STATISTICAL ACCOUNT

OF THE

BRITISH EMPIRE.

PART III.

INDUSTRY OF THE BRITISH EMPIRE.

CHAPTER II. — MINES AND MINERALS.

THE mineral riches of Great Britain, if not superior, are at least equal to those of any other country. We cannot, it is true, boast of mines of gold or silver; but we possess what is of still more importance to a manufacturing nation, an all but inexhaustible supply of the most excellent coal. Iron, the most useful of all the metals, is found in the greatest abundance, and of an exceedingly good quality, in most parts of the empire. Our tin mines are the most productive of any in Europe; and we have also very productive and valuable mines of copper, lead, manganese, &c. Our salt springs, and beds of fossil salt, are alone sufficient to supply the whole world for an indefinite period.

The most valuable minerals are situated in the western and northern parts of England; and in the southern and middle parts of Scotland. The English mines are by far the most important. Were a straight line drawn from the Isle of Portland, in Dorsetshire, to Rugby in Warwickshire, and thence to Hartlepool, on the coast of Durham, the country to the east of it would be found to be destitute of coal, copper, tin, lead, salt, &c. Iron is, indeed, found in various places to the eastward of the line now mentioned; but, owing to the want of coal, it is not wrought. This district may, therefore, as compared with the other parts of the country, be said to be destitute of minerals; and, to a considerable extent, also, of those branches of industry for the successful prosecution of which an abundant supply of minerals is necessary.

We begin our notices of the different minerals with that of coal, by far the most important and valuable of them all.

1. COAL.—It is hardly possible to exaggerate the advantages England derives from her vast beds of coal. In this climate, fuel ranks among the principal necessaries of life; and it is to our coal mines that we owe abundant and cheap supplies of so indispensable an article. Had they not existed, wood must have been used as fuel; and it is quite impossible that any attention to the growth of timber could have furnished a supply equal to the wants of the present population of Great Britain, even though a large proportion of the cultivated land had been appropriated to the raising of trees. But, however great and signal, this is not the only advantage we derive from our coal mines: they are the principal source and foundation of our manufacturing and commercial prosperity. Since the invention of the steam-engine, coal has become of the highest importance as a moving power; and no nation, however favourably situated in other respects, not plentifully supplied with this mineral, need hope to rival those that are, in most branches of manufacturing industry. To what is the astonishing increase of Glasgow, Manchester, Birmingham, Leeds, Sheffield, &c., and the comparatively stationary or declining state of Canterbury, Winchester, Salisbury, and other towns in the south of England, to be ascribed? It cannot be pretended, with any show of reason, that the inhabitants of the former are naturally more ingenious, enterprising, or industrious, than those of the latter. The abundance and cheapness of coal in the north, and its scarcity, and consequent high price, in the south, is the real cause of this striking discrepancy. The citizens of Manchester, Glasgow, &c. are able, at a comparatively small expense, to put the most powerful and complicated machinery in motion; and to produce results quite beyond the reach of those who have not the same command over coal, or, as it has been happily defined, "hoarded labour." Our coal mines have been sometimes called the *Black Indies;* and it is certain that they have conferred a thousand times more real advantage on us than we have derived from the conquest of the Mogul empire, or than we should have reaped from the dominion of Mexico and Peru. They have supplied our manufacturers and artisans with a power of unbounded energy and easy of control; and enabled them to overcome difficulties insurmountable by those to whom nature has been less liberal of her choicest gifts.

Consumption of Coal in Great Britain. — It is uncertain when coal first began to be used amongst us as fuel: probably it did not long precede the 13th century. In 1281, however, Newcastle is noticed as having some trade in this article. In the reign of Edward I. its use, in London, was prohibited, because of the supposed injurious influence of its smoke. This prohibition was renewed at several subsequent periods, but to no purpose. Experience showed that the smoke was not deleterious; while the growing scarcity, and, consequently, increased price, of timber, and the superiority of coal as an article of fuel, secured its ascendency in despite of every obstacle. Since the reign of Charles I., it has become almost the only description of fuel used in London, and in most other towns and districts throughout the kingdom.

