A

PROPOSAL

FOR AN

APPLICATION TO PARLIAMENT,

TO TAKE OFF THE

Duties on CINDERS carried Coaſtways,

AND TO REPLACE THEM

By an Alteration on the Duties on Cinders and Culm exported.

ADDRESSED TO THE

CHAMBERS OF COMMERCE OF GREAT BRITAIN.

IN WHICH

The USES of CINDERS are conſidered,

IN THEIR

Relations to Domeſtic Oeconomy, Manufactures at Home, and Commerce abroad.

BY

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One of the Barons of Exchequer in Scotland.

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A

PROPOSAL, &c.

THE following ſheets are to contain a Propoſal, and the reaſons on which it is founded, for an Application to parliament, to take off the duties on cinders carried coaſt-ways, and to replace them, by an alteration on the duties on cinders and culm exported; but, as ſome of my opinions on this head may appear uncommon, I am forced, in order to expect a patient hearing, to go round my object a little, inſtead of going directly up to it.

It is a juſt obſervation, and, for the ſake of ingenuity and ingenious men, a pleaſing one: "Nulla ars, non alterius "artis, aut mater aut propinqua eſt:" "There is no art that "is not either the mother or the relation of another art." The Earl of Dundonald's late diſcoveries of the qualities of pit-coal,

pit-coal, and of the commercial uſes which may be derived from them, preſent a proof of the juſtice of this obſervation. In extracting tar from pit-coal by condenſation, it was found that the upper part of the liquid, when extracted, contained oils; the middle part, volatile alkali; the ſediment, tar; and the reſiduum of the whole, a cinder.

The Chambers will pardon my aſking their attention for ſome time to the importance of thoſe four articles to the domeſtic oeconomy, to the manufactures, and to the commerce of Britain; becauſe, on that importance, or the want of it, depends the merit, or want of merit, of the propoſal which I am to preſume to ſuggeſt to the Chambers.

OILS. Theſe are fit for varniſhing and preſervation of ſhips, of all woods, and of moſt metals, and for various other purpoſes of manufacture; the tenth part of which are probably as yet unknown.

VOLATILE ALKALI. The volatile alkali goes to make the valuable commodity of ſal ammoniac, and many other chemical articles, the tenth part of which are probably as yet unknown. I was told by an eminent chemiſt, that Lord Dundonald, though himſelf an able chemiſt, did not know one half of the uſes to which it was known his diſcoveries will apply. There is no doubt that the foſſil alkali or barilla may be made of ſalt, combined with an extraction from pit-coal,

coal, in reducing it to cinder. This ſingle application of his Lordſhip's diſcoveries and inventions would ſave L. 500,000 a year, which the manufacturers pay for Spaniſh barilla, and ſome hundred thouſand pounds a year, which they pay for potaſhes from Ruſſia.

TAR. The tar made from pit-coal is not only far ſuperior, in common uſes, to tar made from vegetable ſubſtances, but has this capital and ſingular quality, derived from its being a mineral ſubſtance, and the ſmoothneſs of its ſurface, that it preſerves ſhipping from the worm, and even from all foulneſs of bottom. One conſequence of which is, that the expenſive, ſlow, and dangerous practice of ſheathing ſhips with copper will from henceforth become unneceſſary; and another conſequence is, that ſhips, being cleaner in their bottoms than formerly, will ſail faſter, ſafer, and laſt longer, than they uſed to do.

Ships have gone and come from the Eaſt Indies payed with this tar; they returned untouched with the worm. Ships have been ſent to the Weſt Indies, and to the north ſeas, that is, to the hotteſt and the coldeſt climates, of which one ſide was payed with the common vegetable tar, the other with the mineral, that is, the coal-tar; the ſide payed with the firſt returned eat with the worms, and loaded with barnacles and ſea-weeds; the other ſide was untouched with the worm, and ſcarcely affected with the other two. Piles of wood, covered with

with coal-tar, have, by orders of the admiralty of Amſterdam, been driven into the mud of the Dutch harbours and dikes; at the end of two years, they came out ſo pure, that the ſmell of the tar was felt when they were drawn up, the wood was ſmooth, and the tar remained upon it. Other piles, that had been driven in the ſame day, were found, when drawn up, to be in a polluted ſtate.

Moſt nations complain of the foulneſs of their harbours. Of the only three great harbours which the kingdom of Spain poſſeſſes in Spain, the benefit of the beſt of them, Ferrol, is almoſt entirely loſt, from this circumſtance. The King of Spain, who grudged not to employ the whole force of a kingdom to recover one port, would grudge no ſum or ſums that could ſave and ſecure the uſe of another.

The extreme heat of the air in the Weſt Indies expoſes every wooden object to be rent, rotted, waſted, and deſtroyed. In the oils and tar extracted from coal, remedies will be found to thoſe miſchiefs. Not England alone, but Spain, France, Holland, and Denmark, will become dependent, in their Weſt India iſlands, on the Britiſh coal-tar trade for the preſervation of their houſes, their works, the roofs of both, and the fences which guard them, all of which are moſtly of wood there. The cities, harbours, and works of Europe, which reſt upon piles, and in general all poſts and railings, will find the ſame ſafety in the Britiſh coal-tar.

Coal-

Coal-tar has the ſame effect to preſerve iron that it has to preſerve wood. The honey-comb in artillery, the ruſt and waſte in ſhot, which, by cauſing windage in the gun, takes away from its force, are prevented by coal-tar. Iron rails, pipes, and an infinity of other iron articles, may for years be preſerved entire by a ſpunge dipped in coal-tar.

The demand of tar from the Eaſt Indies, a region into which very little tar of any kind from Europe has hitherto found its way, is already an hundred times more than Lord Dundonald can ſupply.

But it is needleſs to enumerate markets. The univerſe muſt be the market for mineral, in preference to vegetable tar; and Britain has, in the preſent reign, diſcovered that ſhe may enjoy a monopoly of the tar trade againſt all nations with more certainty than the Dutch do the ſpice trade; becauſe her poſſeſſion depends upon nature and her own kingdom, not upon diſtant ſettlements, which the chance of war or a treaty might wreſt from her.

CINDERS. Theſe ſerve for moſt family uſes equally well with raw coal. They are far ſuperior for the uſes of the kitchen, on account of their cleanneſs, and the regularity of their heat. To perſons of weak lungs they are abſolutely neceſſary, becauſe they contain little or no ſulphur; and to perſons of the ſtrongeſt lungs they are, for the ſame reaſon, more wholeſome

wholeſome than raw coal. Tar-cinder, when carried to a diſtance, muſt be far cheaper than raw coal carried to the ſame diſtance, or even to a much nearer; becauſe the profit on the tar, and other parts of the buſineſs, enables thoſe who carry it on to ſell the cinder cheap; and becauſe, though coals, when reduced to cinder, preſerve their meaſure, they loſe half their weight; and, therefore, one half of the cartage of feuel is ſaved, when cinders are uſed.

The reaſon, in Scotland at leaſt, why the merit of cinders, as a feuel in private families, has not been known and acknowledged, has ariſen from the avarice of the cinder-burners: For there are chiefly two ſpecies of coal in Scotland, called the rough and the ſplint; the rough is properly a congeries, or maſs of coal, in which the parts run into each other irregularly, as if they had been melted together. The cinder of this coal is generally of a ſoft nature, lights eaſily, conſumes ſoon, leaves much aſh, and the heat of it is not very intenſe. The parts of the ſplint coal, on the contrary, come off in regular flakes from each other; the cinder of it is hard, lights more ſlow, burns long, has great force of heat, burns almoſt to the laſt grain, leaving few aſhes behind it, to clog the grate or the furnace; on all which accounts, the blaſt furnaces, which require the ſtrongeſt heat they can get, and the coal that is moſt free of aſhes, prefer the cinders from it to thoſe from the other coal. But the rough coal breaks out into bliſters in reducing to cinder, by which it extends to a greater

greater meaſure of cinder, and conſequently increaſes the profit of the cinder burner, who attends to meaſure alone, not to quality, and therefore ſends the rough coal alone in cinder to the market. The ſecond fault he commits, is to uſe no coals but what are called in this country *chows*; that is, coal from a cube of one inch to a cube of four inches in ſize; becauſe he pays for theſe only two thirds of the price of great coal; the conſequence of which is, that the ſmall cinder, like ſmall coal, conſumes faſt.

