

Messrs. SHEAFER, Engineers of Mines, &c.,

POTTSVILLE, PA.

Messrs. SHEAFER, Engineers of Mines, &c.,

MERCHANDISE.				ANTHRACITE COAL OUT-PUT OF		DATES OF THE OPENING OF AVENUES TO MARKET.		ANTHRACITE COAL OUT-PUT OF		RAILWAYS of the WORLD, end of 1876. From 77 and 75; Pa. 65.	
Year.*	IMPORTS-(Foreign)	EXPORTS-(U.S.)	SCHUYLKILL-(Red)	LEHIGH-(Blue)				WYOMING (Yellow)	TOTAL	COUNTRIES.	MILES.
1820				365	Lehigh Canal.			1820	365		
1821	54,530,835	43,071,894		1,073					1,073	United States	77,470
1822	79,871,695	49,874,079	1,480	2,240					3,720	Dominion of Canada	5,219
1823	72,481,371	47,155,408	1,128	5,823					6,951	Mexico	378
1824	72,170,037	50,649,500	1,567	9,541					11,108	Honduras	66
1825	90,189,310	66,944,745	6,500	28,393					34,893	Costa Rica	29
1826	78,095,511	52,449,225	10,767	31,230					45,047	Panama	49
1827	71,332,938	57,873,117	31,360	32,074					83,434	Cuba	450
1828	81,020,083	49,074,632	47,284	30,232					77,516	Porto Rico	21
1829	67,088,915	55,087,307	79,973	25,110	Delaware & Hudson Canal.				7,000	Jamaica	34
1830	62,720,956	58,524,873	89,984	41,750					43,000	Barbados	6
1831	95,885,179	59,218,588	81,854	40,966	Nesquehoning R. R. and Plane.				54,000	U. S. of Columbia	43
1832	95,121,762	61,726,529	209,271	70,000	Little Schuylkill R. R.				84,000	Venezuela	38
1833	101,047,943	69,950,856	252,971	123,001	Union Canal.				111,777	Guiana (Brit.)	69
1834	108,609,700	80,623,662	226,692	106,244	Wyoming and State Canals. Lykens Valley R. R.				43,700	Brasil	1,337
1835	136,764,295	100,459,481	339,568	151,250					90,000	Paraguay	47
1836	176,579,154	106,570,943	432,945	148,211					163,861	Uruguay	231
1837	139,472,803	84,280,893	530,152	225,902	Baer's Meadow Mines, Pine Grove.				115,387	Peru	1,528
1838	95,976,388	55,560,880	446,875	213,615	Haiton Railroad.				98,307	Argentina Republic	1,466
1839	156,496,956	101,625,533	475,077	221,025	Shamokin.				120,300	Bolivia	38
1840	98,258,706	111,660,561	490,599	225,313	Back Mountain. Quakake R. R.				148,470	Chili	691
1841	122,957,544	103,636,226	624,466	143,037	Philadelphia & Reading R. R.				192,270	Great Britain	
1842	96,075,071	91,799,242	583,273	272,540	Cumberland.				232,599	and Ireland	17,263
1843	42,433,464	77,686,354	710,200	267,793					285,605	France	12,722
1844	102,604,606	99,531,774	887,937	377,002					365,911	Spain	4,112
1845	113,184,322	98,455,330	1,131,724	409,453	Morris Canal.				451,826	Portugal	902
1846	117,914,065	101,718,042	1,308,500	517,716	Lehigh and Susquehanna R. R.				518,389	Italy	5,028
1847	122,424,349	150,574,844	1,665,735	625,367					583,067	Switzerland	1,211
1848	143,683,644	130,263,700	1,733,721	679,321					865,196	Austria	6,961
1849	141,296,199	131,710,081	1,728,500	781,656					732,910	Hungary	4,923