The consumption of coal in Great Britain is immense. It was recently estimated by Mr. Taylor, an experienced coal owner and engineer, at 15,580,000 tons, exclusive of the exports to foreign countries. We suspect, however, that this estimate is a great deal under the mark. The yearly importation of water-borne coal into the port of London amounts, at present, to about 2,050,000 tons. The population of the district that derives its principal supply from this source amounts to about 2,200,000, or 2,300,000, giving an annual consumption of nearly a ton to each individual. There are, no doubt, several very extensive gas works, breweries, &c. in London, in which large quantities of coal are consumed; and the population may be reckoned more opulent, and, consequently, able to consume more fuel than that of most other parts of the kingdom. But, on the other hand, the comparatively high price of coal in the metropolis and its vicinity reduces its con-

sumption by the middle and lower classes considerably below the level of the consumption of the same classes in Lancashire and other coal counties. The accurate researches of Dr. Cleland show that, in 1831, when the population was 202,000, the consumption of coal in Glasgow amounted to 437,000 tons. We believe we shall make a liberal allowance for the coal consumed in cotton factories, and other public works of a description not carried on in London, if we estimate it at 225,000 tons; which would leave 212,000 tons, or more than a ton for each individual, for the domestic consumption of the city. — (*New Statistical Account of Scotland*, No. 7. p. 162.) On the whole, therefore, we should be disposed to think that, including the consumption of coal in gas-works, breweries, distilleries, brick-works, soap-works, sugar-refineries, bakehouses, and such sort of businesses as are carried on in the valley of the Thames, the consumption of Great Britain may be estimated at nearly the same rate, or at about a ton of coal for each individual, exclusive of the consumption in iron-works and other great branches of manufacture. This would give 16,500,000 tons for what may be called the domestic consumption of the island; though, to be within the mark, we shall take it at only 15,000,000 tons. The domestic consumption of coal in Scotland, in 1813, is estimated, in the *General Report* (vol. i. p. 66.), at 2,000,000 tons; the population being, at the time, under 1,900,000. But to this quantity many very large additions have to be made.

The quantity of iron annually produced in Great Britain may be taken at 700,000 tons; and the quantity of coal required, at an average, to produce each ton of iron, including that used by engines, &c., may be estimated at 5½ tons; giving a total of 3,850,000 tons consumed in the making of iron. According to Mr. Kennedy, the quantity of coal consumed in the cotton manufacture, in 1817, was upwards of 500,000 tons; and the manufacture has since more than doubled; so that, allowing for greater economy, we may fairly estimate the consumption of coal in the cotton trade at 800,000 tons a year. Its consumption in the woollen, linen, and silk trades cannot be less than 500,000 tons. The smelting of the copper ores of Cornwall consume annually about 250,000 or 300,000 tons; and it is supposed that the brass and copper manufactures require nearly as much. In the salt-works of Cheshire, Worcestershire, &c. the consumption is probably not under, if it do not exceed, 300,000 tons. The consumption in lime-works may, it is believed, be estimated at 500,000 tons. It would appear, therefore, that the total annual consumption of coal in Great Britain may be moderately estimated as follows: —

	Tons.
Domestic consumption, and smaller manufactures	15,000,000
Production of pig and bar iron	3,850,000
Cotton manufacture	800,000
Woollen, linen, silk, &c.	500,000
Copper smelting, brass manufactures, &c.	450,000
Salt-works	300,000
Lime-works	500,000
	21,350,000
Exports to Ireland	750,000
Ditto to colonies, and foreign parts	600,000
Total	22,700,000

In this estimate no allowance has been made for the coal consumed in the manufacture of hardware and cutlery at Birmingham, Sheffield, &c.; so that for this, among other reasons, we do not think it can be justly accused of exaggeration.

If we suppose that the above quantity of 22,700,0000 tons costs the consumer, at an average, 7*s.* a ton, it will be worth in all 7,945,000*l.* a year!

Supply of Coal in England. — The importance of coal as a necessary of life, and the degree in which our superiority in arts and manufactures depends upon our obtaining supplies of it at a cheap rate, has naturally attracted a good deal of attention to the question, as to the period when the exhaustion of the coal mines may be anticipated. But the investigations hitherto made, as to the magnitude and thickness of the different coal-beds, and the extent to which they may be wrought, are too vague and unsatisfactory to afford grounds for forming any thing like a tolerably near approximation to a solution of this question. But such as they are, they are sufficient to show that many centuries must elapse before posterity can feel any serious difficulties from a diminished supply of coal. According to Mr. Taylor, to whose estimate of the consumption of coal we have already referred, the coal-fields of Durham and Northumberland are adequate to furnish the present annual supply for more than 1,700 years. We subjoin Mr. Taylor's estimate: —

Estimate of the Extent and Produce of the Durham and Northumberland Coal-fields.

