposits a quantity of sediment from the flowing tide, and which forms a stratum of soil or manure, when the waters have receded from it. This definition of the word appears to be chiefly limited to tide-water flowing from the sea; though the nature of the accumulation seems to be nearly the same with the siltage of fresh-water rivers, the redundancy of which, by way of distinction, is called flooding.

“The method recommended by Lord Hawke in the Agricultural Survey of Yorkshire (West riding), p. 164, is, to bank the land, which is to be warped, against the river; sloping the banks on each side of their crown or top, at the rate of three feet to every one foot perpendicular rise. The height and breadth of the top will, of course, be regulated by the strength of the tide, and depth of the water; for the object is to command the land and water at pleasure. The openings or sluices in the banks are in a smaller or greater number,



number, according to the extent of the land to be warped, and the fancy of the proprietor; but in general there are only two sluices; one called the *floodgate*, to admit; and the other called the *clough*, to let off the water gently. These, Lord Hawke says, are enough for ten or fifteen acres.

“ When the spring tide begins to ebb, the floodgate is opened to admit the tide; the clough having been previously shut by the weight of water brought up the river by the flow of the tide. As the tide ebbs down the river, the weight or pressure of the water being taken from the outside of the clough next the river, the tide-water, that has been previously admitted by the floodgate, opens the clough again, and discharges itself slowly, but completely through it. The cloughs are so constructed as to let the water run off, between the ebb of the tide admitted, and the flow of the next; and to this point particular attention is paid. The floodgates are placed so high as only to let in the spring tides when opened; they are placed above the level of the common tides.

“ The expence of warping will be greatly influenced by the situation of the lands, and the course and distance, which the warp is to be conducted. The expence per acre will depend greatly on the extent of land, which may be overflowed by one and the same set of drains and cloughs. Mr. Day, of Doncaster, thinks



that great quantities of land may be warped at so small an expence as from four to eight pounds per acre; and he states the advantages gained at various rates, from five to fifty pounds per acre; and considers the greatest advantage to arise from warping the worst and most porous land.

“ In enumerating the advantages, that accrue from warping, Mr. Day says, the land will bring very large crops for several years afterwards without any further manure; and that warping may be easily repeated at a small expence, by opening old drains, which may serve in the interim for draining the land, if it should be necessary. He recommends the culture of oats for the first crop after warping; and thinks this practice better adapted to oats, wheat, or beans, than to barley; which last is rendered too strong and coarse by the great fertility of the soil. He recommends, however, a coat of warp, whenever the land is fallowed; and considers this management, above all other kinds, the cheapest, when properly applied.

“ Mr. Day defines warp to be the sediment left upon the land by flooding it with tide water. It seems to be the letting in water, where the tide flows, that is termed warping; letting in fresh water from a river, though by a similar operation, would be called flooding, and not warping. The benefit derived from warp appears to rest in the saline particles, and a greater deposit

deposit of sediment than can be generally obtained from fresh-water floodings. He recommends June, July, and August as the best months for warping, because at this season the soil is in its driest state, and, of course, the most susceptible of those impregnations and acquisitions, which are received in the acts of absorption and adhesion. He considers wet seasons the least proper for warping, because the redundancy of fresh water, which becomes mixed with the muddy tide, must necessarily weaken the saturation, and render it less capable of depositing sediment. Land thus manured is deemed to be the best for potatoes, and far the most productive. The depth of the water to be used for warping will vary according to the surface of the soil, nor is it material, that it should be always at the same height, although it is well to retain a depth of three or four feet where the situation and embankments will admit of it.

“ Mr. Young, in the Agricultural Survey of Lincoln, says; what the land is, intended to be warped, is not of the smallest consequence; a bog, clay, sand, peat, or a barn floor, all one; as the warp raises it in one summer from six to eighteen inches thick, and in hollows, or low places, two, three, or four feet, so as to leave the whole piece level. The first warping-works, which Mr. Young viewed, were at Morton ferry, where Mr. Harrison, who shewed them, has a large concern



concern in a very great undertaking, no less than to warp 4,620 acres of commons, by means of an act of inclosure and drainage. They are attempting to warp four hundred acres in one piece, which is to be sold *to pay the expence of doing all the rest*, and they have been offered thirty shillings an acre rent for it, when finished.

“ The improvements by warping, which Mr. Webster has made at Bankside (which is within the county of York), merit particular attention. His farm contains 212 acres of land, all warped; it cost him 11*l.* per acre, and he would not now take 70*l.* for it; he thinks it worth 80*l.* per acre generally, and some parts of it worth 100*l.* The whole expences of his improvements did not exceed 2,500*l.*, or 12*l.* per acre. A neighbour below him offers 5*l.* per acre for the use of his sluice and main cut, to warp three hundred acres, which amounts to 1,500*l.* and reduces the expence of Mr. Webster's works to 1,000*l.*; take it however at the highest, and say that the land cost 11*l.* and the improvements 12*l.* per acre, making 23*l.*, and he will gain, by a sale at 70*l.* per acre, 47*l.* per acre, or 9,964*l.* upon the operation.

