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PHILADELPHIA, APRIL 4, 1838.

Nicholas Biddle, Esq. Philadelphia.

DEAR SIR:—You were kind enough to say that the facts which I mentioned to you the other evening, respecting the importance of Coal and Iron to Pennsylvania, were of interest to you; and you also expressed a desire that I should commit them to paper with any other matters that I might think interesting in relation to these minerals chiefly in a commercial point of view.

My principal object being to show how vital the development of these minerals will be to the prosperity of this great state, I shall endeavor so to arrange the different branches of the subject as to give you as clear a notion of my views as possible.

First, then, as to the extent of the coal fields with which we are pre-eminently blessed—that of the bituminous coal extending from a point near to Towanda, in a line nearly parallel to the boundary line of the state of New York, as far as Warren, and thence south west to Sharon, on the Ohio state boundary. This forms very nearly the northern boundary of this great coal field in Pennsylvania.

The southern boundary may be considered to stretch from the same starting point, through Lycoming county, north of Williamsport, to Farrandville, and thence along the western declivity of the Alleghany mountain to Cumberland in Maryland. It will only be necessary to cast the eye upon the map to perceive that the area of this boundary embraces nearly if not quite a third part of the whole state.

Besides this, we have bituminous coal in a circumscribed space on Broad Top mountain, on the Rytown branch of the Juniata, and on Stony creek in Dauphin county.

The anthracite coal fields are comparatively small when viewed in relation to that of the great bituminous coal field, but they are of greater commercial importance at this time.

The first, or that of Pottsville, commences near to the Lehigh, on the Mauch Chunk company's lands, and filling up the valley between the Sharp and Broad mountains terminates some miles east of the Susquehanna, and is about sixty miles long its greatest breadth being about five miles. In the section of the broadest part, which is at Pottsville, there are found between ninety and a hundred beds, nearly the whole of which it is likely will be found worth working. In the southern part of this coal field are found the valuable Red Ash beds.

The second anthracite coal field, or that of Shamokin, commences near the Lehigh at Buck mountain, and terminates at the point of junction of the Big and Little Mahony, and is perhaps about the same width of the last.

The third anthracite coal field, or that of Wilkesbarre, commences near to Carbondale, and terminates at the Susquehanna near Nesquehly.

Having defined the limits of our coal fields, I would call your attention to the important agency this mineral has had in raising Great Britain to a state of prosperity such as no other nation has perhaps ever seen. Nearly all the British writers who have touched upon this subject have given their testimony as to its being in fact the very basis of the wealth of the nation.

The following extracts are from M'ulloch, one of the most recent writers on the subject, and whose opinions have great weight:

"Of the different minerals (in Great Britain) that of coal is by far the most important and valuable of them all.

"It is hardly possible to exaggerate the advantages England derives from her vast beds of coal.

"Our coal mines 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 favorably 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, &c. and the comparatively stationary or declining state of Canterbury, Winchester, 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 any more ingenious, enterprising, or industrious than those of the latter. The abundance and cheapness of coal in the north and its scarcity in the south, is the real cause of this discrepancy. The citizens of Glasgow, Manchester, &c. are able, at a small expense comparatively, 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 happily has been defined 'BOARDED LABOR.' 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 or Peru."

Mr. Porter, author of "Progress of the Nation," says, "it cannot be necessary to point out the many advantages which we derive from the possession of our coal mines, the source of greater riches than ever issued from the mines of Peru, or from the diamond grounds at the base of the Neela Mulla mountains. But for our command of fuel, the inventions of Watt and Arkwright would have been of small account, our iron mines must have long since ceased to be worked, and nearly every important branch of manufactures which we now possess must have been conducted upon a comparatively insignificant scale."

The author of an able work, entitled, "Fossil Fuel," does not overrate the importance of coal to England, in the following extracts:—"The expenditure of coal in the generation of steam is an extremely interesting feature of its history, regarded as an element in our national capabilities, and, when speaking of industrial resources of the part which, by the economical conversion of her abundantly argillaceous carbonate of iron into cannon, Great Britain was enabled to take for good or for evil, in the late wars of Europe, and of the agency of steam, in enabling her to understand the world in our manufactures, and to grow rich, despite a national debt of £800,000,000; when speaking on these and similar subjects, the essential consequence of our commodious and all but inexhaustible collieries, is not always sufficiently taken into the account."