	Sq. Miles.	
DURHAM.		
From South-Shields southward to Castle Eden, 21 miles; thence westward to West Auckland, 32 miles; north-east from West Auckland to Eltringham, 33 miles; and then to Shields, 22 miles; being an extent or area of	594	
NORTHUMBERLAND.		
From Shields northward, 27 miles, by an average breadth of 9 miles	243	
		837
Portion excavated, in Durham, on Tyne, say	39	
——————, on Wear	40	
	79	
in Northumberland, say 13 miles by 2	26	
		105
		732
Estimating the workable coal strata at an average thickness of 12 feet, the contents of 1 square mile will be 12,390,000 tons, and of 732 square miles		9,069,480,000 Tons.
Deduct 1-3d part for loss by small coal, interceptions by dikes, and other interruptions		3,023,160,000
Remainder		6,046,320,000

This remainder is adequate to supply the present vend from Newcastle, Sunderland, Hartley, Blyth, and Stockton, of 3,500,000 tons, for a period of 1,727 years.

It will be understood that this estimate of the quantity of coal in Durham and Northumberland can only be an approximation, especially as the south-eastern coal district of Durham is yet almost wholly unexplored; but the attempt is made, in the hope of satisfying the public that no apprehension need be entertained of this valuable mineral being exhausted for many future generations.

There is also a considerable extent of coal-field in the northern and south-western districts of Northumberland; but the foregoing comprises that which is continuous and most suitable and available for exportation. — (*Lords' Report*, 1829, p. 124.)

Dr. Buckland, the eminent geologist, considers this estimate as very greatly exaggerated; but in his examination before the committee of the House of Commons, he quotes and approves a passage of Bakewell's Geology,

in which it is stated, that the coal-beds in South Wales are alone sufficient to supply the whole present demand of England for coal for 2,000 years. The passage is as follows: —

"Fortunately we have in South Wales, adjoining the Bristol Channel, an almost exhaustless supply of coal and iron-stone, which are yet nearly unwrought. It has been stated, that this coal-field extends over about 1,200 square miles; and that there are 23 beds of workable coal, the total average thickness of which is 95 feet; and the quantity contained in each acre is 100,000 tons, or 65,000,000 tons per square mile. If from this we deduct one half for waste, and for the minor extent of the upper beds, we shall have a clear supply of coal equal to 32,000,000 tons per square mile. Now, if we admit that 5,000,000 tons from the Northumberland and Durham mines is equal to nearly one third of the total consumption of coal in England, each square mile of the Welsh coal-field would yield coal for 100 years' consumption; and, as there are from 1,000 to 1,200 square miles in this coal-field, it would supply England with fuel for 2,000 years, after all our English coal mines are worked out." — (See also Mr. Bakewell's art. on the *Geology of England*, *ante*, vol. i. pp. 85—90.)*

It is unnecessary to add any thing more, to show the futility of the apprehensions of the speedy exhaustion of our coal mines. But, though we were shut out from South Wales, and though the supply in Northumberland and Durham were far more limited than it really is, we should have nothing to fear. In the West Riding of Yorkshire there are many extensive coal-beds hitherto wholly untouched. In Staffordshire the coal-beds are of immense magnitude, that round Dudley being no less than 30 feet thick! It is true that, in the present slovenly mode of working the mines, more than *two thirds* of the coal is left in the mine and wasted (*Bakewell's Geology*, 4th ed. p. 183.); but it is abundantly certain that, were there any thing like a scarcity of coal apprehended, this wasteful practice would be put an end to, and means would be found of totally exhausting the mines. For all practical purposes, therefore, and in relation to such periods of time as may be supposed to come within the scope of the remotest schemes and combinations, our supply of coal may be considered as infinite.