“ This gentleman has warped some land, which, before warping, was moorland, worth only 18*d.* per acre; but it is now as good as the best; some of it would let at 5*l.* per acre for flax and potatoes, and the whole at 50*s.*

“ Mr.



“ Mr. Webster has also applied warping on stubbles in autumn, by way of manuring: the crops have been very great; of potatoes from 80 to 130 tubs per acre; each tub measuring thirty-six gallons, and selling at 3*s.* to 3*s.* 6*d.* per tub for the round kind, and at 5*s.* to 8*s.* per tub for the kidneys.

“ Twenty acres, warped by this gentleman in 1794, could not be ploughed for oats in 1795; he therefore sowed the oats on the fresh warp, and scuffled in the seeds by men drawing a scuffler, allowing nine men to a scuffle; three acres of this, measured separately, afforded fourteen quarters one sack per acre.

“ Mr. Webster also warped twelve acres of wheat stubble, and sowed it with oats in April, which produced twelve quarters per acre; then wheat, thirty-six bushels per acre; never less than thirty bushels per acre.

“ Six acres of beans, says Mr. Young, produced ninety bushels per acre; and one acre, measured for a wager, went nine bushels over this; these lands have produced 144 pods from one bean, on four stalks, and Tartarian oats seven feet high. One piece, warped in 1793, produced oats in 1794, at the rate of six quarters per acre. White clover and hay-seeds were sown with them, mown twice the first year; the first cutting yielded three tons of hay per acre; the second one ton; and after that an immense eddish (after-grass).

“ The

“The great beauty of this species of improvement seems to consist, not only in the capacity of creating soil altogether, but also in the ease, with which land can always be reinstated, or refreshed at a small expence. Flax produces on warp-land forty to fifty stone per acre.

“Warped lands, at Reeveress, have sold for 100l. per acre. Lord Beverley has six or seven sluices going, and has warped three hundred acres in a year.

“Twenty-four thousand pounds was, some time past, expended in making a canal from the river Trent, near Althorpe, to Thorne, &c. This is a navigable canal, of forty feet bottom, and designed for warping a vast extent of country. A branch to Crowle is laid out, and another from Thorne to the river Dun; these are for navigation; and on each side of the navigable canals are sokage drains for relieving the overflowing waters of the country, and at other times admitting tide waters for the process of warping. It is proposed to make cuts of twelve miles, at right angles, for the purpose of selling warp to the country, and for delivering through sluices on either side, as occasion requires. *The price proposed is from four to five pounds per acre.*”

I have thus selected what I considered would be most useful for my present purpose; but it must strike any person acquainted with the situation of Merriion-strand, that admitting the tide-water alone would be injurious,

injurious, as the sea, after washing the sand-banks of Arklow, &c. would deposit little or nothing but a barren sand; the improvement must begin by admitting the muddy water of the river Liffey and the river Dodder to deposit their valuable contents; this, with alternate irrigation, would, in a few years, make these barren wastes highly valuable.



## CANALS.

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*I am under great obligations to the Directors of the Grand and Royal Canals, for supplying me with ample materials, from which the following extracts are taken.— To Richard Griffith, Esq. I am highly indebted for information, and in particular for the use of his Map of the Inland Navigations, hereunto annexed.*

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### *The origin and progress of the Grand Canal.*

THE company of undertakers of the Grand Canal were incorporated in the year 1772, for the purpose of carrying on and completing a canal, already begun by the commissioners of inland navigation, from Dublin to the river Shannon, with off-branches to the rivers Barrow and Boyne, and were entitled, under the act of incorporation, to levy a toll of 3*d.* per ton per mile; a subscription was entered into accordingly to the amount of £100,000, of which not more than £63,600 was received, and the shares, £36,400, of the defaulting subscribers, were sold at £40 per cent. which produced but £14,560.

The company then proceeded to carry on their canal, until their funds, by the above subscriptions, were entirely expended. They then, (1783) made application

to Parliament for a loan of £50,000, and the prayer of their petition was granted by a resolution of the House of Commons; but a condition was annexed to the grant reducing the toll on the canal from 3*d.* to 1½*d.* per ton per mile, which condition the company, although then struggling with the greatest difficulties, refused to accept, and on the 23d December, 1783, raised the sum of £50,000, at the rate of £50 per cent. The company afterwards borrowed several sums of money, and issued debentures for the same, bearing an interest, some at four, and others at six per cent. and made various subscriptions at seventy, one hundred, and one hundred and forty per cent. which sums, so raised, together with about £116,000, which they have from time to time received in bounties from Government, they have expended on their works, making in the whole of stock and bounties upwards of one million sterling.

*The constitution and management.*

The affairs of the company are managed by fifteen directors, annually appointed by the proprietors. In these directors are vested all the powers of the company, except those of alienating the tolls and revenues of the company, borrowing money, or commencing new works, until approved by the company.

*The extent of the works executed.*

A complete floating dock, capable of containing upwards of four hundred ships, with three large graving docks for the repairs thereof.

Main trunk of the canal from said docks, running round the circular road, and communicating with the canal in St. James's-street; extent - - - 3 miles.