Professor Buckland in the following extracts from his able work of the Bridge-water Treatise, seems equally impressed with the importance of coal. "The amount of work done in England has been supposed to be equivalent to that of 3 or 400,000,000 of men by direct labor, and we are almost astonished at the influence of coal and iron and steam upon the fate and fortunes of the human race. It is 1800 feet below the earth's surface—it rows, it pumps, it excavates, it carries, it draws, it lifts, it hammers, it spins, it weaves, it prints."

"We need no further evidence to show that the presence of coal is in an especial degree the foundation of increasing population, riches and power, and of improvement in almost every art which administers to the necessities and comforts of mankind, so admirably adapted to the benefit of the human race."

An able writer in the Penny Magazine says, "it is the chief source of wealth and power, as the foundation of our manufacturing industry, and without such a supply of fuel, our iron, lead, tin, and copper ores must have remained in their beds."

Bakewell in his Geology says, "I may be permitted to remark, that however ancient the formation of coal and iron may have been, the frequent occurrence of these minerals together, both destined in future time to give to man an extensive empire over the elements and to contribute largely to his means of civilization and comfort, cannot fail to impress the reflecting mind with evidence of prospective designing intelligence."

In the examination before the Committee of the House of Lords, in 1830, Mr. Biddle, who is said to understand this subject better than any other man in Europe, stated as his opinion, that the manufacturing interests of this country, colossal as is the fabric which it has raised, rests principally on no other basis than our fortunate position with regard to the rocks (carboniferous) of this series. Should our coal mines ever be exhausted, it would melt away at once, and it need not be said that the effect produced on private and domestic comfort would be equally fatal with the diminution of public wealth. We should lose many of the advantages of our high civilization and much of our cultivated grounds must be shaded with forests, to afford fuel for the remnant of our present population."

Having given you the opinions of British geologists and political economists as to the vital importance of coal to the prosperity of that nation, let me call your attention to some of the facts which afford abundant evidence to sustain such unqualified opinions.

As to quantity used, and the value.—M'ulloch states the quantity of coal consumed and exported in 1836, to be 22,608,000 tons, valued at 7s. per ton, seven millions nine hundred and forty-five thousand pounds. This quantity it has been stated some months since by Mr. Porter, from the chair of the Statistical Society of London, is much below the real amount which he said he had reason to believe was 30,000,000 tons. This calculation at two dollars per ton gives the enormous production of 60,000,000 dollars per annum.

The annual trade from the Tyne and the Wear including the home consumption is about 4,200,000 tons—the trade from New Castle alone occupying it is supposed 1600 ships constantly.—The Sunderland Herald has recently stated that there were building at that time at Sunderland and on the Wear, ninety-five ships, some of them of very large tonnage.

It has been mentioned before that all the chief manufacturing cities were situated in the coal fields. The following table exhibits the large population and the rapid increase of the cities dependent on coal for manufactures.

	1811.	1831.
Manchester,	98,573	182,812
Liverpool,	94,376	165,175
Birmingham,	85,783	146,966
Leeds,	62,534	123,393
Bristol,	76,433	117,016
Sheffield,	35,840	59,011
New Castle on Tyne,	27,587	42,760
Merthyr Tydvil,	15,720	22,093
Wolverhampton,	14,886	24,782

Many other places could be named, but it is only necessary to draw a slightly on-

dulating line from the mouth of the Tees to Exmouth, and you will have on the left the carboniferous rocks, and on the right the superior strata. On the one side will be found all the prosperous manufacturing towns, on the other, scarcely an improving one.

The city of Glasgow in 1831 contained 202,000 inhabitants, and consumed then 437,000 tons of coal. As manufactures have greatly increased there since, particularly that of iron, the consumption has no doubt greatly increased if not doubled, for Professor Thompson recently stated before the British Association at Liverpool, that 200,000 tons of iron were made in the vicinity of Glasgow within the previous twelve months.