Supply of Coal in Scotland. — The previous statements as to the consumption of coal apply to Great Britain; but those as to its supply are applicable only to England. We should, however, have a very incorrect notion of the coal-fields of Great Britain, if we omitted to notice those of Scotland: they are of great extent and value; and would of themselves suffice to furnish the whole empire with an adequate supply of coal for a very long series of years. We borrow the following details from the *General Report of Scotland*: —

"Coal is found in several districts of Scotland, as in Dumfriesshire, and Roxburghshire, in the more southern counties; but the great field of Scotch coal stretches from S. W. to N. E., across the centre of the kingdom; and is to be found in greater or smaller quantities, in the shires of Haddington, Edinburgh, and Linlithgow (commonly called the Lothians), Stirling, Clackmannan, Kinross, Fife, part of Perth, Ayr, Renfrew, Lanark, Dunbarton, and part of Argyll. Its average breadth is 33 miles, and its length, on the mainland of Scotland, is 98 miles; consequently, its total area is 3,234 square miles. From this, deducting 360 miles for the space covered by the Frith of Forth, there will be left 2,874 square miles of territory, in most parts of which coal is found at different depths, and of various qualities; and in 600,000 acres of which, it is computed, it may be worked to advantage. The districts through which this great field of coal extends

* For further details as to the consumption and supply of coal, see the *Treatise on the Collieries and Coal Trade*, Lond. 1835, pp. 416—463.

are by far the most populous in the kingdom, containing above 2-5ths of the people in less than 1-10th part of the space; and the soil in general is well cultivated. This improved cultivation is, in no small degree, to be attributed to the advantages arising from the extensive distribution, easy conveyance, and moderate price of coal; for wherever fuel is most abundant, there the population is greatest, and manufactures, commerce, and agriculture, mutually aid and stimulate each other.

"The depth of coal varies, but in general it seems to be rather nearer the surface in the western than in the eastern division of the country. There is also a great variety in the number of its seams or strata, and their thickness. The most extraordinary thickness in the island is at Quarrelton, near Paisley, where five contiguous seams are upwards of 50 feet thick. Seams less than 18 inches are not deemed equivalent to the expense of working." — (*General Report of Scotland*, i. p. 64.)

Number of Persons engaged in the British Coal Trade. — Mr. Buddle, of Wallsend, an extremely well informed coal engineer, gives the following estimate of the number of persons engaged in the different departments of the coal trade on the Tyne and Wear, in the conveyance of coal to London, and in the London coal trade: — "I hold a paper in my hand, stating the number of people employed in the coal trade in each department. I would beg to observe, the returns from the Tyne are official documents; from the Wear I have no returns, but it is by an approximate calculation. The number of persons employed under ground on the Tyne are, — men, 4,937; boys, 3,554; together, 8,491: above ground, — men, 2,745; boys, 718; making 3,463: making the total employed in the mines above and below ground 11,954, which, in round numbers, I call 12,000, because I am pretty sure there were some omissions in the returns. On the river Wear, I conceive there are 9,000 employed; making 21,000 employed in digging the coal, and delivering it to the ships on the two rivers. From the best calculations I have been able to make, it would appear that, averaging the coasting vessels that carry coals at the size of 220 London chaldrons each vessel, there would be 1,400 vessels employed, which would require 15,000 seamen and boys. I have made a summary. There are seamen, 15,000; pitmen and above-ground people employed at the collieries, 21,000; keel-men, coal-boatmen, casters, and trimmers, 2,000: making the total number employed in what I call the northern coal trade, 38,000. In London, whippers, lightermen, and so forth, 5,000; factors, agents, &c. on the coal exchange, 2,500; 7,500 in all, in London. Making the grand total in the north country and London departments of the trade, 45,500. This does not, of course, include the persons employed at the outposts in discharging the ships there."

We regret our inability to lay any similar estimates before our readers of the number of persons engaged in the coal trade in other places; but, in the absence of more authentic statements, the following details may not, perhaps, be unacceptable. The annual trade from the Tyne and the Wear, including the home consumption, is about 4,200,000 tons, or about one fifth part of the entire quantity of coal consumed in, and exported from, Great Britain. Now, as 21,000 persons are engaged above and below ground on the Tyne and the Wear, and in carrying the coal to the ships, it seems reasonable to conclude, that there will be in Great Britain five times this number, or 105,000 persons, engaged in the raising of coal and in its land carriage; and adding to these 30,000 for the seamen, wharfingers, and others employed in the trade from the Tyne, the Wear, and the Tees, to the south, and from Whitehaven, Liverpool, &c. to Ireland, and the trade by sea with other places, we get 135,000 as the total number of persons directly engaged in the British coal trade. We do not, of course, put forth this as an accurate estimate: we have stated the grounds on which it is made; and it is merely to be regarded, in the absence of more authentic information, as an approximation to the real state of the case.

