1643-1664  Tanning and brewing done by Swedes and Dutch in southeastern area, along the Delaware.  (1)

1681  Lime kiln at Mont Joy, manor of William Penn.  (1)

1683  Tannery and glass house established by William Penn in Philadelphia. Latter unsuccessful, but soon after a glass house and pottery was started in Frankfort.  (1)

1685  "Brickeries" mentioned by William Penn in Philadelphia.  (11)

1690  First paper made in American colonies by William Rittenhouse at Roxborough; near Philadelphia.  (2)

1699  Two tanyards listed in Philadelphia, operated by William Hudson and Mr. Lambert.  (1)

1716-1728  Earliest Pennsylvania Ironworks: Pool forge (1716), Colebrookdale furnace (1720) near Pottstown, Redding furnace on French Creek (1728 ?), Durham furnace (1727) in Bucks County.  (3)  (4)

1733  Slipware pottery made in Pennsylvania.  (11)

1740  Type foundry, Christopher Saver, Germantown, Pa.  (1)

1742  Cornwall Furnace made iron (until 1883) from adjoining mines which are still productive.  (5)

1743  America's oldest pharmacy, Bethlehem, Pa. Started in Moravian Community Building by John Frederic Otto. Not the earliest on the continent, but of longest duration, 1743-1954.  (6)

1752  Franklin's kite experiment proving lightning an electrical phenomenon.  (7)

Culture of silkworms, Bethlehem, Pa.  (8)
1753 Sources of clay for bricks and pottery, described by Lewis Evans. (10)

1754 John and Daniel Elliott, "druggists and colourmen," Phila. (7)
Bethlehem Water Works, first in Pennsylvania involving pumps, etc. (9)

1762 Early charcoal iron furnaces and forges at Boiling Springs, Cumberland County. Within a decade, others at Mount Holly Springs and Pine Grove Furnace, between Carlisle and Gettysburg. (16a)
Wetherill & Bro., white lead, Philadelphia. First in America. (7)
Anthracite coal reported found by John Jenkins at Wyoming, along Susquehanna River. (12)


1765 First medical school in this country founded at the College of Philadelphia, now the University of Pennsylvania. John Morgan, professor of medicine, delivered the first chemistry course in the United States. (31)
David Wheeler, Philadelphia blacksmith, makes fire engines and lightning rods. (1)

1769 Benjamin Rush elected professor of chemistry in the medical school, College of Philadelphia, becoming the first professor of chemistry in Pennsylvania. (31)

1770 Hopewell iron furnace in Schuylkill Valley began operations. Worked until 1883.
Earliest work on chemistry for teaching purposes to be printed in America, "A syllabus of a course of lectures on chemistry for the use of students of medicine in the College of Philadelphia," by Benjamin Rush. (13) (31)

1772 Henry William Stiegel announced "The American Flint Glass Manufactory." This was the development from earlier glass houses begun in 1764 by an iron master who became a renowned glass maker. (14)
1775 Instructions for home manufacture of saltpeter issued by Congress.
A small factory directed by Dr. Rush extracted and refined "salt-petre" for gunpowder for Continental Army.
Type foundry erected, Benjamin Franklin.

1784 Coal mining privileges given by Penns in Pittsburgh area.
"Sea coal" reported on map of John Pattin in 1750, along Kiskiminitas River.

1786 Ammonium chloride and Glauber’s salt manufactured by Christopher and Charles Marshall, Philadelphia

1787 Pennsylvania Society for the Encouragement of Manufactures organized; Samuel Wetherill, Jr., was moving spirit.
Benjamin Rush began teaching chemistry at the Young Ladies Academy of Philadelphia. This was the earliest chemical instruction for girls in Pennsylvania, probably in the United States. Rush published a syllabus of the course.

1788 Morocco and other colored leathers made at Philadelphia. Here leather manufacture was a major industry. Exports of leather from the port of Philadelphia were 40,725 pounds in 1772. The fancy leathers were made in thirty large factories employing about 1500 hands.

Calico and linen printing, John Hewson, Pennsylvania.

1790 First chemical society in the United States organized in Philadelphia. It lasted, apparently, about one year.
First U. S. patent for a chemical process issued to Samuel Hopkins of Philadelphia for an improved potash kettle.
First iron furnace on the Youghiogeny River by Wm. Turnbull & Co.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1790-1791</td>
<td>Anthracite discovered at three locations: By Nicho Allen on Broad Mt., near Pottsville; by Isaac Tomlinson at Shamokin; by Philip Ginter, near Mauch Chunk.</td>
<td>(12)</td>
</tr>
<tr>
<td>1792</td>
<td>Philadelphia Chemical Society formed; lasted until about 1810. This was the first chemical society in the United States to issue publications. First iron furnace in the Pittsburgh district erected by George Anschutz.</td>
<td>(18) (19)</td>
</tr>
<tr>
<td>1793</td>
<td>First U. S. mint in Philadelphia began operations; David Rittenhouse, Director. Sulfuric acid first made in America by John Harrison, Philadelphia. This, and the preparation of nitric and muriatic acids, was small-scale production. Harrison, a druggist, turned his entire attention to chemical production in 1804 &quot;to the supply of the whole United States.&quot;</td>
<td>(19) (22) (20)</td>
</tr>
<tr>
<td>1794</td>
<td>Joseph Priestley arrived in America; welcomed first in New York and Philadelphia, then took permanent residence in Northumberland, Pa.</td>
<td>(7)</td>
</tr>
<tr>
<td>1795</td>
<td>General James O'Hara and Isaac Craig built the first glass works in Pittsburgh. Priestley (Dec. 1795) sends two papers to the American Philosophical Society relating to the analysis of air, and generation of air from water.</td>
<td>(1) (23)</td>
</tr>
<tr>
<td>1796</td>
<td>Samuel Jackson and Jonathan Sharplees erect first paper mill west of the Alleghenies, Brownsville, Pa. Gas lights exhibited by Peter Ambrose, Philadelphia.</td>
<td>(7)</td>
</tr>
<tr>
<td>1799</td>
<td>Priestley obtained an inflammable air (carbon monoxide) by heating smithy scale with charcoal. Oliver Evans invents the &quot;luminous&quot; grate stove for coal, with talc lights.</td>
<td>(24) (1)</td>
</tr>
<tr>
<td>1800</td>
<td>Oliver Evans invents the &quot;luminous&quot; grate stove for coal, with talc lights. Robert Hare invents oxyhydrogen blowpipe.</td>
<td>(23)</td>
</tr>
<tr>
<td>1801</td>
<td>Mercurials produced by Adam Seybert.</td>
<td>(7)</td>
</tr>
</tbody>
</table>
1802 Illuminating gas from fuel patented, Benjamin Henfrey (7)