Main trunk of the canal from St. James's-street, Dublin, to Lowtown common, to the Shannon and Barrow lines - - - 21

Continuation of the main trunk from Lowtown to Tullamore, within eighteen miles of the Shannon at Banagher, and at Athlone 23

Branch from the main trunk of the canal at Lowtown to the river Barrow at Athy - 21

Collateral branch on summit level to reservoirs at Milltown - - - 7

Ditto at the Bog of Allen, with a reservoir at Foranfan - - - 3

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 78

A canal from Tullamore, nearly completed to the river Shannon, near Banagher, - 18

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 Irish miles 96

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 English miles 122

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*The*



*The actual use of the works.*

The principal commodities carried on the canal are flour, malt, wheat, oats and barley, turf, Kilkenny coal, timber, bricks, furniture, camp equipage, ordnance stores; the number of boats now employed, 412. The amount of freight in the last year, viz. 120,000 tons, are the best criterions of the actual use of the works.—Previous to the commencement of the rebellion, immense quantities of military stores were conveyed to the different parts of the kingdom by the canal, as far as Athy on one line, and as Tullamore on the other; and when the French landed at Killala, the Marquis Cornwallis embarked a considerable number of troops, with their baggage, camp equipage, and military stores, at Dublin and at Sallins, and proceeded with them to Tullamore, where they arrived on the following day, fresh, and fit to proceed on their march to Athlone; and it is to be observed, that this was the first trial made of the conveyance of large bodies of troops on the canal, for which sufficient preparation had not been made; but so well satisfied was his Excellency of the expediency of this mode of conveying troops and military stores, that he ordered the Quartermaster-general to enter into a contract with the company, to provide and hold in readiness a certain number of boats for the use of Government, which was accordingly

accordingly done for the sum of £900 per month. A considerable reduction in the expence of travelling, by the cheap conveyance in passage boats, is another material advantage to the public, arising from the Grand Canal.—The arrangements made by the directors for the accommodation of passengers travelling in their boats, are admirably well calculated for convenience and œconomy. Three passage boats leave Dublin at different times every day, for Athy, Tullamore, and Robertstown respectively, and the same number return daily to the metropolis from those places. Hotels are established at the above stations, exclusively, for the reception of passengers travelling in the boats, and the whole business is conducted on a system superior to any other establishment of the kind in Great Britain, Holland, or any other part of Europe, the beneficial effects whereof are experienced by the company in a large and encreasing revenue, and by the public in the accommodation of upwards of 130,000 passengers, who annually travel in the passage-boats.—The Barrow navigation company, pursuing the same wise and liberal system above mentioned, have established passage boats, which ply regularly between Athy, Carlow, Leighlin-bridge, and Gregnemanough, (a distance from the capital of 58 Irish miles) and convey passengers travelling in the Grand Canal passage boats to and from Athy.

There

There are 56 locks and 8 aqueducts on this canal and its branches, including its extension to Banagher.—The locks are 70 feet long, and 14 feet 6 inches wide.—The average fall of the locks is 9 feet. The summit level is well supplied with water—its height is 240 feet above the sea. The depth of the canal is 5 feet over the cills of the locks and aqueducts, and 5 feet 6 inches in the body of the canal; it is 25 feet wide at bottom, and 40 feet wide at water surface.



*The Revenues of the Company.*

The revenues of the company have risen in a gradual progression in the last sixteen years, ending 1st August 1802, from £.6,900 to £.47,100 per annum, viz:—

In 1787 - 6,984,

1788 - 10,560,

1789 - 11,770,

1790 - 13,732,

1791 - 14,818,

1792 - 17,635,

1793 - 18,062,

1794 - 11,725,—The canal was shut up for six months, in consequence of its undergoing a general repair and some improvements.

1795 - 19,566,]

1796 - 23,636,

1797 - 33,831,—In consequence of the corn bounties having been withdrawn in the last session of parliament, the tolls did not encrease this year in their usual proportion.

1798 - 19,518,—This extraordinary decrease was produced by the rebellion, which broke out in May:

1799 - 29,796,

1800 - 36,944,

1801 - 42,524,

1802 - 47,100,

*Extracts of the quantity of COALS, TIMBER, and TURF, passed on the Canal in the following years.*

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	<i>Tons of Coal.</i>			<i>Tons of Timber.</i>			<i>Tons of Turf.</i>	
1794	-	3,340	12	-	917	7	-	20,194 0
1795	-	3,070	1	-	1,242	16	-	22,195 15
1796	-	2,413	6	-	1,373	17	-	17,572 5
1797	-	2,032	2	-	568	5	-	18,000 0
1798	-	1,699	0	-	1,055	3	-	11,169 5
1799	-	3,027	9	-	2,443	15	-	16,205 0
1800	-	3,062	0	-	2,532	4	-	25,207 10
1801	-	2,532	15	-	3,338	18	-	29,278 18

When the canal to the Shannon near Banagher shall be opened, and the navigation of that river and of the Barrow completed, it is expected, that the revenues of the company will exceed £.100,000 per annum.