Such are the powers of cinders in family uſes: But I applied to various manufacturers to try the cinders from tar works in their different manufactures. Mr John Aitchiſon diſtiller tried them on a large ſcale, and reported, that, tho' he found it neceſſary to uſe raw-coal to bring his ſtill to run, yet that, after ſhe began to run, the regularity of the heat of cinder made it preferable to raw-coal. Mr William Aitchiſon baker, whoſe public and private ſpirit vies with his brother's, gave them ſtill fairer play; for he conſtructed a baking oven on purpoſe, which had a ſmall furnace at the ſide of the oven, about a foot broad and long; from whence, at right angles, he made a flue about two feet long, and ſix inches diameter, into the oven, at the mouth of which flue a damper was fixed, to increaſe, diminiſh, or ſtop altogether the heat, as he pleaſed. He did not expect to ſee a vivid flame flow from cinder; but, to our ſurpriſe, the draught from the external air, occaſioned by the furnace, and the flue, threw a long ſtream of flame into the oven, which played round the ſides of it, and reverberated

from the top to the bottom, heating the whole in a very ſhort time. The advantages were, 1ſt, That cinders from the tar-works are, and always muſt be, cheaper than raw coals brought from the ſame or a much nearer diſtance, for reaſons already explained. 2dly, That a ſmaller quantity of cinder than of raw coal was required, not even a half. 3dly, That the oven was not ſullied with ſmoke. And, laſtly, That, when the damper was cloſed, and the fire intended to be extinguiſhed, the ſeparation of the cinders from each other in drawing them from the furnace, extinguiſhed the fire in an inſtant, and left no ſulphur in the bakehouſe to hurt the men, and taint the bread. His own ingenuity ſuggeſted an improvement upon the oven; for he placed a plate of iron over the furnace, on which the butter in the pits was melted, without any additional labour or feuel, or any ſmell. His oven is now open to the inſpection of all; and, if the bakers in Edinburgh, London, and other great cities, do not follow his example, they muſt be blind to their own intereſts indeed. For great works there is nothing to hinder one ſuch furnace to heat three ovens, if one is put before, and one on each ſide of the furnace, to receive, by means of the dampers, the communication of the flame to one or all of the three, according as it is needed.

That cinders are the neceſſary feuel for maltſters is known to all. Salt-makers, lime-burners, brick-makers, wool-combers, ſtocking-weavers, founders, confectioners, and ſome other manufacturers, gave me repeated teſtimonies of the

the ſuperiority of tar-cinders over other cinders, and over raw coal, in their reſpective manufactures. In all thoſe manufactures which require heat, but not flame, as in all the drying parts of buſineſs, ſuch as the drying parts of the ſugar-baking and pottery buſineſs, the ſuperiority of the regular heat of cinders over the irregular heat of raw coal, muſt be ſelf-evident. In other branches, I was not ſo lucky. I either got no anſwers, or they were unfavourable; whether theſe laſt were juſt or not, can be known only by experience: But, what a private perſon cannot do, public bodies may do: And I know no better ſervice the Chambers of Commerce of Britain can do to their country's intereſt, and their own, than to recommend to their members in thoſe different branches of their manufacture which are conducted by feuel, to make trials of the comparative merits of raw coals and of cinders, and of cinders made in tar-kilns with thoſe made in the common way.

The gentlemen engaged in the iron trade in Colnebrook Dale acted in this manner. They had comparative trials exhibited between the power of cinders which had been made in the open air, and the power of thoſe which had been made in tar-kilns, and before hundreds of ſpectators, who were judges. The reſult was, that, beſides the ſaving of time, and, conſequently of labour, and beſides other advantages of the tar cinders, four waggons of tar cinders, in the blaſt furnace, did the buſineſs of five waggons of cinders made in the open air; and the gentlemen then entered into contracts of vaſt magnitude with Lord Dundonald's family, beneficial equally to that noble houſe and

to

to themſelves, for erecting tar-works cloſe to their iron works, that they might have the benefit of the cinders from them.

After experiments ſo grand, I am aſhamed to mention little ones made by myſelf, with a view to bring the uſe of culm in aid of the uſe of cinders, in order to keep up the force, but to diminiſh the expence of feuel. I put half a dozen tons of a ſplint coal, remarkably hard, and completely pure, into a tar-kiln, and let them remain in the kiln the common time; part of the cinders were ſent to Mr Hugh Bell, an eminent brewer in Edinburgh, who complained they were not ſufficiently burnt. The next charge was harder burnt, ſo much ſo, that, when the cinders were let fall on a pavement, or on each other, they did not break at all, but rung like a well burnt thin fire brick; and then he was ſatisfied. Some of the confectioners, however, complained they were what they called dour, that is to ſay, difficult to light; but I found that a few puffs of a bellows for half a minute removed the objection. The coal being very hard, and many of the pieces which I had put into the tar-kiln large, the cinders came out from the kiln in the ſame regular ſhapes in which the coals had been put into it, and many of them a cubic foot in ſize: But the manufacturers to whom they were to go having deſired that they might be of the ſame ſize to which they had been accuſtomed, I kept the large ones for family uſe, and found that they made a heat as hot as the hotteſt raw coal. The common complaint againſt

gainſt the uſe of cinders is, that, tho' they make a warm and clean fire, yet it is a dull one, becauſe they do not flame. In order to create flame, I bethought myſelf of putting the ſmall coal, which in this country is called panwood, and in England is ſometimes called ſlack, and ſometimes culm, upon the cinders, when in a very hot ſtate. I knew that the common Newcaſtle coal, when ſufficiently heated, was capable of a very briſk flame, though the particles of which it is compoſed are no larger in ſize than our panwood; and I knew no reaſon why our panwood ſhould not have the ſame effect. I tried the panwood ſeveral times, but to little purpoſe. It clogged the fire, or, at the beſt, kept a very long, but a very dull heat. Having obſerved this to one of my colliers, he ſaid that ſome ſeams of coals were ſeparated from the rock, which makes their pavement, by a kind of clay, which the colliers cut away to undermine the coal, and that other ſeams had foul coal, and ſemimetals in them; that the colliers threw as much as they could of theſe three uninflammable ſubſtances, to increaſe the meaſure, into the panwood, which, in Scotland, goes chiefly to lime-works or ſalt-works, where the large body of feuel, in ſuch large works, prevented the deception from being obſerved; that the panwood which I had put upon the hot cinders had all theſe imperfections; but that, if I would uſe the panwood of a ſeam which was ſeparated from the rock by the coal alone, and which contained none of the impurities of the clay, foul coal, or ſemimetals.