Gradation of Workmen in Coal Mines. — "There are trap-door keepers, boys who attend to the doors, to open and shut them to let the workmen pass to and from the working places; these doors are necessary to keep the current of the air to the front of the working places, and thus sweep off the gas which is evolved from the coal. The next class in age and size is the rolley drivers, who are stouter boys, generally about 12 to 14 years of age; those boys are the drivers of the horses which convey the coals from the crane to the bottom of the shaft. There is another class of boys called putters, who are stronger lads, and whose ages vary from 15 to 22 or 23 years; those lads are employed in bringing the corves filled with coal from the hewers working at the face of the bords, or the pillars working to the crane, where they are lifted to the trains and put upon the rolleys, which bring them to the bottom of the shaft. The next class is the hewers, who are the producers of the coal. The next gradation in rank is the deputy, who is under the immediate direction of the overman; this man has the management of the pit, and the care of the miners, in the absence of the overman. The next in station is the overman, who gives the daily directions to the miner as to the working of the mine; he takes an account of their daily earnings, and sees that each working place is properly ventilated before the miner is permitted to go to it. Then the under-viewer, whose business it is to descend the mine daily, and see that all is right in the ventilation and general management; he consults with the overmen, and gives them such directions as he sees necessary, if nothing occurs of so much moment as to require his previous communication with the viewer, and to take his directions as to what may be necessary for the management of the mine. The viewer is the chief superintendent." — (*Report of* 1835 *on Accidents in Mines*, p. 87.)

Mode of paying Colliers' Wages, &c. — Colliers are always paid by the piece, and consequently their wages, although at the same rate per chaldron, vary according to the quantity of work they have to do; and it is difficult to form an average, they vary so very considerably; they have varied from 14*s.* a week to, in some instances, 40*s.* The colliers can earn up to 5*s.*, or even more, per day; but there is not full employment for them; they sometimes do not earn more than half that sum; 2*s.* 6*d.* is the certain wages that they are hired to receive from their employers, whether they are employed or not; that is, consequently, a tax on the coal owner, during the suspension of his colliery from any accident. The men have the option of finding work elsewhere; but if they cannot do this, they may call upon their master to pay them 14*s.* per week; it was 15*s.* a week till 1828.

Accidents in Coal Mines. — These, we regret to say, are very frequent. They arise principally from explosions of inflammable gas, but partly also from the presence of carbonic acid gas, or choke damp, and partly from other causes. The returns of these casualties are very far from complete; but the committee of the House of Commons appointed to inquire into the subject, in 1835, state, that defective as the returns are, they show that 2,070 persons have lost their lives in coal mines within the previous 25 years. While the committee was sitting, an explosion took place in one of the northern coal mines, by which 101 men and boys were destroyed in an instant! The report of the committee serves rather to show the dangerous nature of the evil to be contended with than any thing else. In many instances, not one of those engaged in mines that have exploded has survived to tell how the accident arose; and the causes of explosions, and the means of obviating them, have not been subjected to the continued or searching investigation of scientific men. It appears that, during the 18 years that have elapsed since the introduction of Sir Humphrey Davy's lamp, decidedly more accidents have taken place in the northern mines than during the previous 18 years. This, however, is not to be ascribed to the instrument not realizing the expectations of its illustrious inventor, but to the fact of very dangerous, or, as they are

expressively called, "fiery mines," being wrought by its means, that must otherwise have been long ago abandoned. It is, however, clearly established that under certain circumstances, and especially when exposed to a current of air, the safety lamp is no protection at all. As matters now stand, all the more dangerous mines require in their working a degree of vigilant and continuous attention, that can hardly be expected from ordinary workmen, and especially from boys. The smallest inattention, the placing a lamp where it should not be placed, the closing of a door that ought not to be closed, or the opening of one that ought to be kept shut, the accidental striking of a spark, or any such occurrence, may occasion an explosion, and the instant death of hundreds.