It was some time ago in the contemplation of Government to purchase the tolls of the Grand canal company (at least on the necessaries of life) in order to encourage agriculture, and to afford some compensation to the citizens of Dublin, as well as to the farmers

farmers, millers, and malsters of Ireland, for the loss of the bounties formerly paid on the carriage of corn to the capital, which bounties amounted annually to the sum of £.90,000. This wise and beneficent plan, we understand, has been laid aside, which must be a subject of deep regret to every friend to agriculture. The principle of reducing tolls has, however, been so far prosecuted in respect to corn transported on the rivers Shannon and Barrow, that the tolls on those rivers are (in consequence of bounties granted by Government) to be reduced to a very low rate. But the grand trunk, through which the capital is to be supplied with the necessaries of life from the fertile banks of those rivers, remains loaded with a heavy toll of 3*d.* per ton, per mile, on all goods and merchandize whatever: and it cannot be expected, that the company, after having expended upwards of a million sterling, should relinquish the golden prospects before them, without an adequate compensation from the public.

The increased demand for corn from Great Britain (which appears to be every year augmenting) on the one hand, and on the other the drain, which this country sustains by absentees, the remittances of the interest of our public loans, with the unfavourable balance of trade against Ireland, makes it imperative on Government to encourage and extend the agriculture of this country, in order to supply the demand for corn in Britain, and to counteract the injurious effects



effects above alluded to. This matter is so clearly stated in a short work lately published by a gentleman of superior talents that, with his permission, we take the liberty of making a few extracts from it.

“ Another reason, why the increase of tillage should  
 “ be promoted to the utmost here, is derived from the  
 “ actual circumstances of the empire at large.—Great  
 “ Britain, from the astonishing improvement of her  
 “ manufactures within the last fifty years, and the in-  
 “ creased number of hands employed in them, which  
 “ evidently argues an augmented population, is no  
 “ longer able to grow corn at home sufficient for her  
 “ own consumption.

“ Dutch Linn.

“ Linn.

“ Linn.

“ Linn.

“ Linn.

“ Linn.

“ Linn.

“ Linn.

“ Linn.

Her

Her average import during the three years, ending 5th January 1799, was as follows:

	£.	s.	d.		28 stone	£.	s.	d.	in weight	Tons.
" Barley	-	1	5	—	per quarter of	91965	3	1	12875	
" Beans	-	1	5	—	—	27052	19	4	4396	
" Indian Corn		2	10	—	—	18782	3	9	1526	
" Oats at	-	—	18	—	—	607837	14	6	91808	
" Oatmeal	-	—	11	6	per Boll.	38157	5	9	2859	
" Peafe	-	2	5	—	per quarter	54158	18	1	4889	
" Rye	-	2	—	—	—	117176	15	—	11900	
" Wheat	-	3	—	—	—	1668279	—	—	112956	
" Ditto Flour		1	4	—	per cwt.	90996	3	10	3791	
										<hr/>
Total amount of imported corn										Total wt. 247000
										<hr/>

“ Near two millions and three quarters of money  
 “ therefore have been annually sent from Great Britain,  
 “ in the three years of moderate plenty preceding the  
 “ present, in order to pay for the 247000 tons of corn  
 “ she has had occasion for; of which there was sup-  
 “ plied by Ireland only to the amount of 453,003/.  
 “ annually, which is no more than the sixth part of  
 “ the entire demand. In years of scarcity, such as  
 “ the present, a vastly greater supply is necessary;  
 “ and the entire importation of Great Britain, from  
 “ all the world, will not probably, this year, fall much  
 “ short of the enormous sum of eleven millions sterling,  
 “ of which this country shall have contributed scarce  
 “ any thing at all\*.

“ Were Ireland then capable of exporting six times  
 “ more grain than she does in plentiful years, and even  
 “ a hundred times more than she can afford in years  
 “ of extreme scarcity, she would readily find a market  
 “ for it in Great Britain. Now to undertake the long  
 “ and tedious voyages of the Baltic, the Mediterra-  
 “ nean, or North America, in order to look for wheat

\* It appears by the foregoing statement, that Great Britain has, in the course of four years, paid a sum exceeding eighteen millions sterling for corn imported, and that Ireland has not received quite one million out of the whole eighteen. The remaining seventeen millions may be considered as a bounty given by Great Britain to improve the agriculture, and increase the population and resources of countries, in whose welfare the empire can have no interest; or in other words, those seventeen millions have been expended in creating future armies and navies for nations, whose object is to rival the commerce, and may, perhaps, attempt to subdue the power of Great Britain.



“to feed the English manufacturers, or, which is still  
“worse, to suffer the owners of that wheat to enjoy  
“the profits of its carriage, while almost entire pro-  
“vices of this fertile island are allowed to continue  
“in a state of nature, and merely to feed a few fat  
“bullocks or sheep by the natural richness of the soil,  
“without the smallest attempt at cultivation; this is  
“such a solecism in political economy, such a violation  
“of the principles of all rational government, such an  
“immense and reciprocal loss to both islands, that it  
“is high time their respective governments should seri-  
“ously turn their attention towards it.—To say that the  
“provision trade in cattle must needs suffer by the ex-  
“tension of agriculture here, and that salted provisions  
“are as necessary to the empire as corn, is to frame  
“objections gratuitously, and without considering, that  
“by introducing here the improved modes of uniting  
“pasturage and tillage together, as practised in Great  
“Britain, each acre of our pasture land might be made  
“twice as productive as it now is, and that, upon the  
“whole, though tillage might be greatly encreased,  
“the quantity of beef, pork, and butter exported  
“would not be diminished, and with regard to pork  
“particularly, which depends so much on agriculture,  
“its quantity would be prodigiously augmented.