In Leith alone the glass houses consume 40,000 tons of coal annually. The consumption of coal for gas in London is enormous, being about 320,000 tons yielding 2,400,000 cubic feet of gas, the light being equal to 160,000,000 pounds of mould candles.

In 1834 England exported to foreign countries 615,255 tons, 40,000 of which came to the United States.

The great amount of tonnage necessary for the transportation of coal has a highly beneficial effect on the commerce of Great Britain. It is that which makes the port of New Castle of so much importance, it being according to M'ulloch "second in rank as a shipping port immediately after London."

The influence that coal has on the prosperity of Great Britain may be further illustrated by the immense number of machines kept in motion. "It has been calculated," Professor Buckland says, "that there are about 15,000 steam engines daily at work, and one of them in Cornwall of 350 horse power, and would require 1000 horses to be kept to produce the same work." In July 1835 there were 527 steam vessels belonging to her ports all of which were of course worked by coal.—The number of ships which arrived with coal in London in 1829, was 7,021, the wages of the masters and men being 55,640L. Since that year the trade has materially increased.

Mr. Biddle stated during his examination, that 21,000 persons were engaged in the collieries on the Tyne and the Wear.

Long as coal has been used in England, (a duty of 6d. was laid in 1379) its real value has not until within fifty years been properly appreciated. In 1582 Elizabeth obtained a lease of all the mines of Durham for 93 years, for the annual rent of 90L. It has been recently stated that the earl of Durham derives an annual revenue of 50,000L. from his mines. What relation this has to those rented by the Queen can only now of course be surmised.

In 1755 the land and mines for several miles around Merthyr Tydvil were let for 99 years for 200L a year. That town is now the largest and most wealthy in Wales and in 1831 had over 12,000 inhabitants. I cannot find any statement of the quantity of coal raised in South Wales, but as the quantity of iron alone made there in 1836 was 355,000 tons, it certainly is not likely to be less than 4,000,000 tons. Mr. Coffin states in 1729 that "twenty years previous, there were hardly any coals shipped in Newport, perhaps not a thousand tons in the course of the year, whereas, at the period named, the shipments amounted collectively in that port alone, to nearly 1500 tons a day."

After what has been said above, it will not I think be denied that coal has been the important agent in placing Great Britain in her present pre-eminently prosperous state, and we may, I think, draw the conclusion that Pennsylvania will owe in a great measure her future prosperity to the abundant resources she possesses in the extent of her domain of the same mineral.

It is now apparent to the most casual observer, that the increased trade in coal has added much within a few years to the value of property in Philadelphia. In 1825 the Schuylkill Navigation Company passed through their locks, 6,500 tons—in 1837 the amount was increased to 523,152 tons, being nearly 45 per cent. increase annually for 12 years. Within this period a new population has sprung up in Schuylkill county, the importance of which is evinced in the fact that the Post Office at Pottsville has become the third in importance within the State; being next to Pittsburgh. Already capitalists are in competition for this trade from Pottsville by erecting an expensive Rail Road nearly on the line of the Canal. In the same ratio of increase for the next twelve years we would have 37,000,000 tons, an increase, however, quite impossible; it may be in that period 1,500,000 or 2,000,000.

The importance of the coal trade to Philadelphia is so evident that it seems scarcely necessary to touch upon the subject. It might, however, be called to mind, that some twelve years since a solitary wood shoop was only occasionally seen at the bridge wharf on the Schuylkill where now may sometimes be observed to arrive in a single tide 50 or 60 vessels from sea; the whole amount of coal shipped from there last year being 328,304 tons, by 3070 vessels—in fact causing a new city to be built on the western front, while the line of the Canal to Pottsville is kept in constant motion by about 800 Canal boats. To this trade chiefly we owe the great increase of the shipping of Philadelphia, the number of arrivals last year be-

ing 8185,\* while during the two preceding years together, it was only 8187. So far has the importance of this trade already gone beyond the calculations of the most sanguine, that those which we deemed formerly the most extravagant and wild, are not far behind in reality. Confidence in the Schuylkill Navigation Company stock was so small as at one time to permit it to be sold at 30 dollars per share, while now it sells for about \$170, which is unquestionably below its real value.—Several colliers at Pottsville, who were considered enthusiasts in the early part of the business, offered to guarantee to the Company the passage of 10,000 tons through its locks per annum, provided their tolls were reduced—that tonnage was last year 523,152 tons!