Obſerve

Obſerve the proportion of one part in culm, in point not of weight but of meaſure, to four parts of ſizeable cinders; and throw as much water upon the feuel as would wet what I was to uſe; he would anſwer with his head, that I ſhould have flame enough in five minutes, and in leſs time, if I did not put on too much culm at once. On a Scottiſh coal-hill there is always plenty of philoſophy. The academy of Plato never exceeded it, for diſcuſſion and diſpute. Another collier obſerved, that flame was only ſoot on fire; that all cinders, even the beſt burnt, contained ſoot, which ſoot was capable of flame, as appeared from a draught of air forcing a ſtream of purple flame from cinder; that throwing panwood upon the cinder confined the inflammable ſoot of the cinder; but, when it was opened, the flame would burſt out with force redoubled from its interruption. A third added, that the water which I had been adviſed to throw upon the panwood was a glue, to make the ſmall parts of the panwood unite, and to form a ſolid maſs of coal, which, like other ſuch maſſes, would flame when the cruſt of it was broke. And a fourth ſaid, he was very ſure that the expanſion of the ſteam, ariſing from the heat of the water, would, of itſelf, open paſſages for the flame, though none were made for it. Without examining the reaſoning, I followed the opinions of my philoſophical friends. The reſult was, that I obtained a very fierce fire, in a ſhort ſpace of time, and which flamed the moment it was touched with a poker. When this fire was at the hotteſt, I threw more wetted culm upon it, without the addition of cinder,

der, and it made a heat and flame equal to the former. When it was again at the hotteſt, I threw large cinders and culm promiſcuouſly upon it, without much regard to any proportion, except what fed it, and found the heat intenſe, and, at the ſame time, the flame high, whenever it was ſtirred with a poker.

After I had tried theſe experiments, I was told that Mr Haig and Mr Aitchiſon, two diſtillers of vaſt trade, were throwing panwood upon their great coal when in a very hot ſtate, even in thoſe parts of their operations where the greateſt heat was required. I examined Mr Haig's panwood, which I found he brought from Fife at a heavy expence, but which was perfectly free from impurities; and I found that Mr Aitchiſon's was equally good. The practice of theſe two gentlemen proves, that culm thrown upon cinder, when in a very hot ſtate, will make a feuel of very great power; for raw coal, in a very hot ſtate, is neither more nor leſs than a cinder on fire.

After theſe three trials, I am apt to believe that a proper mixture (for different proportions of mixture will be required in the different kinds of heat that are needed,) of culm and cinder, provided the cinder be large, and completely free of impurities, and be the culm of a ſtrong coal, will, if the workmen are attentive to the ſtate of the fire, ſerve all the purpoſes of the diſtiller, the brewer, the glaſs-houſe, the ſugar-

gar-boiler, the ſoap-boiler, the bleacher, the linen and cotton printer, the potter, the candlemaker, and almoſt every manufacture that is thought to require flame as well as heat. I ſay, *that is thought* to require flame; for there are many manufactures in which flame is believed to be neceſſary, when, if the veſſel was lowered down nearer to the fire, and proper alterations made in conducting the flues, the regular heat of cinder would do the buſineſs juſt as well.

If the reſult of trials made by others ſhall agree with thoſe made by Mr Haig, Mr Aitchiſon, and me, then the expence of ſaving to the public upon feuel, in mixing cinder from tar-kilns with culm, will amount to above 30 per cent. in all caſes where the diſtance of the tar-kiln and of the raw-coal are equally a few miles *by land* from the market. My reaſon for thinking ſo is, that I think I can afford to lay down at Edinburgh, from the tar-works at Cranſton, a feuel of this kind, 30 per cent. cheaper than raw coal can be laid down at Edinburgh from its great field of ſupply, the Woolmet coal; although the Woolmet coal be only five miles from Edinburgh, and my tar-cinders and culm are above twice that diſtance from it. I calculate thus:

	L.	ſh.	d.
A ton of tar cinders at Cranſton, from the ſeam above mentioned	0	4	2
Carriage of five bolls, which make a ton of meaſure	0	2	6
500 weight of panwood, at 1s 6d per ton	0	0	4½
Carriage at 3d the hundred weight, or 5 ſh. the ton	0	1	3
	L. 0	8	3½

But a ton and quarter of raw coal from Woolmet, laid down at Edinburgh by the carters, is about 11 ſh. 6d.; and therefore the ſaving is about 3 ſh. 3d.

But the ſaving will be ſtill greater, if the panwood ſhall be taken from ſome of the coal-works in the neighbourhood of Edinburgh; in the varieties of which, many kinds of panwood may be found free of impurities. At theſe works, the price of panwood is only 1 ſh. and 3 d. per ton, and the price of its carriage would be only 7½ d. at 2 ſh. 6 d. the ton; and therefore the ſaving on the two would be about 8½ d.: And, upon the whole, the price of the feuel would be 7 ſh. 7d. inſtead of the preſent price of 11 ſh. 6d. at Edinburgh.

All this ſeems to merit ſome conſideration, in a city in which coals ſtarted up laſt winter 50 per cent. in their price, from ſome accidents befalling two or three coal-pits in its

neighbourhood; and in which, from ſome accidents that have lately happened to others, I am much miſtaken if they do not ſtart up 50 per cent. again in the courſe of this winter. They are already, when the winter is hardly begun, raiſed 12 per cent. on moſt of the coal-hills near Edinburgh.

Mr Maitland, in his hiſtory of Edinburgh, computed that there were, if I remember right, 72,000 people in Edinburgh, and its precincts. There can be little doubt that they are increaſed 28,000 ſince he wrote. In London, there are 700,000 people; and, by Biſhop Watſon's accounts in his chemical eſſays, about a million of tons are conſumed there in a year; that is, near a ton and a half to each perſon. By the ſame rule, Edinburgh and its precincts ſhould conſume 150,000 tons. But, as the cold at Edinburgh is greater, and laſts longer than at London, and as the Scottiſh coals are cheaper, and conſume faſter, than the Newcaſtle coals, which are chiefly uſed in London, the conſumption of Edinburgh and its precincts cannot be rated under 200,000 tons, or two tons to each perſon. Above 30 per cent. ſaved on the preſent price of feuel, would pay three-fifths of the houſe-rents of Edinburgh, ſuppoſing them to amount, as is generally ſuppoſed, to L. 50,000 a year.

If ſuch be the ſaving, where the diſtance is only a few miles from the market, it would be proportionally greater as the

the diſtance by land from the market is greater; becauſe the chief ſaving on the price of cinders ariſes from their lightneſs, which ſaves carriage. I am enabled to form ſome judgment of this ſaving alſo from experience. The people to the ſouth of the tar-works at Cranſton, in the counties of the Merſe, Tiviotdale, and Selkirk, carry the cinders from the tar-kilns, for the uſe of private families, at twenty and thirty miles diſtance. I ſhall ſuppoſe twenty-five at an average, and calculate thus:

If a ton of cinder in meaſure coſts, in carriage from Cranſton to Edinburgh, 2 ſh. 6 d. at 10 miles diſtance, it ſhould coſt, at 25 miles diſtance	L. 0 6 3
If a quarter of a ton of culm in carriage from Cranſton to Edinburgh coſts 1 ſh. 3 d. at 10 miles diſtance, it ſhould coſt, at 25 miles diſtance	0 3 1½
The two together	L. 0 9 4½
Again, if the carriage of raw-coal (which is of the ſame weight with culm,) from Cranſton to Edinburgh coſts 3 d. per 100 weight, and conſequently 5 ſh. per ton, then the carriage of the ton and quarter of raw coal ſhould coſt, at 25 miles diſtance	L. 0 15 7½
The difference is	L. 0 6 3

Which

Which is a ſaving, in the carriage of the feuel, of above 5 ſh. per ton, or above cent. per cent. of its original value, ſuppoſing the value to be 5 ſh. the ton.

Then add to this, ten-pence, being the difference between the price of the cinder at 4 ſh. 2 d. the ton, and the price of raw coal at 5 ſh. . . . L. 0 0 10

And 10½ d. being the difference of the price of the quarter of a ton of panwood, at 4½ d. and of raw coal at 1 ſh. 3d, . . 0 0 10½

And the ſaving on the price would be . L. 0 1 8½

Thus, the ſaving on the carriage, added to the ſaving on the price, joined together, will amount to 7 ſh. 11½ d.; or near 5 ſh. upon every cart of the common weight of 12 cwt. which goes from Cranſton to thoſe three ſouthern counties.