“According to the imperfect modes of farming, pre-  
“valent among the Irish peasantry, the average pro-  
“duce of a plantation acre of the different sorts of  
“grain

“ grain may be looked upon as equivalent to a ton  
“ weight. Ireland supplies nearly a sixth part of the  
“ 247,000 tons of corn, by which quantity Great Bri-  
“ tain is deficient in years of moderate plenty, i. e. she  
“ employs about 41,166 acres of her soil to grow corn  
“ for the British market. In order to enable her to  
“ supply that deficiency entirely, she must employ six  
“ times more land, or 205,834 additional acres for  
“ the same purpose, according to the present rate of  
“ their produce; or if she improves in the knowledge  
“ of farming, and that a smaller quantity of land will  
“ be sufficient, still the extension of tillage must be  
“ very considerable, that shall enable her to answer  
“ the entire demands of Great Britain.

“ Let us now consider, whether the construction of  
“ navigable canals, to the extent already mentioned,  
“ would not operate sufficiently to produce this de-  
“ firable effect.—The average rate of land carriage,  
“ in this country, is not at present less than one shil-  
“ ling per ton per mile, and the charge upon canals,  
“ if built at the public expence, need not be more, in-  
“ cluding the freight, than two-pence per ton per mile,  
“ and even much less in great distances, viz. such  
“ a sum as will suffice to pay the freight, and to  
“ keep them in repair. Supposing then, that the en-  
“ tire deficiency of corn, under which Great Britain la-  
“ bours, viz. 247,000 tons annually, were supplied  
“ from this country, and that each ton weight was  
“ obliged

“ obliged to be carried twenty-four miles, on an aver-  
“ age, to the harbours most eligible for its exportation,  
“ and it will follow that the growers of these 247,000  
“ tons would gain annually ten-pence per ton for each  
“ of these twenty-four miles, by the substitution of ca-  
“ nals for land carriage, that is, they would gain  
“ twenty shillings a ton yearly in the exportation of  
“ the entire quantity, which is 247,000*l.* per annum,  
“ as a premium for agriculture; for if a ton weight is  
“ the produce of an acre of corn, the farmers of this  
“ country would thus have a bounty of twenty shil-  
“ lings an acre for the prosecution of their trade.—  
“ It is difficult to say, what would be a sufficient en-  
“ couragement to agriculture, if twenty shillings an  
“ acre, annually expended upon it by the public, would  
“ not be a sufficient inducement to active exertion.—  
“ Nor is it by any means extravagant to suppose, that  
“ each ton weight of grain would, on an average, re-  
“ quire to be carried twenty-four miles, before it reaches  
“ the place of its export, because the harbours prefer-  
“ red for that purpose would either be Dublin, or  
“ some of the ports on the east side of the island, op-  
“ posite to Great Britain, to avoid the great expense  
“ and delay of a circuitous navigation by sea.—If it be  
“ objected, that the price of corn would fall in the  
“ British market, or that the rents of corn-lands would  
“ rise in this country in consequence of the reduced  
“ price of carriage, so that the Irish farmer would not  
“ feel



“ feel the benefit of it ; it may be replied, that the de-  
“ mand of Great Britain seems to be constantly on the  
“ encrease, so that it is difficult to set any bounds to  
“ it ; and though the rent of lands should rise, as no  
“ doubt it would, yet in the interval of time, until they  
“ come to the natural level, to which the new improve-  
“ ments would carry them, sufficient encouragement  
“ would be held out to the growing of corn, though  
“ it should not amount to twenty shillings an acre : even  
“ five shillings clear profit would be a sufficient stimu-  
“ lus to convert, by degrees, to agriculture all the  
“ land, that would be necessary fully to supply the  
“ growing demands of Great Britain, which at the  
“ present rate of that demand would only require  
“ 205,000 acres more of the Irish soil to be converted  
“ to agricultural purposes.—But into whatever pockets  
“ the gain was ultimately distributed, still it remains  
“ certain, that the country in general would save  
“ £.247,000 yearly, which, valued at twenty years  
“ purchase, may be estimated in round numbers at five  
“ millions of pounds sterling.—Were Ireland then to  
“ convert only 205,000 acres more of her soil to til-  
“ lage than are at present employed in it, she could  
“ afford to spend five millions sterling in constructing  
“ canals necessary for the transport of corn to the sea  
“ side, without losing or gaining by the operation.—  
“ But if all the canals already enumerated could be  
“ made for a much less sum than five millions ; or if,  
“ when

“ when constructed, they would serve for an infinity  
“ of other beneficial purposes, besides the mere trans-  
“ portation of grain; both of which assertions are  
“ true in a most exceeding great degree, then it ap-  
“ pears as clear as noon day, that this country cannot  
“ possibly make too great exertions in this line, and  
“ that, if a rage for any thing in any country is at all  
“ excuseable, it ought clearly to exist in Ireland in fa-  
“ vour of canal navigations.