In the coal fields we may naturally expect a very large population. The cheapness of fuel will induce manufactures to erect their works near to the mines, and we may in time have there as industrious and teeming a population as in the coal fields of England and Wales.† Pennsylvania, having about four fifths of the area of England and Wales, (the former having 43,950, and the latter 57,000 square miles,) and a soil equal in its natural qualities, there can be no reason why Pennsylvania might not in time nearly equal the present population of that kingdom.

IRON.

Having stated the importance and extent of the coal fields of Pennsylvania, it may be said with truth that iron is second only, as regards her mineral wealth, to coal. So widely are the various ores of iron diffused over the State that I believe there are very few counties which do not possess the means of making that metal, where the fuel can be obtained. In this respect nature has been more bountiful, it is believed, to our state than to any other; and, accompanying it as she has done with inexhaustible beds of coal, she has been doubly bountiful.

The counties in which it seems most abundant are Northampton, Berks, Lancaster, York, Franklin, Columbia, Lycoming, Clearfield, Centre, Huntingdon and Fayette. In these it seems to have been worked most advantageously, but with the exception of the Clearfield Coke and Iron Company at Karthaus, only with charcoal.

In every part of the United States, however, the manufacture of iron is comparatively in an infant state; and although we make, it is supposed, in this State two fifths of all that is made in the United States, it is not more than is produced by two establishments in South Wales, Crawshay & Co. and Guest & Co.; their furnaces yielding together over 100,000 tons per annum.

The important influence which iron has in the prosperity and civilization of nations is admitted. In England this metal was worked at an early period, but it was not until during the 17th century that the quantity was so far diminished by the want of wood, as to require very large imports. So early as in 1619 attempts were made to smelt iron with bituminous coal, and Edward Lord Dudley in that year obtained a patent for the purpose; but his works were destroyed by the mob who were opposed to improvements such as they supposed likely to deprive them of work. It was not until 120 years after this period that iron was made by coke at Colebrookdale, the quantity made in England having then been reduced to 17,000 tons, about twice that quantity being imported. From this period it increased agreeably to the following table:

In 1740,	17,000 tons
In 1750,	22,000 "
In 1768,	68,600 "
In 1796,	125,000 "
In 1806,	250,000 "
In 1820,	400,000 "
In 1828,	703,000 "
In 1836,	700,000 "

according to M'ulloch.

This last estimate is, however, supposed to be materially short of the real amount.—Mr. Porter, president of the Statistical Society of London, states the quantity to be at least 1,000,000 tons, and we can scarcely doubt this when we find that in South Wales there were 355,000 tons made in that year, and as we are assured by Professor Thompson, that 200,000 tons are made in the vicinity of Glasgow per annum.

M'ulloch estimates the exportation of iron from Great Britain, at 155,000 tons and the importation at 16,000. In 1806 the capital employed in making iron was estimated at 5,000,000L. The number of persons supported by it 200,000. In 1837 this author estimates the capital at 7,000,000L.

When coal, iron ore, and lime are found in proximity there may be seen a dense and thriving population. Merthyr Tydvil and the contiguous district, the seat of the immense works of Guest & Co., the largest in the Empire; of Crawshay & Co., Thompson & Co., &c., was about the middle of the last century, an insignificant village. In proof of this it is sufficient to

\* A part of this increase is owing to a new mode of entry at the Custom House. † Staffordshire, about 90 square miles has 200,000 souls, nearly all of whom are engaged in mining or manufacturing. Lead which was formerly an open common, is now, in some cases, selling for 1000 pounds per acre. ‡ This firm has recently refused £200,000 for their works. § Nearly all Swedish iron, for making steel, &c. &c.

state that in 1755 the land and mines for several miles round the village, the seat of the great works mentioned above were let for ninety-nine years for 200L per annum. In 1831 the population of Merthyr was 22,000.