1850	173,509,529	134,900,233	1,840,620	690,456	Pennsylvania Coal Co. Pennsylvania Central R. R.				827,822	Germany	18,229
1851	210,771,429	178,620,138	2,328,225	764,224	Delaware, Lackawanna & Western R. R.				1,156,167	Belgium	2,275
1852	207,440,398	154,021,147	2,637,835	1,071,136	Central Railroad of New Jersey.				1,284,500	Holland	1,091
1853	263,777,265	189,869,162	2,665,110	1,654,309					1,475,732	Luxemburg	169
1854	297,623,030	215,328,300	3,291,670	1,207,186	Short Mountain Co. Northern Central R. W.				1,603,478	Denmark	803
1855	257,808,708	192,751,135	3,552,943	1,284,113	Lehigh Valley R. R. to Phillipsburg.				1,771,511	Sweden	2,597
1856	310,432,310	266,438,051	3,603,629	1,351,970	Terreton R. R. Broad Top R. R.				1,972,581	Norway	369
1857	348,428,342	278,906,713	3,573,797	1,318,641	Belvedere & Delaware R. R. North Penn. R. R.				1,932,603	Russia	13,702
1858	265,358,634	251,251,033	3,272,245	1,380,030	Lackawanna & Bloomsburg R. R. McCauley's Mt. R. R.				2,136,094	Roumania	991
1859	351,333,541	278,392,800	3,448,708	1,628,611					2,731,226	Turkey	807
1860	336,616,119	316,242,423	3,749,632	1,921,674					2,941,817	Greece	7
1861	290,310,542	204,899,016	3,160,747	1,738,377					3,055,140	Turkey, Asia Minor	279
1862	189,356,677	179,644,924	3,372,583	1,351,054	Philadelphia & Erie R. R.				3,145,670	British India	7,132
1863	243,335,815	186,002,912	3,911,683	1,894,718					3,759,610	Ceylon	200
1864	316,447,283	145,504,027	4,161,970	2,054,669					3,960,886	Philippine Islands	279
1865	293,745,580	136,940,248	4,356,959	2,040,913					3,234,519	Java	296
1866	434,812,066	337,518,102	5,787,902	2,179,364					4,736,616	China	10
1867	395,761,096	279,786,809	5,161,671	2,502,054	Lehigh & Susquehanna R. R. to Philad'a.				5,325,000	Japan	41
1868	357,436,440	269,589,900	5,535,737	2,567,587	Pennsylvania & New Jersey R. R.				5,990,813	Egypt	1,013
1869	417,306,379	275,156,897	5,556,136	1,929,323	Nesquehoning Valley R. R.				6,065,369	Tunis	92
1870	455,958,408	376,616,473	4,851,853	3,172,916	Erie R. R. Co.				7,831,125	Algeria	401
1871	529,223,684	428,396,908	6,314,422	2,115,633					6,689,302	Cape Colony	136
1872	629,595,077	428,487,131	6,469,912	3,743,273					8,812,995	Mauritius	97
1873	642,136,210	505,033,439	6,294,769	3,243,168	Philadelphia & Reading Coal and Iron Co.				10,047,241	Victoria	96
1874	507,466,342	569,433,421	5,642,180	4,047,656					9,290,910	New South Wales	501
1875	533,005,436	499,284,100	6,281,712	2,834,605	Lehigh Valley & Perth Amboy.				10,596,155	Tahiti	21
1876	400,741,190	525,582,247	6,221,934	3,854,919					8,424,158	Queensland	452
1877	451,323,126	589,670,224	8,195,042	4,332,760					8,300,377	West Australia	69
1878	437,051,322	680,709,268	6,282,226	3,237,449					8,083,587	Tasmania	41
1879	445,073,775		8,960,329	4,505,587					12,586,293	New Zealand	412
1880								1880		South Australia	301