“ Probably two, or at most three millions judicious-  
“ ly and faithfully expended, (in which indeed lies  
“ the principal difficulty) would be amply sufficient to  
“ give this country all the extent already mentioned of  
“ water communications.—The single saving on the  
“ carriage of exported corn, should it ever amount to a  
“ quantity sufficient to supply the wants of Great Bri-  
“ tain, of which there is every probability, would be  
“ twice more than sufficient to refund this sum to the  
“ nation, which on this article alone would therefore  
“ gain two millions sterling.—Every other use, to  
“ which navigable canals can be applied, every other  
“ benefit resulting from them, is so much clear addi-  
“ tional profit, for which credit may be taken in fa-  
“ vour of the scheme.—But to enumerate these other  
“ benefits and advantages, is really a task of the most  
“ difficult and laborious kind, entirely resulting from  
“ the unbounded extent of the subject.—Besides corn  
“ for export, how many other species of bulky  
“ commodities,

“ commodities, both native and foreign, must, the  
“ former be carried out of, and the latter brought  
“ into the very heart of this country, on all of which  
“ a reduction of the rate of carriage, to one sixth of  
“ what it costs at present, would afford the former  
“ exceedingly cheaper to the consumer at home, and  
“ encrease the demand for the others abroad, by less-  
“ ening their demand in the foreign market.—Would  
“ not the exchange of the native products and manu-  
“ factures of the different parts of the island with each  
“ other be extended and promoted in a still higher de-  
“ gree than its intercourse, and that most beneficial of  
“ all the branches of commerce, the inland trade of  
“ the country, be thus quickened and revived in a most  
“ surprising degree?—Would not the Irish manufac-  
“ turer acquire much cheaper the materials, upon which  
“ his industry is exerted, and the price of the manufac-  
“ tured article remain nearly the same?—Would not his  
“ application to his trade be thereby excited, and his  
“ gains encreased?—Would not the circumstance, of  
“ our being able to supply other countries more cheaply  
“ with the native articles we send to them, enable us  
“ either to put the difference in our pockets, or to en-  
“ crease the quantity produced by the growing compe-  
“ tition for these profits?—In short, it would be end-  
“ less labour to enter fully into the particulars on this  
“ fruitful subject, which embraces almost the entire  
“ circle of intercourse, which man holds with man.”



The article before us is of such importance to the welfare of this kingdom, that we have been induced to indulge ourselves in an ample discussion of its merits, which we shall conclude with one short remark, that the benefits, resulting to a nation from a complete and extensive inland navigation, are not confined to agricultural and commercial improvements only. Internal security, arising from the power of concentrating military force, is another happy effect of it. Ten thousand men might be conveyed from Athlone to Dublin, to Limerick, or to Waterford, or *vice versa*, together with their arms, baggage, and military stores, in one fourth of the time, which such an army would take to arrive at those places, even by forced marches; and if conveyed by water, they would be fresh and fit for immediate action as soon as they stepped on shore; and it is to be remarked that, as long as we possessed the interior of the country, an invading army could not avail itself of our navigations, as we could turn the water from the upper levels, and leave the bottoms of the canals dry; or if we retired from the coast, we might, if we thought fit, destroy the locks in our retreat, after we had used them. Ireland is the vulnerable part of his Majesty's dominions; we conceive it to be impossible, that Government should not see the wisdom of strengthening a country so likely to be assailed in every war with France, and we will venture to assert, that to possess the means of transporting

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ing troops and military stores, with expedition and safety, from one end of the kingdom to another, is one of the most important features in the defence of a country.

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### ROYAL CANAL.

THE Royal Canal commenced under an act of parliament, and a charter from his Majesty, in the year 1789. A subscription was entered into by the company for 134,000*l.* and parliament granted 66,000*l.* making in the whole 200,000*l.* with a power of enlarging the subscription on the capital stock to 500,000*l.* and with a power also of borrowing 500,000*l.*; making, in the whole, to be laid out on the works, one million of money.

#### *Constitution and Management.*

There are four general quarterly meetings of the corporation in each year, who have a controuling power over all the affairs of the Company: each proprietor of stock, to the amount of six hundred pounds, is eligible to vote at such meeting; and every proprietor is entitled to vote, for every six hundred pounds stock he is possessed of, so far as three thousand pounds.

The

The general management of the Company's affairs is in the hands of a court of directors, consisting of twenty-one members, annually elected by the Company, from those who are proprietors of at least twelve hundred pounds stock; and no money can be drawn from the treasurer, without a warrant signed at public meetings by five of said directors.

*Extent and Progress.*

THIS canal is intended to proceed to Tarmonbury on the river Shannon, with off branches to such market towns, or other places, as may seem expedient. Twenty-two miles of navigation have been completed, viz. from the river Liffey at Dublin to Newcastle, west of the Nineteen-mile house, on the Mullingar road, and boats ply regularly every day. From Newcastle to Griffinstown, one mile and a half beyond Kinnegad, being thirty-three Irish, or forty-two English miles from Dublin, the canal is nearly completed, and a considerable progress has been made in the remainder of the line to Mullingar.