It cannot be doubted that the manufacture of iron in England has been a most important part in the prosperity of that nation. Where the ore of iron is found with coal, there may be observed an industrious and wealthy population, such as in South Wales, Staffordshire, Birmingham, Glasgow, &c. This fact has induced the author of "Fossil Fuel," to say that "the occurrence of the argillaceous carbonate of iron in immediate connection with coal seams, is a circumstance of immense importance as lying at the foundation of the manufacturing superiority of this country." And the same writer says "so important is iron to man that it has been said that in proportion to the intelligence and advancement of reason in nations is their iron works."

In the United States we have but few places where, happily, these minerals are situated in combination. The State of Pennsylvania in this respect is more fortunate than her neighbors,\* as in the great western coal field we have frequently the argillaceous iron ores in connection with beds of coal. Karthaus,† Blossburg, &c. are instances where this takes place and at the former locality the stratification is said to resemble that of Merthyr Tydvil in a very striking manner. In Dauphin county, near Harrisburg, bituminous coal and various iron ores have very recently been found in considerable quantity, and it is believed will lead to valuable results, there being two beds of coal, of three and four feet, within nine miles of the Susquehanna, a short distance above that town.

In regard to the quantity manufactured in the United States, we have the authority of the Convention at New York in 1831 to state it at that time to have been 191,536 tons of pig iron made in 239 furnaces in the previous year. One of the committee informs me that it was supposed that two fifths of this amount was made in Pennsylvania, and that the quantity made in 1837 in all the States might be fairly taken at 250,000 tons, giving to this State the same ratio as before.

The great superiority which Great Britain possesses over the United States in regard to the quantity made, arises from the fact of bituminous coal (a very much cheaper fuel than charcoal) being used there, and by which the yield of each furnace is greatly increased. In 1828, 278 furnaces in that country produced 703,184 tons, being 48 tons per week for each furnace, while in 1830, 239 furnaces in this country produced only 191,536 tons, being 15½ tons per week. The average of the British furnaces must now be greatly increased, as those of the largest size in South Wales are making over 100 tons and it is said in some cases as high as 100 tons per week; the introduction of the hot blast having been very instrumental in the increased yield.

The recent discovery of Mr. Crane in South Wales, where the anthracite prevails, in making iron of superior quality with that coal, is of great importance, and likely in a short time to create a very great change in the manufacturing of iron in Great Britain and in this country. Mr. C. having had a furnace in blast for the last year making from thirty five to forty tons per week, establishes the success of this desideratum.—Should it ever happen, a thing not at all likely, that the Anthracite of Pennsylvania could not be made to answer, still there cannot be a doubt but that the most ample supply may be obtained by the use of our inexhaustible beds of bituminous coal.

Reviewing the foregoing facts, I think we may come safely to the conclusion that the destiny of Pennsylvania is a brilliant one. Nature certainly has done every thing for her, and it will depend upon the wisdom of her own citizens whether the period of her prosperity shall be retarded or accelerated.

Very truly, yours, &c. ISAAC LEA.

\* At Cumberland in Maryland, these minerals are found together, and it has been recently stated that in Virginia near Richmond a large bed of ore has been found convenient to the Coal.

† In the section of the stratification of hill at Karthaus, which is five hundred feet high from the surface of the river, we have, in the first three hundred feet from top, six seams of bituminous coal, making seventeen feet (one seam being six feet)—of iron ore five seams, in the aggregate nine feet eight inches—lime stone, three feet—fire clay, two seams of four feet—fire stone, two feet. The remaining two hundred feet, and the stratification below the water level, have not been examined. The above section proves that the various minerals so essential to the cheap manufacture of iron, are nearly the same here as those which exist at Merthyr.

How beautifully does Thomson, the poet of the "Seasons," describe a spring morning.— "The meek eyed morn, mother of dews, At first faint gleaming in the dappled east, Blue through the dusk the smoky currents skim; And from the bladed field, the fearful hare Limp awkward, while along the forest glade The wild deer trip, and, often turning, gaze At early passenger. Mornick awakes The native voice of undissembled joy. And thick around the woodland hymns arise! Round by the cock; the soon-clad shepherd leaves His mossy cottage, where with peace he dwells, And from the crowded fold, in order drives His flock, to taste the verdure of the morn."