At present, it would seem to be the opinion of the most experienced miners, that *efficient ventilation* is the only thing to be depended on. But the statements in the report go to show, what we have been otherwise well assured of, that this indispensable security is, in numerous instances, too little attended to.

The question whether the legislature should interfere in such a case is one of much difficulty, and involves various considerations. Certainly, however, it does appear to us that the working of "fiery," or unusually dangerous mines, ought not to be permitted till they have been so ventilated, or otherwise secured, that the risk of danger may be obviated with ordinary attention. To this extent, at least, government would seem to be justified in interfering. It is useless to trust any thing to the disinclination of the pitmen to engage in dangerous mines. By daily exposure to danger they become habituated to and careless about it; and, besides, they are apt to trust implicitly to the reports of "viewers" and others, who are quite as much interested in getting the coal brought cheaply to the pit mouth as in the security of the mine.

But before resorting to other means, it would be well, in the first place, to see whether the resources of science might not be made to yield greater security. And, on this ground, we think that a commission, consisting partly of eminent scientific men, and partly, though in an inferior degree of the most skilful mining engineers, might be advantageously appointed to inquire into the state of the mines, in the view of preventing accidents, and of increasing the security and comfort of the miners.

Profits of Coal Mining. — Instead of the business of coal mining being, generally speaking, an advantageous one, it is distinctly the reverse. Sometimes, no doubt, large fortunes have been made by individuals and associations engaged in this business; but these are rare instances. The opening of a mine is a very expensive and hazardous operation, and of very uncertain result. Collieries are exposed to an infinite number of accidents, against which no caution can guard. Besides explosions which are every now and then occurring from the carelessness of the workmen, and other contingencies, mines are very liable to be destroyed by *creeps*, or by sinking of the roof, and by drowning, or the irruption of water from old workings, through fissures which cannot be seen, and, consequently, cannot be guarded against. So great, indeed, is the hazard attending this sort of property, that it has never been possible to effect an insurance on a coal-work against fire, water, or any other accident.

Mr. Buddle, who is intimately acquainted with the state of the coal-trade, informed the committee of the House of Lords, that "although many collieries, in the hands of fortunate individuals and companies, have been, perhaps, making more than might be deemed a reasonable and fair profit, according to their risk, like a prize in a lottery, yet, as a trade, taking the whole capital employed on both rivers, he should say that certainly it has not been so." — (*First Report*, p. 56.) Again, being asked, "What have the coal owners on the Tyne and Wear, in your opinion, generally made on their capital

employed?" he replied, "According to the best of my knowledge, I should think that *by no means* 10 *per cent. has been made at simple interest, without allowing any extra interest for the redemption of capital.*" — (p. 57.)

Irish Coal Mines. — There are mines of coal, in Ireland, at Ballycastle, on the north coast of Antrim; at Arigna in Leitrim; at Castle-Comer in Kilkenny, and in some other places. The mines now mentioned are all wrought, but not to any considerable extent. The quality of the Irish coal is, in general, bad; and we agree in Mr. Wakefield's opinion, that "*there is no vein of coal yet discovered in Ireland which can come into general consumption.*" — (*Account of Ireland*, vol. i. p. 621.) Almost all the coal used in Dublin, Belfast, and other towns, is imported from England and Scotland.

Duty on Coal. — A duty on *sea-borne* coal was imposed in the reign of William III., and continued till 1830. A duty of this sort fell, of course, principally on London and the southern and south-eastern counties, and was not at all felt in the coal districts, or in those places to which coal could be conveyed by inland carriage! It is impossible, in fact, to imagine a more partial, unequal, and oppressive impost. At the period of its repeal it amounted to 6*s.* a chaldron, and produced about 900,000*l.* a year. Duties appropriated for local purposes are still charged on the coal imported into London and some other ports.

An Account of the Quantity of Coals brought Coastwise, and by Inland Navigation, into the Port of London, during the Year 1834, comparing the same with the Quantities brought during the Year 1833. — (*Parl. Paper*, No. 51. Sess. 1835.)