The people of Glaſgow are at preſent crouding the Newspapers in Scotland with reſolutions to apply to parliament to take off the bounty on the exportation of corn, and to allow to all nations the moſt unbounded liberty of importing corn into Britain when they pleaſe: That is to ſay, they are to apply to parliament to hurt the firſt great manufacture in the kingdom, the manufacture of raiſing corn, and to beggar the landed men, and their tenants, who, in all countries, are the

beſt cuſtomers that the manufacturers have. They ſay, the manufacturers, with their families, in a ſmall compaſs of country, in and round Glaſgow, are a hundred thouſand, and the ſtock laid out in employing them is a million of money; and that therefore corn muſt be at a low and an equal rate within that circuit. But, why do they not recollect that there is another article of life, almoſt as neceſſary in a cold climate as corn, I mean feuel; that theſe hundred thouſand manufacturers, with another hundred thouſand perſons who muſt be within the ſame circuit, cannot conſume leſs, becauſe both of them are richer than the people in and round Edinburgh, than 400,000 tons of feuel; that coal in Glaſgow, as well as at Edinburgh, is ſubject to ſtarts in its price; that, to keep the price of feuel at a low and an equal rate, is a great object to a manufacturing intereſt; that 30 per cent. ſaved on the price of thoſe 400,000 tons of coal, by uſing cinder and culm inſtead of raw coal, will pay all the difference in price that they contend for, between what they now pay for corn, and what they wiſh to pay for it; and that, by raiſing tar-works from their pit-coal, and iron-works from their iron-ſtone, (of both of which they have vaſt abundance), round their city, they may get the command of the market of tar, and cinder, and iron, to Ireland, to the Weſt Indies, and to all other markets to which they trade. And to one of which markets, I mean the firſt one, I can aſſure them that they might make cent. per cent. of profit, if they will ſend tar-

tar-cinders to Ireland, from the coaſt of Airſhire, and not a great deal leſs, if they ſend them even from the Clyde.

For the ſake of thoſe who may wiſh to erect tar-kilns, with a view to the benefit of the cinders made in them, I muſt here warn them againſt an error, which for ſome time was fatal to the character and ſale of both Lord Dundonald's cinders and mine. In the body of ſome ſeams of coal, there are ſtratums of ſtone an inch or half an inch thick, called by the colliers, *ribs*, and lumps of ſemimetals. Theſe will infallibly crack, burſt, and fly in the fire; and therefore no coal ſhould be uſed in a tar-kiln that is not perfectly clear of ſuch ſubſtances.

And, for the ſake of thoſe who may wiſh to put wet culm on their cinders in a hot ſtate, I muſt warn them againſt all culm that has ſulphur in it, becauſe the ſteam ariſing from the junction of heat and water on culm is accompanied with vapours the moſt diſagreeable, and probably noxious, becauſe they are ſo.

Manufacturing arts are arts of ſelection and diviſion, when manufacturers have invention and thought. Thoſe ſeams of culm which have ſulphur in them will go to the lime-kiln, the ſalt-pan, the brick-work, and other works, which are either conducted in the open air, or in large areas, where the ſmell

ſmell of the ſulphur cannot hurt the men; the ſeams that have no ſulphur will go to private houſes; and, if the cooks, or their maſters, have common ſenſe, or common palates, they will admit no feuel but cinder, and cinder without mixture, into the kitchen.

Now, if the ſavings be ſo great from uſing cinders and culm as a feuel in the two cities of Glaſgow and Edinburgh, how vaſt would the national ſaving be, if they were allowed to paſs coaſtways free of duty, and were uſed in the other towns and cities of the kingdom, whether carried coaſtways or not! That ſaving would enable the inhabitants to pay the houſe-tax, the window-tax, the commutation-tax, the ſhop-tax, and a dozen others, into the bargain.

But the extent of the market would not be confined to Britain alone, if the high duties on the exportation of cinders did not prevent the market from expanding itſelf elſewhere. The following countries would throw their arms open to receive them.

Spain and Portugal.—There is no coal in Portugal or Spain, at leaſt none that the inhabitants, who are no great proficients in natural knowledge, know of. The firſt of theſe countries is poorly wooded; the latter is ſtill worſe wooded, of which the extenſion of the ſheep-walks is probably the cauſe. In paſſing acroſs both of them, from Liſbon to Perpignan, I hardly ſaw a tree,

tree, except two or three ſmall cork-foreſts in Eſtramadura, and a mountain of pine-trees, before we came down to the plain in which Barcelona ſtands. England, in one of her fond hours, allowed culm to be exported to Liſbon, on a low duty, in the 31ſt year of the late King; but, like a lover jealous of the deſertion of a kept miſtreſs, parliament gave the boon only for a few years; and, to make the favour the more mortifying, the act declared that the inductive cauſe of paſſing it was, becauſe, without Britiſh culm to burn the lime of Portugal, the houſes of Liſbon could not be rebuilt. The favour was repeated in the preſent reign, by an act of the 13th of his preſent Majeſty. But the limitation of time was repeated alſo in the act. And in both acts the exporter was obliged to find ſecurity that the culm ſhould be landed no where but at Liſbon, and the conſul and deputy-conſul there were obliged to grant certificates of its having been landed there only; as if the culm of Britain, not worth two ſhillings a ton, and of which there are millions of tons lying ready worked, but never brought up, in the Britiſh mines, had been ſo many tons of diamonds, in their paſſage from the Brazils to the court of Liſbon. But, if England had granted a power to export cinders and culm to Liſbon at all times, upon a ſmall exportation-duty, the favour would have been received with far more gratitude than the hundred thouſand pounds which parliament ſent to relieve the ſufferers at Liſbon from the earthquake, but which the great

great men of the country, as will happen in every arbitrary monarchy, are ſaid to have divided amongſt themſelves, and gave nothing to the poor.

France. If we conſult books, France is full of coal-mines; but, if we travel through the provinces, we ſee none of them worked; from whence I conclude, that there either are none, or that they are not workable to advantage. France, conſidering the number of her people, and the frequent ſpurts of her government to pay attention to objects of political oeconomy, is in general, with the exception of Burgundy and Normandy, a country very ill wooded; and the climate being colder than in Portugal or Spain, requires a greater ſupply of feuel. Perhaps it is no refinement to ſay, that the high price of feuel is one reaſon why the French leave their own houſes, and croud continually into general companies. The ſame cauſe produces the ſame effect in the highlands of Scotland; for whole villages aſſemble round a common fire at night, during winter; not becauſe the people are more ſociable than others, for in ſummer they have little communication with each other, but becauſe they are colder. The woods of Burgundy, which ſupply Paris with feuel, are waſting ſo faſt, that the King, ſome years ago, gave inſtructions to the farmers-general to introduce Engliſh coal, by means of the Seine, into Paris; but the order was prevented from having conſequences of any extent, by two cauſes; the firſt was the high price of Britiſh

coal,

coal, from the height of the Britiſh duties on exportation; the other was, that the tranſition from the uſe of charcoal in chambers, which is the chief feuel made uſe of in Paris, to that of raw pit-coal, is difficult. The people of Paris have a natural antipathy to the uſe of pit-coal, which they think is the cauſe of thoſe diſorders in the breaſt which produce what they call *la maladie Angloiſe, the conſumption:* But the tranſition from the uſe of charcoal to that of cinder is eaſy. Permit pit-coal, in the ſhape of cinder, to go to Paris under an eaſy duty on exportation, and no other feuel would be uſed in that vaſt city. The great length of the French rivers, with the pains taken to communicate, by water-carriage, ſea with ſea, and river with river, enſure equally the ſucceſs of Britiſh cinders inſinuating themſelves into the moſt interior parts of France. If, in the preſent commercial treaty, England had offered to let cinders paſs into France on a low exportation duty, France would have given any equivalent for a conceſſion, which ſhe would have accounted a bleſſing to her, but which, in reality, would have been a far greater to Britain.