The Governor of the state of Massachusetts has signed the license bill. After the first of July next, no licenses for the sale of spirituous liquors, will be granted in Massachusetts.

Phrenology.—A good deal of interest in relation to this novel science, has been excited among our inhabitants generally, by the delivery of a series of lectures and a large number of examinations of prominent individuals, made during the present week in our borough, by O. S. FOWLER, Esq. This gentleman is eminently and deservedly distinguished for his extensive attainments in the science, and is also possessed of uncommon and striking abilities as a lecturer. Eccentric he is deemed without doubt on many subjects, and even droll on many occasions; but, at the same time, it must be admitted that he is intimately conversant with the main subject he handles, and we confess that ourselves in common with his large audience, listened to him during several evenings with undivided attention and great pleasure.—Manifesting strong enthusiasm in the pursuit of his favorite science, he at the same time exhibits an unusual share of manly openness and sincerity, tempered of course with affability and good nature, so that in his delineations of character, he "nothing extenuates, nor sets down aught in malice;" but speaks of people when they come before him as they phrenologically appear to him to be. To some, this conduct is distasteful, and to others pleasing. For ourselves, we confess, though sorely attacked by him on some tender points, we prefer the straight-forward honest course, and therefore entertain highly favorable impressions of the lecturer, as well as of his gentlemanly and talented assistant, Mr. ALLEN; indeed he would be altogether unworthy of his profession, if he condescended to administer battery or syncope, when he should speak the language of truth and honesty. No enthusiast in any profession ever stoops to prevarication. In his examinations of many individuals, indeed, we may say in nearly all, his developments of character were truly characteristic. We were forcibly struck if not surprised, in some instances that fell under our personal observation, at his "palpable hits," as we shall take the liberty of terming them. Not merely were these evident in isolated prominent features, but also in entire general characters. The lecturer's combinations exhibited moral paintings—not mere sketches or outlines—but paintings with all their lights and shades, presenting vivid and faithful likenesses to the individuals themselves, both as they were recognised by themselves and the community at large; or, to use another simile; we may liken his portraits to the reflections of highly polished mirrors, in which our minds would be as distinctly visible as our features. This will be called by some rather the result of previous knowledge of the individuals themselves derived from oral communications, or perhaps of an intuitive quickness in the discovery of human character from general appearances; but these reasons are manifestly insufficient to account for so many striking coincidences, because, in many instances, the lecturer examined his subjects with his eyes covered. We are aware that such statements as the foregoing may perhaps subject us to the charge of being believers in the doctrines of phrenology; such an inference however, would not be strictly authorised by a mere narrative of facts, any more than he who relates phenomena attributed to alchemy would thereby prove himself to be a believer in alchemy. However, we would say that to believe rationally, it is necessary first of all to investigate thoroughly; because he who makes up his mind to believe or disbelieve without due examination beforehand, may be sometimes right in his conclusions, but must often be wrong. When right, he is entitled to the equivocal merit of being right by chance, and when wrong he may thank his own pre-emption; whilst, on the other hand, he whose conclusions are not the result of passion or prejudice, derives his real repute from his understanding. To reject a doctrine because it is new, would be wrong, until the axiom be first established that whatever is new is necessarily false; and to reject it because we deem it contrary to reason and experience, pre-supposes deliberate prior investigation. The science in question invites investigation, and appears to be worthy of it; for the poet tells us, that "the proper study of mankind is man." Whether true or false, we think the tendencies of its study good. It contains nothing that we perceive at variance with natural or revealed religion, but is said to contain much in confirmation of both, which it employs and exercises in the perceptive and thinking faculties usefully and agreeably. But, supposing it to be true, notwithstanding the difficulties in its application, it will have great and manifold uses, adapted to almost every age and condition of life in individuals, as well as to the melioration of society at large, whereby mankind may be rendered nobler, wiser, and happier.

Letter of Isaac Lea, Esq.—We lay before our readers in this paper, the letter of this gentleman, and commend the same to their attentive perusal. Circumstances beyond our control have occasioned the delay in its publication in our columns, up to the present period. We however referred to it immediately after its appear-