*The fiscal year ends June 30th.

Total..... 104,836

*The fiscal year ends June 30th

Total..... 194,836

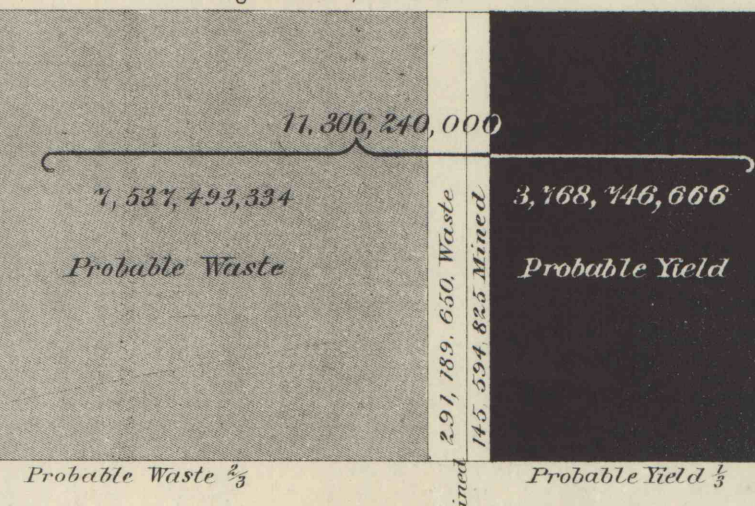
Estimated Quantity of Anthracite Coal in Tons in the several Coal Fields—the Relative Amount of Waste and Quantity Mined.

COUNTRIES.	Production in 1880s—1879s.	Production in 1878s—1879s.
Great Britain.....	2,500,000	6,300,000
United States.....	564,755	320,215
Germany (Luxemb'g)	225,000	1,816,672
France.....	408,973	1,417,073
Belgium.....	142,130	562,086
Austria & Hungary.....	219,460	443,689
Russia.....	191,492	420,035
Sweden.....	125,000	346,955
Other Countries.....	150,000	200,000
Total.....	4,528,810	13,807,725

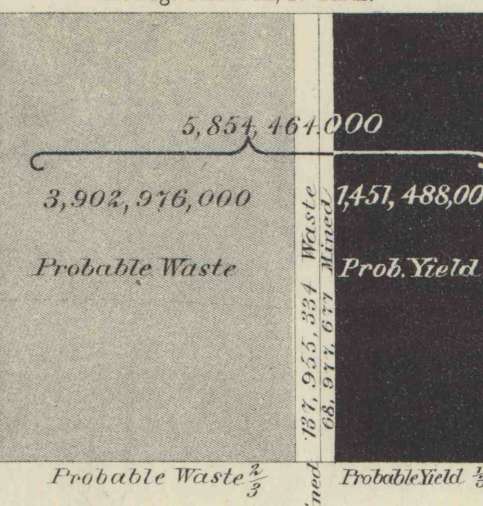
1879, in United States—Blast Furnaces, 672; Rolling Mills, 340; Steel Works, 71; Bloomeries and Forges, 122; total, 1,225. Number of Manufactories of Iron and Steel of all form in 1870, 5,063.

COUNTRIES.	Area Square Miles.	Tons—1870.	Tons—1877.
Great Britain.....	11,900	116,451,192	134,619,763
United States.....	129,000	32,283,000	47,108,550
Germany.....	17,780	34,003,064	49,286,367
France.....	2,086	13,179,708	16,882,201
Belgium.....	510	13,697,118	15,935,523
Netherlands.....	1,830	5,355,444	14,530,088
Russia.....	30,000	829,745	1,900,000
Spain.....	3,561	661,927	690,000
Portugal.....	18,800	325,769	757,000
Nova Scotia.....	24,840	885,564	1,444,171
India.....	2,004	500,000	4,000,000
Japan.....	5,900	500,000	4,000,000
Van Cour'se's Islands.....	330	29,863	120,640
China, Chili, etc.....	800	8,000,000	4,000,000
Total.....	900,801	924,016,524	1,089,293,553