Flanders. Flanders is ſupplied with coal chiefly from Liege; but, as the Liege coal is a caking one, it can never produce cinder by Lord Dundonald's proceſs; becauſe, in that proceſs, the perforation of air through the oven is neceſſary, but which would be ſtopt by the quality of a coal that runs into a maſs.

Holland.

Holland. In Holland, the high Engliſh duties upon pit-coal and cinder force the Dutch in general to make uſe of peat; a feuel cold, offenſive to the ſmell, eyes, and lungs, and dirty to the chamber, furniture, and perſon. The eaſy paſſage, by rivers and canals, in the Auſtrian, Dutch, and French Netherlands, opens a vaſt market there.

Germany. Germany has many coal-mines, and is full of woods; but her coal-mines that are worked are not near the ſea; of which the beſt proof is, that the Dutch get all the coals they uſe from the Maeſe, or from Britain, and not from Germany. The woods are not on the banks of the great rivers, on which, in almoſt all countries, all the great cities, that is, all the great markets, ſtand; but have been deſtroyed in conſequence of the cultivation of the land, and the eſtabliſhment of cities, for ages paſt, along thoſe banks. The great length and breadth of the German rivers open another great market to Britiſh cinders.

Northern kingdoms. Denmark, notwithſtanding her neighbourhood to the foreſts of Norway and Sweden, Ruſſia, notwithſtanding her poſſeſſion of foreſts within herſelf, make demands upon Britain for pit-coal; the common ballaſt from the Firth of Forth to the Baltic is raw coal. Admiral Greig is, at this hour, in Ruſſia, uſing Britiſh coal in making the lime and bricks which go to form the works at Cronſtadt. Had he known, what is now known in this country, that tar-cinders make

make lime and brick far quicker and cheaper than raw coal, he would have ſaved much money to his Royal Miſtreſs.

In moſt of the countries of Europe north of France, ſtoves are made uſe of inſtead of grates. Theſe ſtoves go zig-zag, or obliquely, along the walls of the room; the conſequence of which is, that raw coal cannot be uſed in them; for the ſoot would lodge in the turnings of the pipes, and the ſulphur would be doubly offenſive from the mouth of the ſtove. But the uſe of cinders is not ſubject to any of theſe inconveniencies: And, when high Engliſh duties force thoſe nations to make uſe of charcoal from their own wood, inſtead of cinder from our pit-coal, they ſerve the landed intereſt and the induſtry of others, and hurt both of them at home. It is in the power of Britain to ſupply the maritime coaſts, and many of the interior parts of Europe, with feuel, from the gulph of Lyons to Archangel.

Weſt Indies. But there is another market yet untried, which, in time, may be a great one, I mean the Weſt India iſlands. Almoſt all the old iſlands are deſtitute of wood, long ago waſted; and in both the old and new iſlands, wood cannot be uſed in making rum, or refining ſugars, but pit-coal or cinder alone. The cinder-trade to the Weſt Indies has three advantages. 1ſt, The freight is cheap, becauſe ſhips go often out without cargoes. 2dly, The greater lightneſs of cinder than raw coal is an advantage, in iſlands where the paſſages are difficult,

cult, the roads bad, and carriage dear. And, laſtly, Wood cannot be uſed in making rum, or refining ſugars, but pit-coal and cinders alone. The time, perhaps, is not diſtant, when Britain, by leſſening her exporting duties, may ſupply all nations with feuel for their ſugar-works in the Weſt Indies during peace, and ſtop thoſe works during war, by refuſing the ſupply.

Such are the new views of commerce which the above four articles produced from pit-coal have opened to the nation. But in vain will be all thoſe bright viſions, unleſs the duties, nearly equal to the value of the commodity, ſhall be taken off cinders carried from one part of the kingdom to another by ſea, and unleſs the duty, equal to near three fourths of the value of the commodity, ſhall be made more moderate when it is exported. Two ſimple, but capital facts, ſhow the neceſſity for both meaſures. The firſt is, That, of the four primary articles which are the produce of pit-coal, as three of them, to wit, oils, tar, and cinder, are cheap commodities; and the fourth of them, volatile alkali, not a very dear one; ſo it is impoſſible that the trade on theſe three articles can can be carried on with due advantage, unleſs a market ſhall be ſecured for the cinders. The ſecond is, That the experience of paſt ages has proved that no extenſive market, at home or abroad, can be found for cinders, as long as the preſent duties upon them take place.

The

The moſt injudicious of all taxes are thoſe which produce little or nothing to government, and yet hurt the huſbandman, the manufacturer, and the ſeaman. The tax upon cinders is one of thoſe. Cinders exported are ſubject to the ſame duties as coals exported, to wit, about 15 ſh. 4d. per chaldron, exported in home bottoms, and much higher in foreign ones. Cinders carried coaſtways are ſubject to the ſame duty with coals carried coaſtways, to wit, about 4 ſh. 4 d. per chaldron in Britiſh bottoms, and much higher in foreign ones. The conſequence of which ſyſtem of duties is, that hardly any cinders are exported at all, and few in compariſon of what might be, are carried coaſtways.

If an alteration in the ſyſtem of taxation, in that reſpect, ſhould be thought proper, the prudent way to make the experiment, and yet not to riſk national treaſures upon experiments, would be to bond the preſent duties on cinder carried coaſtways, for a year or two, and, in the mean time, to replace them, by a moderate tax upon cinders and culm exported, in place of the preſent extravagant ones ; and which moderate tax might in future times be increaſed, according as it ſhould be found that foreign markets would bear it. At the end of that year or two, the treaſury or parliament could judge how far the gain on the one had compenſated or exceeded the loſs on the other, and take their meaſures accordingly.

It may be thought that ſome of the arguments which I have made uſe of will go the length of defending the propriety of permitting raw-coal carried coaſtways to paſs without duty, and to be carried abroad on a low duty. That they will defend the firſt of theſe meaſures is certain ; and, if the meaſure could be compaſſed without injuring the revenue, which is not impoſſible, if a moderate tax was paid on exportation to foreign parts, it would be one of the greateſt bleſſings that ever was conferred upon Britain. But the caſe of exporting raw coal to foreigners ſtands on a quite different footing. Four tons of raw coal make a barrel of tar, beſides other commodities in producing it. Therefore, every four tons of raw coal that went abroad would be the loſs of a barrel of tar, and of other commodities, at home. Inſtead of lowering the duties on the exportation of raw coal, perhaps, (for I go no further), it would be political and commercial wiſdom to increaſe them, in order to force foreigners to uſe cinders inſtead of coal ; that is, our manufactured commodity, inſtead of our raw material.

But, whatever be in this, the advantages which would probably flow from the propoſal, limited as I have made it, are as follows.