*Construction of Canal, and Articles of Trade.*

THE ground, through which the canal runs, is so favourable, that one level is six miles in length, another sixteen, and the summit level is expected to be seven-

teen



teen Irish miles in extent, without a lock, into which the grand supply of water comes from Lough Owel near Mullingar. The construction of the canal is of the most perfect kind; the locks are eighty feet clear pool in length, and fourteen in breadth; the banks sloping twenty inches for each foot they rise. The trading-boats carry from eighty to an hundred tons burden; the passage-boats are elegant and commodious.

The great quarries, through which the canal has been carried with much labour and vast expence, near Castleknock, afford immense quantities of limestone, building-stone, and marble, which bear a much higher polish than Italian; all which stones are fully adequate to the demands of the city of Dublin for many years. Over the Rye-water, near Leixlip, an aqueduct has been formed, far exceeding in magnitude any work of that nature in Europe. A communication is formed from the canal to the North-wall, east of the Custom-house, where a sea-lock is intended to be shortly opened, to connect the canal with the river Liffey and the sea. From the direction of this canal, running N. W. from the city into the heart of the country, through which at present immense quantities of goods are carried, great advantages must arise from the cheapness of still-water carriage; but the national benefit must rise still higher when it reaches the Shannon, as coals, manufactured iron, clays, and ores of various kinds, will then come from the counties of  
Roscommon

Roscommon and Leitrim; and turf, stones, bricks, mill-stones, &c. &c. will also be thereby conveyed to Dublin on easy terms.

*Quantity and command of Water.*

The waters, which at present supply the Royal canal, are the rivers Lyre at Larabryan, the Augher and Rye-water at the bog of Cappa, together with some small streams taken in, in its course from Dublin to Newcastle; but the great command of water will be obtained from Lough Owel, on the summit level near Mullingar. The water from this extensive lake at present flows nearly in equal quantities from each end; the north-west end falling rapidly into Lough Iron, and from thence to the river Inny: the stream from the south-east end runs through Cullienmore, where it turns a mill already purchased by the Royal Canal Company, and is the head of the river Brusna. As the summit level is proposed to be from five to six feet lower than the surface of this great lake, the whole waters of those two rivers may be drawn into the canal; therefore there can be no hesitation to pronounce that, in that case, no canal in his Majesty's dominions can boast of so good a supply.

*Height*

*Height of the summit level above the sea.*

	Feet.
From high-water mark, at spring tides, to	
the Broad-stone level, - - -	62
To Kilcock, - - -	141
To the long level at head of 18th lock, -	34
	<hr/>
	237

To level above 25th lock at Baltresna (summit level), - - -	70
	<hr/>

Height of summit level, from high-water mark, above the sea, - - -	307
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In addition to the grant of 66,000*l.* already mentioned, parliament, in the year 1798, granted the further sum of 25,000*l.* of which 11,000*l.* remains to be received by the Company; and in the year 1801, when it was proposed by the Directors General of inland navigation, appointed by parliament, with a laudable zeal for the public good, to reduce the tolls on canals, the Company, influenced by the same public spirit, and foregoing the prospect of exorbitant profit to a few individuals, without affording a proportionate benefit to the community, and particularly to the inhabitants of Dublin, after the most solemn deliberation upon this important subject, agreed to a reduction on the following articles, viz.



For every ton weight, per mile, upon all goods, merchandizes, or commodities whatsoever, from 3*d.* to 2*d.*

For every ton weight of corn and grain, meal, malt, and flour, from 1½*d.* to 1*d.* Potatoes, lime, sand, fuel, manure, iron wrought or unwrought, and all military bodies, with baggage, arms, ammunition, and cannon on their route, per mile, from 3*d.* to 1*d.*

And for every ton weight of potatoes brought to Dublin, per mile, from 3*d.* to one halfpenny.

But there is every reason to believe, that the consequent increase of trade, on the canal running through so fertile and populous a country, will amply compensate the company for this apparent sacrifice in the reduction of their tolls.

On the aforesaid terms the Directors General granted them an aid of 95,866*l.* 7*s.* 10*d.* for the purpose of completing the canal to the end of the summit level at Coolnahun, six miles and a half beyond the town of Mullingar in the county of Westmeath, being a distance of forty-six Irish, or sixty English miles from Dublin. This grant from Parliament, and also a loan of 100,000*l.* raised by the Company, suddenly changed the appearance of their affairs, and enabled them to proceed in this great national work with unexampled spirit and rapidity. At present no less than between three and four thousand men are in constant employment

ment on the line; and it is confidently expected that, in less than two years, a navigable canal will be fully completed from Dublin to Lough Owel.

In addition to the certain and inexhaustible supply of water, which this immense lake will afford to the canal, a considerable advantage may accrue to the Company from supplying the north side of the city of Dublin with water.