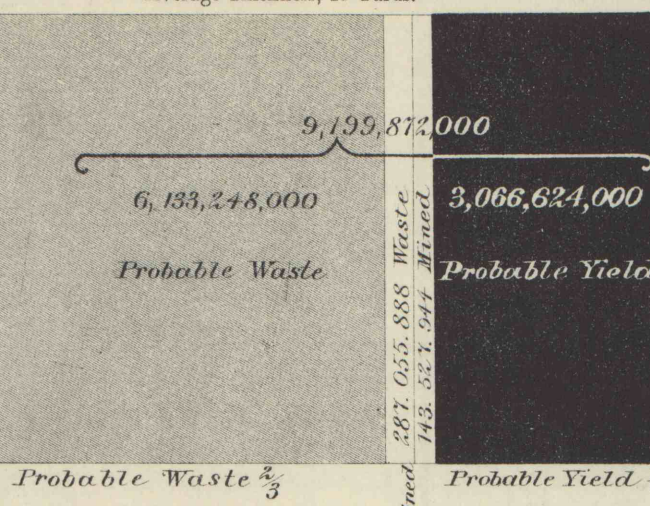
SOUTHERN OR SCHUYLKILL COAL FIELD.
Average Thickness, 25 Yards.



MIDDLE COAL FIELD.
Average Thickness, 15 Yards.



NORTHERN OR WYOMING COAL FIELD
Average Thickness, 15 Yards.



Coal Areas in Square Miles.		
UNITED STATES.		
Canada	450	
Bithumous	136,400	136,850
BRITISH PROVINCES.		
Newfoundland	100	
Petou	850	
Cape Breton	220	
Cumberland	800	
New Brunswick	6,689	7,538
GREAT BRITAIN.		
England	2,700	
Wales	1,000	
Scotland	1,500	
Ireland	200	5,400
France		
Belgium	800	610
GERMAN DISTRICTS		
Saarbrueck	960	
Westphalia	380	
Bohemia	400	
Saxony	30	1,770
Spain	200	
Russia	200	
Australia	200	
India		
China		26,650
Chili		
total		240,000

Statistics of the Coal and Iron Trade of the United States and Great Britain, and Railroads of the United States.

YEAR.	COAL.				IRON, STEEL AND RAILS.						Railroads, Miles.
	Imports, U. S.	Exports, U. S.	Great Britain Number Collieries.	Great Britain's Output.	Pig Iron Imported in U. S.	Iron and Steel Rails Imp. U. S.	Rails Manufactured in U. S.	Pig Iron Manufactured in U. S.	Iron Product of Great Britain.		
1829	45,463							142,000			
1830	58,582			16,034,769				185,000	678,417	22	
1831	86,508							191,538		95	
1832	72,978							200,000		229	
1833	92,452							225,000		380	
1834	71,626								700,000	633	
1835	59,968								1,000,000	1,098	
1836	108,432									1,273	
1837	155,450									1,497	
1838	129,082									1,913	
1839	181,555			31,024,417						2,302	
1840	162,867							285,903	1,347,790	2,818	
1841	155,394								1,248,871	3,535	
1842	141,221							215,000		4,028	
1843	41,163									4,185	
1844	87,073							498,000		4,377	
1845	85,786			84,000,000				505,000	1,572,500	4,633	
1846	156,853			36,400,000				762,000		4,930	
1847	148,021							800,000	1,999,508	5,558	
1848	196,168							800,000		5,996	
1849	198,213							650,000		7,365	
1850	180,439							563,755		9,021	
1851	214,775				74,874			44,098		10,982	
1852	183,015				67,249			413,000		12,908	
1853	231,508			34,000,000	81,873	298,995	62,478	540,225	2,700,000	15,360	
1854	252,865	2,973		64,001,000	114,227	282,867	87,864	805,000		16,720	
1855	287,408	2,813		61,453,079	98,225	155,455	138,574	784,178		18,374	
1856	293,507	2,329		66,645,450	99,012	173,305	180,018	838,137		22,016	
1857	380,712	2,067		65,394,707	51,794	75,745	181,918	738,157	3,669,447	24,503	
1858	396,628	2,958		65,008,641	41,986	69,965	163,712	705,094	3,456,064	26,968	
1859	403,928	2,949		71,979,765	72,515	122,175	195,454	840,627	3,712,904	28,739	
1860	398,938	3,009		50,042,698	71,493	74,490	205,038	919,770	3,828,762	30,635	
1861	469,434	3,025		83,638,214	74,026	8,611	189,618	731,544	3,712,890	31,296	
1862	641,099	3,088		81,638,338	22,247	17,088	213,912	797,662	3,943,469	32,130	
1863	624,373	3,180		86,292,215	31,007	118,714	275,768	947,604	4,510,040	33,170	
1864	667,738	3,263		92,787,873	102,223	77,518	335,369	1,135,996	4,767,961	33,908	
1865	684,180			98,150,587	50,652	73,007	356,292	1,235,362	4,819,284	35,085	
1866	696,053			101,630,546	102,392	96,272	430,778	1,350,243	4,522,897	36,607	
1867	621,305			104,600,480	112,042	151,097	462,108	1,461,626	4,761,023	39,350	
1868	396,228			103,141,157	112,133	237,703	506,714	1,903,000	4,970,206	42,255	
1869	423,566			107,435,157	136,975	270,765	683,598	1,916,641	4,545,707	48,268	
1870	428,008	227,018		110,451,192	153,283	458,055	620,000	1,958,515	4,585,515	52,914	
1871	443,955	277,561		117,352,028	178,138	531,636	775,733	1,911,608	6,627,179	66,244	
1872	490,631	401,078		123,497,316	247,528	357,629	1,000,000	2,854,558	6,741,929	67,333	
1873	456,015	584,633		127,016,747	215,495	148,914	800,072	2,888,278	6,566,451	70,311	
1874	498,028	753,025		125,048,257	92,041	42,082	726,415	2,939,415	5,991,408	72,016	
1875	441,600	619,945		131,897,105	58,748	7,708	719,512	2,966,881	6,905,462	74,374	
1876	407,853	680,078	4,385	134,125,106	79,455	287	879,629	2,093,238	6,555,997	77,031	
1877	479,260	740,455	4,291	134,179,968	78,077	35	764,709	2,314,585	6,608,664	79,208	
1878	578,457	660,138	3,963	132,602,036	81,600	10	882,665	2,577,361	6,381,051	81,955	
1879					98,096	3,813				86,365	