ADVANTAGE

ADVANTAGE I. The value of the coal-mines of the kingdom will be increaſed. It was an obſervation of depth, becauſe of foreſight, by a witneſs who was examined at the bar of the Houſe of Commons on the Iriſh Propoſitions, that the qualities and uſes of many original materials are as yet unknown, and that therefore it was unwiſe to be bargaining for ſubjects of unknown value with any country whatever. The pottery of England conſtitutes the fourth branch of Britiſh manufacture, after woollen, iron, and cotton; and it is extending. At preſent, the clays of the potteries are brought almoſt all from one or two parts of England, at a great diſtance from them, for which perhaps the chief reaſon may be, that they are moſt viſible to the eye in thoſe parts. But, in the ſtrata of coal-pits, many ſpecies of clays, of great though unknown value, are to be found. The more cinders that are conſumed, therefore, the more coal-mines will be opened; and the more coal-mines that are opened, the more clays will be diſcovered. This is not all. Theſe clays are often in contact with the coal, or very near it; often make its pavement, whether they be hard or ſoft; and ſometimes its roof, when they are hard. At leaſt, I am ſure it is ſo in Scotland. And one of Mr Wedgworth's ſons was ſo good as to make a piece of Queen's-ware for me, from the pavement of one of my coals, which he thought good. But ſuch of theſe clays as are in contact with the coal, or near it, cannot be worked without making the coal fall down, if the clay be worked in the pavement; or without making the materials above the clay fall

fall down upon the coal, if the clay be worked in the roof of it; and, in either caſe, the proprietor of the coal, and the nation, will loſe juſt ſo much coal, unleſs a market be created for it, either in a raw ſtate, or a manufactured ſtate, that is, in cinder; but, ſhould that market be provided, the coal would be regularly brought up with the clay, and by that means ſaved. Again, the iron-manufacture is the ſecond in England, and, if examined in all its relations, might perhaps be found to be the firſt. Now, in the ſame manner, the ſtrata of iron-ſtone are often in contact with the coal, or nearly ſo, above or below it; at leaſt I am ſure it is ſo in Scotland. But thoſe ſtrata of iron-ſtone cannot be worked without ruining the ſtratum of the coal, unleſs a market be provided for it, either in its raw ſtate, or in its manufactured ſtate, that is, in cinder. In both caſes, there is a great diſproportion between the quantity of clay and iron-ſtone on the one hand, and the quantity of coal on the other, as if Nature wiſhed to force man to be induſtrious, and to create a market for both, without which ſhe would not reward him with either. The ſtrata of iron-ſtone, where they touch or are near to the coal, are in general, in Scotland at leaſt, from two to four inches thick, when cleared of impurities. I ſhall ſuppoſe ſeveral of them added together to make ſix inches. But the ſtratum of coal is generally from three to nine feet thick. I ſhall ſuppoſe it ſix feet. The proportion, therefore, of the one to the other will be as one to twelve; and the difference in weight between iron-ſtone and coal will bring down the proportion to be about one to ſeven and a half. But it takes only five tons of coals to four

tons of ordinary iron-ſtone, to make a ton of pig-iron. This is not all: It often happens that above thoſe ſtrata in which the coal and iron-ſtone are in a kind of a ſtate of alliance, there are other ſeams of coal near to which there is no iron-ſtone at all; and, in that caſe, there is a hazard that, in working the former ſeams for the ſake of the iron-ſtone, the latter may be cruſhed and loſt. And, therefore, a market for all this ſuperfluity of coal muſt either be provided by national wiſdom, or it muſt be loſt to the nation. But, if that market ſhall be created, by allowing cinders to be ſent coaſtways on no duty, or abroad on a ſmall duty, then every ton of pig-iron that is made will bring riches into the coal-owner's pocket, which he muſt otherwiſe have loſt.

Add to this gain, the gain which the coal-owner will get by the ſale of his culm; a commodity hitherto almoſt totally unſaleable, on account of the duty upon it, of which many millions of tons are now lying in coal-mines ready worked, but not brought up; becauſe they can find no market near the coal, and are barred by the tax from finding it elſewhere. Add, too, the gain on the new demand for cinders from private families and manufactures, when they find them brought by ſea to their doors free of taxes. And add to both, the gain on the new demand from foreign countries, when they go there on duties which thoſe countries are able to pay.

Nor will the ſaving in the expence of feuel to the nation, from the uſe of tar-cinders and culm, diminiſh the conſumption

tion of coal at home, to the prejudice of thoſe who have coal eſtates. The quantity of feuel called for, like that of every other commodity, will always riſe in proportion as the price of it ſinks. The ſaving of expence to the public will not ariſe from the diminution of the conſumption, but from the diminution of the price, of feuel.

ADVANTAGE II. Manufactures will be increaſed. Feuel, in the cold northern climate of Britain, is a neceſſary of life almoſt as much as corn; and, *caeteris paribus*, manufactures will always flouriſh moſt, where feuel is cheapeſt. Of this, the manufactures of England hold up a proof to mankind; and the manufactures of iron and pottery, in the coal-counties, hold up a proof to England. Conſcious of the importance of the firſt of thoſe articles of life, we allow it to paſs coaſtways free of duties, and give bounties on its exportation. But, diſregarding the importance of the other, we make it pay a tax on going by ſea from one part of the kingdom to another, and a ſtill higher when exported. There are parts of the kingdom, in which the limeſtone, and the coal which is to burn it; the clay, and the coal which is to make it into tile and bricks; the potter's clay, and the coal, which are to be put into the ſame oven; the iron-ſtone, and iron-ore, the lime and the coal, which are one day to meet in the ſame furnace, (and forty inſtances of the ſame nature, inſtead of four, might be given), are hundreds of miles aſunder, and are ſeparated ſtill wider, by a tax of cent. per cent. on the value of the coal; a tax which, contrary to the principles of

of all others, does not take place where the commodity is cheap, but only when it is carried to a diſtance, acroſs ſeas, and is therefore dear. But, remove the artificial part of this ſeparation, by removing an impolitic tax, and the natural one will not be felt by a people, who are leſs afraid of ſeas than other nations are of fiſh-ponds.

On this head, the Chambers of Commerce, Parliaments, and men of all ranks, ſhould reflect, that two of the great branches of naval ſtores, thoſe ſtores on which the ſtrength of the nation depends, and in compariſon of which her wealth is but a paultry object, and will make her only a more tempting prey to invaders; I mean, the naval ſtores of tar and iron are connected with, or rather dependent upon, the intereſts of the cinder trade. In the late war, it required the annual protection of a fleet to ſave the naval ſtores that we needed from the Baltic, from being intercepted by the Dutch; but, if that fleet had been at liberty to act elſewhere, it would have caſt the balance of the war. The infinite ſuperiority of mineral tar over vegetable tar, preſents to Britain, if ſhe will not, by her own imprudence, let it ſlip through her fingers, a monopoly of the tar-buſineſs, againſt the northern kingdoms and America. But that buſineſs will be ſtopped in its career, if parliament ſhall continue to lock up the markets at home and abroad, againſt thoſe cinders from which the tar itſelf is made.——Again, with regard to the iron-trade, the ſuperior quality of the tar-cinders to thoſe made in the open air, together

ther with the cheapneſs, and the ſaving of time and labour, which accompanies the uſe of them, give a decided ſuperiority to Britain in the iron buſineſs; and this ſuperiority, if ſhe will open markets for the ſuperfluous coal that is raiſed in conducting that buſineſs, ſhe muſt forever retain, as long as ſhe ſhall continue to be the only country in the world, in which iron-ſtone and iron-ore, lime, and coal, (the component parts of which iron is made), are often found in the ſame field, and in the neighbourhood of the ſea, or of water-carriage to the ſea; and as long as ſhe ſhall enjoy that ſecurity of property, which is the daughter of liberty, and the mother of induſtry. Parliament, and parliament alone, can at this hour take from Britain, or give to Britain, the monopoly of the tar-trade, and of the cinder-trade added to it, and the moſt decided ſuperiority in the iron-trade of the world.

ADVANTAGE III. The landed intereſt and the fiſheries will receive benefit.