**IMPROVED BREEDS****OF****LEICESTERSHIRE COWS AND PIGS.**

I HAVE been favoured with the annexed drawings of cows and pigs by George Grierson, Esq. of Rathfarnham House, in the county of Dublin. They have been drawn from the life by Mr. J. Brocas of the city of Dublin, a young professor of very promising talents. The cows are of the improved Leicestershire breed, ten of which Mr. Grierson purchased from Mr. Astley of Oddston Hall, in Leicestershire, at a very considerable price: they have been bred from the Bakewell famous stock of Dishley, in Leicestershire, to the improvement of which he devoted his entire attention for forty years, with as yet unexampled judgment. Their  
great



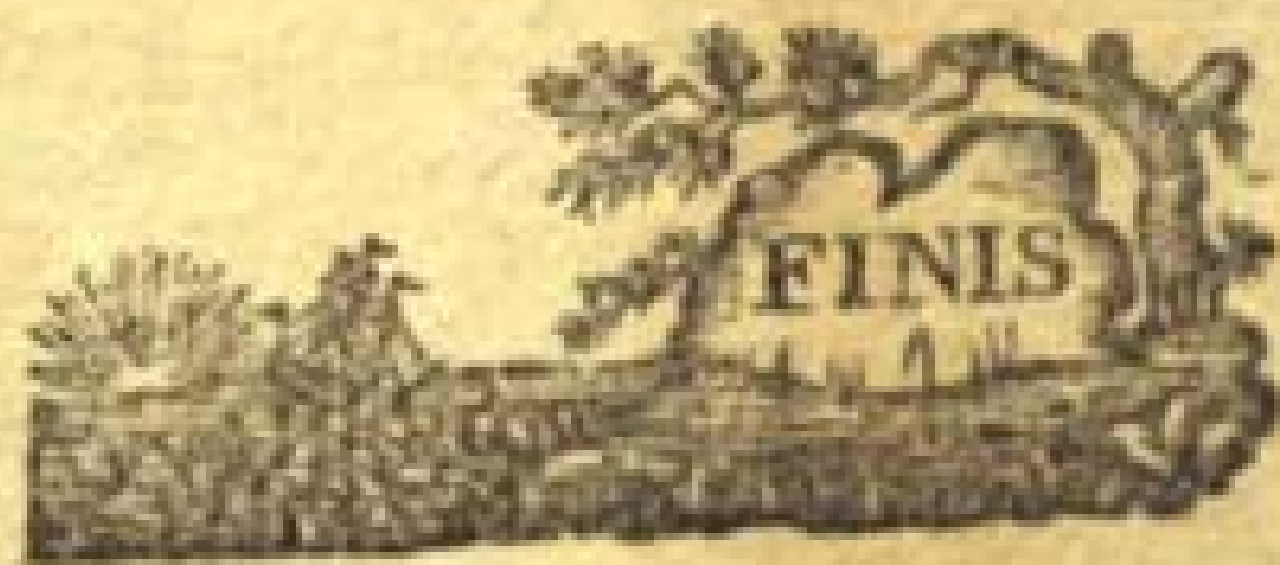
great merit consists in the fineness of their offal, and their wonderful propensity to fatten at an early age, at the same time that they are excellent milchers. The pigs are also of the improved Leicestershire breed, purchased from the same gentleman. They likewise possess the quality of fattening in a short time, on very little keep, and to a wonderful weight.

It must give great pleasure to every real lover of his country, to anticipate the amazing improvement, which the importation of such cattle must, in a few years, make in the general stock of the kingdom. Mr. Grierson has several most beautiful bull and heifer calves from these cows, by the best Shakespear bull he could hire in England; and many other gentlemen have brought over the best cows they could procure in England, and have been equally successful in South-Down sheep. One practice of Mr. Grierson I shall take the liberty of recommending to general notice. He lets his boar to a small farmer or labourer, for his choice of one pig of the litter at six weeks old, though he gets a guinea from men of property. This practice must do infinite service in improving our breed of pigs, which is the poor man's only stock, and generally the stock of every poor man.

Mr. Culley, in his Treatise on Live Stock, gives an account of a pig, that was killed at Congleton in Cheshire, which measured, from the nose to the end of the  
tail,

tail, three yards, eight inches ; in height it was four feet and a half ; and weighed, when dead, eighty-six stones, eleven pounds, or 1215 pounds.\*

\* Vide History of Quadrupeds, published 1792, page 148.



*London & Warrington.*



*Gift of the  
owners & stored by Jas. Brown Janr*

*By a Bull called G.W. by Garrick out of Nell. bred by Mr Fowler of Rotherhithe & her Dam of true Dishley blood.  
The Property of Gen. Grierson Esqr Rotherhithe. House in Dock.*





*Myndy.*



*Drawn & Engr'd by Jas. Brown Junr*

*By a well bred son of Shakespeare out of a Cow by a son of Washingtons Dam also Lady Washington.  
the Property of the Grimmon Esq. Rathfriland House Co. Dub.*



*Set Boar of the improved Leicestershire breed  
 The property of Geo. Freestone Esq. & Northampton House  
 Co. Dublin*



*Engraved by J. G. Smith*

*Printed by J. G. Smith*



*A few of the improved Leicestershire breed  
 The property of George Harrison Esq. Rotherham House  
 Ea. Tisbury*



*Drawn and etched by  
 Brocas junr.*