Imports and Exports of the Globe for the Year 1876.

COUNTRIES.	IMPORTS.	EXPORTS.	Per Cent of Commerce Imports and Exports.	Average per Head, Imports and Exports.
Europe.....	5,650,400,000	4,936,200,000	71.25	34.52
America.....	972,800,000	1,167,200,000	15.28	28.22
Asia.....	489,000,000	641,600,000	8.09	1.40
Australasia.....	287,800,000	224,400,000	3.29	256.77
Africa.....	134,400,000	156,600,000	2.07	5.62
Total.....	7,474,400,000	7,126,000,000	100.00	
United States, incl'd in America.	485,000,000	604,000,000	7.79	10.34

Oil Products of Pennsylvania.

YEAR.	Barrels.	Price at Well per Barrel.	Value at Well.	Exported—Gallons
1859	3,200	\$18.00	\$14,604	
1860	650,000	6.72	4,368,000	
1861	2,016,000	1.68	6,750,000	
1862	2,311,350	3.39	10,417,322	
1864	4,110,182	9.68	20,462,818	23,210,369
1865	3,697,112	6.56	22,977,367	26,430,849
1866	3,507,527	3.73	13,184,775	50,987,241
1867	3,347,506	3.18	10,644,435	70,255,481
1868	3,715,751	4.18	15,420,335	79,458,808
1869	4,000,000	3.85	15,400,000	100,684,760
1870	5,659,000	3.80	21,504,200	117,735,294
1871	5,795,000	4.35	25,208,250	149,892,691
1872	6,593,103	3.75	24,521,636	151,775,653
1873	9,879,455	1.84	18,175,197	187,815,137
1874	10,000,000	1.80	18,000,000	247,806,483
1875	8,619,639	1.26	10,429,763	221,995,036
1876	8,869,906	2.53	22,691,132	243,605,152
1877	13,135,671	2.25	29,555,200	300,198,914
1878	15,153,462	1.17	17,743,591	338,841,803
1879	17,000,000	84	14,356,000	
1880				