Landed Intereſt. I need not repeat to Chambers of Commerce the common topic, that, whatever money is made by the manufacturer and merchant, falls in part ultimately, or perhaps rather immediately, into the pockets of landed men. But, independent of this general benefit, there is a peculiar benefit which the paſſage of cinder by ſea without duty will give to them. Among other conſequences which were not originally foreſeen from Lord Dundonald's diſcoveries, it has been found by experience, that cinder, from which tar has been extracted, burns lime in half the time, and with two thirds of the

the quantity that raw coal does. The Earl of Elgin's lime-works, on the coaſt of Fife, which are perhaps the greateſt in Europe, conſume no feuel but Lord Dundonald's cinders, when they can be got, although they coſt 3 ſh. 6 d. a ton; and the demand for tar-cinders, from all the northern parts of Scotland, for burning lime, is far greater than Lord Dundonald can ſupply. But countries in the colder regions of the globe are improved, or not improved, very much in proportion as they are provided or not provided with lime. Almoſt the whole eaſt coaſt of Scotland not within the Firth of Forth has lime, but no coal. The ſame obſervation will apply to moſt of the eaſtern and ſouthern coaſts of England. The proverbs of a country contain the wiſdom of the greateſt part of it: It is a common proverb in the north of Scotland, that a tax upon feuel is a padlock on the plough. It is therefore in the laſt degree injudicious to prevent the defects of nature, in the want of coal, from being ſupplied by the help of art, in the tranſportation of cinder.

Fiſheries. The trade of cinders, when encouraged, whether carried coaſtways, or exported, will ſupport both the fiſheries round the kingdom, and the more diſtant ones of Newfoundland; for, after the fiſhing ſeaſon is over, the veſſels will be employed in carrying cinders coaſtways, or to the countries neareſt to Britain, when they would otherwiſe have been laid up idle in their harbours. It is with a view to this advantage, that ſome ſpirited gentlemen are now ſetting up tar-works in Ayrſhire,

Ayrſhire, knowing well that the freight of cinders to the oppoſite coaſt of Ireland muſt be cheap, when the fiſhing veſſels ſhall be made ſure of one buſineſs in ſummer fit for that ſeaſon, and of another in winter fit for the winter ſeaſon.

ADVANTAGE IV. The trade, ſhipping, and revenue of the nation, will be increaſed.

Trade. The quantity of coals carried to London in a year is, as has been mentioned, above a million of tons. It is no extravagance to ſuppoſe that the ſame number of tons of cinders, in point of meaſure, may go coaſtways to Britiſh harbours, or be exported to Europe or the Weſt Indies, when the paſſage is made eaſy for them. The reaſons which ſupport the ſuppoſition are as follow. When Portugal called for culm to make lime for building her houſes; when Ruſſia calls for culm to make lime and brick for building her forts and harbours; when all the north of Scotland calls for lime from Lord Elgin's works, in which cinder alone is burnt, and for culm and cinder from Lord Dundonald's works, for burning their own lime; all theſe countries ſpeak the voice of all maritime parts which cinders can reach, not for the uſes of building alone, but for the improvement of land, by the medium of lime. Nothing ſurpriſes a foreigner more, in going through thoſe counties of England which are improved by lime, than to find himſelf involved in clouds of ſmoke, he knows not why; and there is nothing that an Engliſhman from thoſe counties miſſes more

more when he goes abroad, than to find lime-kilns almoſt nowhere, except in the neighbourhood of great cities. But, if England would give the boon, the generous boon, in favour of the food of mankind, that traveller would ſoon think that he was in his own conntry again. Add to theſe uſes, the prodigious demand for cinders, for the uſe of private families and manufactures in the great cities of France, ſuch as Paris, Rouen, and Bourdeaux, even excluſive of the reſt of France, and the great cities in Holland and Zealand, even excluſive of the other five Dutch provinces, and the great cities on the great rivers of Germany; and it may be found that I am rather within than beyond the mark, when I ſay that a million of tons in point of meaſure would be required in the new markets.

The gain to the national trade from that million would be as follows:

In extracting tar from the coal, to reduce it to cinder, there would be produced in tar, oils, and other commodities,	L.	200,000
A million of tons of cinders, at 6 ſh. a ton		300,000
Freight of them, at 15 ſh. upon an average		750,000
Saved to manufactures in barilla and potaſh		700,000
	L.	1,950,000

I count nothing for the freight of the produce. The proportion of its freight to that of cinder will be as one to forty.

Neither do I count what will be ſaved to the nation, by paying ſhips with coal-tar, inſtead of ſheathing them with copper, becauſe I cannot know the extent of it. I am told that the expence of ſheathing a middle ſized ſhip of war is ſeventeen hundred pounds. Much leſs than an hundredth part of the money would pay ſuch a ſhip with coal-tar.

Shipping. While the Italian States, and other nations after their example, were purſuing the trifling commerce of the luxuries of life, the Dutch ſtruck out a new road to wealth and grandeur, by purſuing the commerce of the neceſſaries of life; thoſe neceſſaries, which are always bulky, and, beyond all others, require the carrying trade for their help. Coal, when reduced to cinder, loſes half its weight, but retains its original bulk. Hence a ton of cinder in weight employs double the ſtowage that a ton of raw coal does. Cargoes of much room, but of little weight, have this advantage, that the ſhipmaſter mixes goods of much weight and little ſtowage with them, by which he is paid for the weight of the one ſpecies of goods, and the room of the other.

Britiſh fleets of cinderers would be ſeen paſſing along the coaſts of Holland, Flanders, and France, as fleets of colliers are now ſeen paſſing from Newcaſtle to London. Next to

 the

the navy, the coal-ſhipping is the bulwark of England; becauſe that ſhipping ſupplies the navy in time of war with ſeamen accuſtomed to boiſterous ſeas; healthy, becauſe not broken with hot climates; and near at hand when they are needed. But the cinder-trade will be of double the advantage to the nation that the coal-trade is; becauſe every ton of weight in cinder makes two tons in meaſure, and therefore requires a proportionally greater quantity of ſhipping, and number of ſeamen; two circumſtances which will add to the dignity of the nation in peace, and to her power in war. Alterations in the form of veſſels will indeed be required, ſuited to the nature of the cargo; but, even in theſe alterations, the ſhip-building buſineſs will be gainers. In the laſt paragraph, under the article *Trade*, I ſuppoſed the million of tons required in the new markets to be a million in point of meaſure, which would be equal to the tonage of all the coal-ſhipping that goes to London: But, ſhould we ſuppoſe that the Britiſh markets and the foreign markets would call for the ſame quantity of feuel, in point of weight, which the ſingle city of London does, to wit, a million of tons in point of weight, (a thing not difficult to be ſuppoſed, becauſe, in proceſs of time it certainly will happen); then, not only would the trade of England be increaſed L. 1,950,000 more than I have ſtated under the article *Trade*, but the ſhipping of Britain would receive an addition to the extent of twice the preſent tonnage of the coal-trade to London. And, ſhould that addition be made, the navy of England might defy that of Europe,

rope, from the Streights of the Dardanelles in the ſouth, to Peterſburgh in the north.

Strange! that parliaments ſhould meet year after year, of which many members have coal eſtates, or are engaged in the ſhipping buſineſs, and yet that not one of them ſhould think of aſking the countenance of parliament in favour of the cinder-trade, the benefit of which would go to the coal-owner, and to the bulwarks of the nation, the ſeamen, and their employers.

Revenue. If there be a maxim in the ſcience of political oeconomy true beyond all others, it is, that, in proportion as the mining, the manufacturing, the landed, the fiſhing, the coaſting and foreign trade, and the ſhipping of the nation increaſes, the amount of the national revenue muſt extend with them.