Ships.		Ports whence Shipped.	Tons.	
1833.	1834.		1833.	1834.
3,387	3,625	From the Port of Newcastle -	1,060,839	1,142,903
2,369	2,036	— Sunderland -	666,787	559,105
773	1,007	— Stockton -	170,690	221,971
178	248	— Blythe and Seaton Sluice	48,689	64,268
67	176	From Leith, Inverkeithing, Kirkaldy, and other Ports in Scotland - - -	15,138	39,487
130	135	From Swansea, Llanelly, Milford, and other Places in Wales - - - -	32,156	33,200
173	177	From Hull, Goole, Gainsborough, and other Places in Yorkshire - - -	16,110	17,751
—	—	Quantity which passed the Boundary Stones on the Grand Junction Canal at Grove Park, Herts, and on the River Thames, at Staines	4,395½	1,862
7,077	7,404		2,014,804½	2,080,547

Exports. — The coal exported in 1834 amounted to 615,255 tons, the duty on which produced 220,746*l.* All coal exported is now charged with a duty of 4*s.* a ton. Holland, Germany, France, the British North American and West Indian Colonies, and the United States, are the principal foreign markets for British coal.

2. IRON. — We are ignorant of the period when iron began to be made in England; but there is authentic evidence to shew that iron-works were established by the Romans in the Forest of Dean, in Glou-

cestershire, and in other parts of the kingdom.* They were also established, at an early period, in Kent and Sussex; these counties being well supplied, not only with iron ore, but (which was, at the time, of still more importance) with timber, the only species of fuel that was then used in the furnaces. It is to this latter circumstance that the slow increase in the production of iron in England, during a lengthened period, is to be ascribed. Complaints were very early made of the destruction of timber by the iron-works; and in the reign of Elizabeth, when an unusual demand for timber for the navy and for merchant vessels, also, took place, the decrease of timber excited a great deal of attention. At length, in 1581, an act was passed prohibiting the manufacturers of iron from using any but small wood, and from establishing any new works any where within 22 miles of the city of London, and 14 miles of the river Thames, and in several parts of Sussex specified in the act. Soon after this Edward Lord Dudley invented a process for smelting iron ore with pit-coal instead of timber: and it is not possible, perhaps, to point out another invention that has been more advantageous. The patent, which his Lordship obtained in 1619, was exempted from the operation of the act of 1623 (21 James I. c. 23.), setting aside monopolies; but though, in its consequences, it has proved of immense value to the country, the works of the inventor were destroyed by an ignorant rabble, and he was well nigh ruined by his efforts to introduce and perfect his process.† The invention seems, in consequence, to have been, for many years, almost forgotten. The complaints of the destruction of timber continued; so much so, that in 1637 the exportation of iron without licence was prohibited, and fresh restrictions were laid on the felling of timber. But the evil could not be abated by such means; and, in the early part of last century, complaints of the destruction of timber by the iron-works became more prevalent than ever, and their total suppression began to be contemplated as a lesser evil than the continued decrease of the stock of timber. At this period, more than two thirds of the iron made use of was imported, and the condition of the manufacture was most unprosperous. But the growing scarcity and high price of timber, coupled with the increasing demand for iron, at last succeeded in drawing the attention of some ingenious persons to Lord Dudley's process; and, about 1740, iron was made at Colebrookdale, and one or two other places, by means of pit-coal, of as good a quality as that made with timber. From this period the business steadily increased; at first, however, its progress was comparatively slow; and the furnaces of Kent and Sussex were not wholly relinquished for more than 30 years after iron began to be largely produced by means of pit-coal. The great demand for iron occasioned by the late war, and the obstacles which it threw in the way of supplies from abroad, gave the first extraordinary stimulus to the manufacture, which has now become of vast importance and great value. In 1740, the quantity of pig-iron made in England and Wales amounted to about 17,000 tons, produced by 59 furnaces. Since this epoch, the increase is believed to have been as follows; viz.:—in 1750, 22,000 tons; in 1788, 68,000 tons, produced by 85 furnaces; in 1796, 125,000 tons, produced by 121 furnaces; in 1806, 250,000 tons, produced by 169 furnaces; and in 1820, about 400,000 tons were produced, but there is no account of the number of furnaces. From extensive inquiries made by government and others connected with the iron trade during several years previously to 1832, the following statements have been deduced. They exhibit the districts in which iron is made, the number of furnaces, and the total quantity produced in 1823, 1825, 1828, and 1830:—

* *Pennant's Wales*, ed. 1810, vol. i. p. 89.
† *Report of Committee of House of Commons on Patents*, p. 168, &c.