Remarks on Oil

Drake first struck oil Aug. 28, 1859, at 71 ft.; 400 galls. per dim., at 55c.	
Amount exported crude in 1875, or its equivalent in oil, 37,696,471.	
Value of oil exported, \$1,290,242.14.	
Number of wells drilled to January 1, 1869, 56.	
Product, 257,000 barrels; average, 4,600 bbls. to well.	
At \$4.08 per bbl. amounts to \$1,870,000 per well.	
From 1869 to 1874, 4,938 wells; product, 49,000 barrels.	
Average, 4,900 bbls. to well; at \$2.91 per bbl., \$24,500 per well.	
Cost of 10,000 wells at \$5,000,	\$52,500,000
" pumping 8,000 good wells, at an average life of two years, at \$10 per dim.,	58,400,000
391 square miles, or 25,260 acres, at \$900,	12,646,000
	\$123,586,000
67,707,094 bbls. at \$1.67 per bbl.,	285,475,000
Profit \$1.67 per bbl. net,	112,195,120

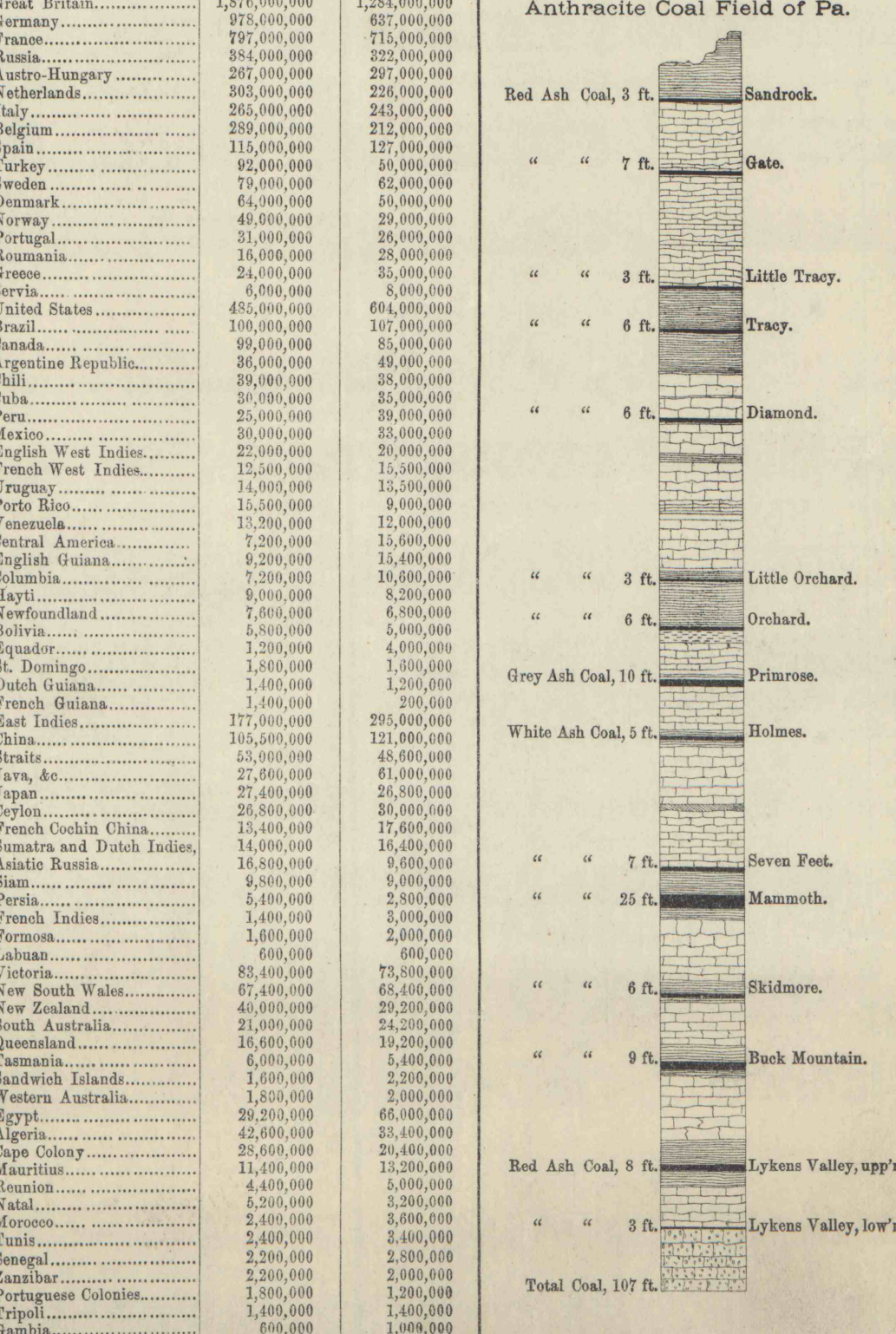
United States Coal Product of 1869 and 1878