There is a kind of ridicule which attends the drawing great conſequences from little objects, ſuch as the grandeur of an empire from the rakings of a coal-fire. But what is of ſo little conſequence in appearance, at firſt ſight, as the tobacco-ſtalk of America; the tea-leaf of the Eaſt, and the ſugar-cane of the Weſt Indies; the leys of burnt plants, from which barilla and pot-aſh are made; the pit-coal of Britain, which keeps 700,000 people together in London, and is the great great cauſe, beyond all others, (the enjoyment of liberty alone excepted),

excepted), of the ſuperior wealth of England above all other nations? yet look at the books of merchants, and of the treaſury, and ſee what ſources of private and public wealth ariſe from objects apparently as contemptible as cinder, and the importance of which was once as little thought of, as the various commodities which are now known to be produced, in converting a piece of raw coal into a piece of cinder.

OBJECTION I. The exportation of cinder upon eaſy duties to foreign manufacturers will enable them to underſell our own. This is impoſſible. The expences attending the carriage of the cinder from the coal-pit to the ſea, the putting it on board, the duty on exportation however moderate, the freight, the carriage from the port to the place of deſtination, a probable tax at the foreign port, commiſſion, inſurance, and intereſt of money, muſt always make it four times dearer to the foreign than to the Britiſh manufacturer. Nothing can be ſo abſurd as to inflict a certain evil upon ourſelves, in the hopes of inflicting a very uncertain evil upon our neighbours.

OBJECTION II. We ſhall exhauſt our own coal-mines, and deſtroy the hen that lays the golden eggs. This is equally incredible. Beſides the long wide extenſive ſtretch of country full of coal, from Newcaſtle acroſs the iſland to South Wales, through countries replete with water-carriage, by rivers and canals, there is a vaſt range of coal country from the eaſtmoſt part of Fife to the weſtmoſt part of Ayrſhire, an hundred miles

miles in length, along both ſides of two arms of the ſea, into which many rivers empty themſelves. A ſmall tract of country near Newcaſtle has ſupplied London, and England, and ſome foreign markets, with coal for centuries. In the hill above the villages of Preſtonpans, Muſſelburgh, Dalkeith, and Newbattle, in the county in which I write, there are ſo many ſeams of coals, capable of being brought out at the mouth of the ſame pit, that, if they were all joined together, they would make above forty perpendicular feet of coal; and every cubical yard of theſe ſeams would yield 1800 weight of coals. There is more coal in that ſingle hill than would ſupply London for many centuries to come.

OBJECTION III. The common objection to the uſe of cinder without mixture is, that they conſume faſt. This is well founded, when they are ſmall, but not otherwiſe. That large coal can be burnt to a cinder, to the heart, in the open air, I very much doubt. But, in a tar-kiln, they can be ſweated, and all the liquid ſubſtance extracted from them, though they be ever ſo large; and the more they are ſweated, the harder they become. Some benevolent ſocieties in Europe have advertiſed premiums to thoſe who ſhall diſcover the cheapeſt and moſt commodious feuel for the benefit of mankind. But I believe the beſt that ever was thought of, or probably ever will be thought of, for a coal-country, is a fire made of large cinders; becauſe, if a few ſmall cinders are put under it, it will light with a few puffs of a bellows, and laſt three or four hours; when

when taken off at bed-time, will extinguiſh in an inſtant; what is left will light in the morning almoſt in another inſtant, and laſt an hour or more; and in all theſe ſtates of alteration it will be free of ſulphur and ſmoke.

The large ſize of the cinder is of conſequence, even when culm is to be put upon it; for, if the cinder be ſmall, the culm will fall down through all the little vacuities occaſioned by the number of the cinders; whereas a large cinder keeps the fire open, and gives paſſage to the air.

But, whether the cinder be great or ſmall, care muſt be taken that it does not receive wetneſs.

I cannot conclude this paper without ſaying, what I think juſt, to the Earl of Dundonald, who, after ſerving his ſovereign by land and by ſea, and enriching his mind with all that variety of knowledge, which the varying ſituations, in place and company, give to a ſeaman and ſoldier of genius, dedicated the reſt of his life to ſtudies and purſuits the moſt uſeful to his country. I have ſometimes amuſed myſelf with conſidering which have been the greateſt diſcoveries in Britain in the age in which I lived. Theſe ſurely are, electricity,

ty, the improvements upon the ſteam engine, which in ſome caſes make the labour of ten men equal to that of ten thouſand, and the diſcoveries in the qualities and uſes of pit-coal. To theſe may be added Mr Millar's invention and improvements of the Carronade guns; ſome of which are ſo light, as to be carried, with all their appurtenances, on two poles, by two men, through broken countries, or over mountains; and others of which carry a ball of an hundred pounds weight the diſtance of two miles, or not a ſhot, but a ſheet of ſhot of above 1000 ſmall balls, which drop in a long line that would deſtroy every thing in its paſſage and end in a circle of 40 or 50 yards diameter: An invention which, amidſt all its horrors, may in the end prove beneficial to mankind, becauſe, by the uſe of general and equal deſtruction, it may force nations to keep peace with each other; but, at any rate, of the laſt importance to Britain, becauſe it preſents her with a ſhield to guard her only vulnerable parts, her docks, and other maritime places, which cannot be turned into fortreſſes, without danger to liberty at home, nor left as they are, without being expoſed to inſult from abroad; and one of which, in time of war, requires a fleet ſtationed to defend it, inſtead of annoying the enemy, when that enemy, I mean France, needs no ſuch protection, becauſe her fortified maritime places defend themſelves. To perſons of philoſophical minds, at a diſtance from politics, and all thoſe politicians who keep men of genius always at a diſtance from men in power, it was an amuſement of late, (though a painful one), to ſee one half of the

Engineers,

Engineers, Generals, Admirals, and makers of bad ſpeeches, for or againſt miniſters, diſputing how to begin to miſapply millions at home, after millions had been miſapplied abroad, for making bad fortifications worſe, when a few hundred Carronades, carrying the weight of 100 pounds, and judiciouſly diſpoſed, would guard the ports of England, and of her dominions, againſt the attacks of the univerſe..

It is ſtrange, that, in a country full of genius and application like England, the firſt of theſe diſcoveries ſhould have been made by an American, and the other three by Scotſmen! Perhaps it is ſtranger ſtill, that the two perſons who have beſt turned their talents from the love of the theory of the ingenious arts, a thing not unnatural to men of rank, becauſe it is fully as amuſing as attendance upon a gaming table, to the moſt extenſive practice and detail of thoſe arts, ſhould have been two Peers of the realm. Public praiſe will point out that the Duke of Bridgewater is one of the two to whom I allude.

But there is a compliment of a more private nature, which I owe to Lord Dundonald, and his brothers, Captain Cochran of the navy, and Mr Cochrane late of Quebec. I was the firſt perſon in the kingdom after Lord Dundonald who erected a tar-work from pit-coal. But, in my hurry to be rich, or to ſhow public ſpirit, I know not which, I bound myſelf to articles in the contract, which might have had very unlucky effects to my family. But pin after pin was looſed, almoſt

almoſt without my aſking it, to make the bargain equal on both ſides.. I ſhould not have troubled the public with an anecdote, which relates only to a private perſon, was it not that the relation of it may ſhew others how ſafe they are in forming engagements with three brothers, one of whom, amidſt all his tars, oils, alkali's, and cinders, cannot forget that he is the twelfth Earl of his family; another of whom has all the nice ſenſe of honour of a Britiſh officer; and the laſt of whom poſſeſſes the plain, downright, correct, and generous honeſty of an Engliſh merchant.

F I N I S.

THE public has ſo far entered into the ſentiments of the above Pamphlet, that the orders for tar-cinders from Cranſton, for private families, and for manufacturers, are already far greater than the works can ſupply.—Complaints have been made that orders for cinders have not been obeyed. It is impoſſible for a private perſon to find carts enough for ſome time; and therefore it is wiſhed that brewers, and others who need the tar-cinders would for ſome time ſend their own carts, or join with their neighbours in hiring carts, until a ſufficiency can be got at the works.