	1869-Tons.	1878-Tons.
ASTERACITE.		
Pennsylvania.	13,666.180	17,956,282
RTUMINOUS.		
Pennsylvania.	7,798,517	13,500,000
Illinois.	2,929,963	3,500,000
Ohio.	2,627,285	5,000,000
Maryland.	1,819,824	1,877,322
Missouri.	621,890	800,000
New Virginia.	938,873	1,000,000
Indiana.	437,870	1,000,000
Iowa.	203,487	1,500,000
Kentucky.	150,852	900,000
Massachusetts.	133,413	375,000
Virginia.	161,933	75,000
Kansas.	32,938	
Oregon.		200,000
Michigan.	21,150	30,000
California.		600,000
Rhode Island.	14,000	14,000
Alabama.	14,000	200,000
Nebraska.	1,425	75,000
Arkansas.	50,000	100,000
Washington.	17,844	150,000
Utah.	5,800	60,000
Colorado.	4,077	867,000
Total.	31,027,904	40,120,554

COAL EXPORTS FOR THE FISCAL YEAR ENDING JUNE 30 1878 U S.—SAVARD.

TOTAL EXPORTS FOR THE FISCAL YEAR ENDING JUNE 30, 1878, U. S. SAUARD.							
COUNTRIES.		Tons Anb.	Tons Bit.	COUNTRIES.		Tons Anb.	Tons Bit.
Austria.....		202		Australasia.....		10	
Brazil.....		1,852	533	Hawaiian Islands.....		842	257
Central America.....		11	94	Hayti.....		713	
Chili.....		1,093	510	Italy.....		2,060	16
China.....		3,659		Japan.....		706	
Danish West Indies.....		1,497	11,360	Mexico.....		756	3,144
France.....		764		Dutch East Indies.....		101	
French West Ind. & Guiana.....		240	615	Peru.....		1,878	
Miquelan & C. Islands.....		30		Azores, Madeira.....		325	
Other French Possessions.....			1	San Domingo.....		434	297
Nova Scotia.....		30,300	5,054	Cuba.....		17,983	62,613
Quebec, Ontario, &c.....		268,378	214,982	Porto Rico.....		43	32
British Columbia.....		17	22	United States of Columbia.....		3,373	17,491
New Foundland.....		98		Venezuela.....		630	581
British West Ind. & Hond.....		1,471	1,222				
British East Indies.....		454		Total.....		340,506	319,587

Cross Section in the Southern Anthracite Coal Field of Pa.



NOTE.—We are indebted to the following reliable authorities in preparing the above Tables: H. D. Rogers, First Geological Survey of Pennsylvania; J. P. Lesley, Second Geological Survey of Pennsylvania; Fred'k E. Saward; H. V. Poor's *Manual of the Railroads*; American Iron and Steel Association; Prof. W. S. Jevons (England); J. H. Jones (P. & R. R. Co.); U. S. Bureau of Statistics; James McFarland, etc.

**Accompanying a paper read before the American Association for Advancement of Science, at Saratoga, September 1st, 1870.*

[Entered according to Act of Congress, in the year 1880, by P. W. Sheaffer, in the Office of the Librarian of Congress at Washington.]