Potato starch process, John Biddis, Philadelphia

1804 American Philosophical Society encourages dye studies with a gold medal award. Experiments with chemical arts conducted by the Harmony Society in Phila. - tanning, brewing, distilling, dyeing, leaching potash, expressing oil, making soap, etc. (7)

Dr. Joseph Priestley died February 6 in Northumberland, Pa.

First white lead works in the U. S. erected by Samuel Wetherill and Son, Samuel Wetherill Jr. Christopher Wetherill, father of Samuel, imported white lead from 1783 to 1809. First plant burned down. New works built in 1808. (20)

1807 Carbonated water manufactured by Joseph Hawkins, Phila. (7)

First successful flint glass factory in America founded by Bakewell & Page in Pittsburgh. (19)

Commercial manufacture of oilcloths started in Phila. by John Dorsey. (19)


Queensware, Columbia Pottery Co., Philadelphia. (7)

1809 First geological survey of U. S., Wm. Maclure. (7)

Oliver Evans applies steam engine to grist mill, Pittsburgh. (19)

Evans credited with first effective application of the high-pressure steam engine on land and water. Began 1773; given exclusive right to make and sell them in Pennsylvania in 1787. (1)

1810 One of the first trusts - builders & lime quarry owners - formed. (1a)

Pennsylvania had 715 tanneries. (New York had 867; U. S. total, 1316.) (1)
1811 Colombian Chemical Society formed, Philadelphia. Published one volume of Memoirs, 1813.

Thomas Cooper (judge, author, educator) became Professor of Chemistry at Dickinson College, Carlisle, Pa.

1812 Tench Coxe makes systematic survey of American chemical industries.

First effective industrial use of anthracite by White and Hazard at Falls of Schuylkill.

1813 Pittsburgh Chemical and Physiological Society formed. This was the first chemical society inland from the Atlantic Coast.

Salt shortage led to first production on Conemaugh and Kiskiminetas Rivers (western Penna.). Salt-drilling process.

1814 Platinum still first used in U. S. for concentrating sulfuric acid by John Harrison, Philadelphia.

Fort Pitt Iron Works for cannon, Joseph McClurg, Pittsburgh.

Copper plating, platinum working, and porcelain glazing, Eric Bollman, Philadelphia.

1815 Congress petitioned for protection by manufacturers of chemicals.

Dry colors developed by C. Schrack & Co., Philadelphia.

1816 Robert Hare invents calorimotor (electric battery for obtaining high temperatures).

Gas lighting employed on large scale, Philadelphia. First theatre in the continent illuminated, Nov. 25 (New Theatre).

Dr. J. R. Coxe, professor of chemistry (U. of Pa.), proposes an electric telegraph based on signals resulting from color changes produced by decomposition of water and metallic salts.

First steam paper mill in U.S., Pittsburgh, based on principle of O. Evans.
1816 Thomas Gilpin patented first cylinder machine (for paper making) in this country.

1817 Patents: To Genet Troost, Philadelphia, alum from lignite; to George F. Hagner, Philadelphia, manufacture of verdigris and white lead.

1818 Farr & Kunzi begin manufacture of sulfuric acid; later known as Farr, Powers and Weightman, a firm which fifty years later was among the largest general manufacturing chemists in the world.

1819 First American lithographic printing done by B. Otis, Philadelphia.

Lead pigments, Mordecai Lewis (later John T. Lewis & Bros.), Philadelphia.

1820 Lehigh Coal & Navigation Co. ship 325 tons of anthracite from Mauch Chunk to Philadelphia by artificial navigation.

Bleachery operated by H. W. Butterworth & Son, Philadelphia.

1821 First college of pharmacy established (1821) as the Philadelphia School of Apothecaries in Carpenter's Hall. This was the first American institution of its kind; now the Philadelphia College of Pharmacy and Science.

Horricks & Bro., dye works, Philadelphia.

1822 Cyanogen produced by James Cutbush.

B. Douredoure, oils, fats, candles, soaps.

Zeitler & Rosengarten (later Rosengarten & Sons), medicines, Philadelphia.

1824 Franklin Institute incorporated; the Institute gave the first course of instruction in mechanical science in United States. Soon after formation, regular lectures were given by four professors: subjects, Natural Philosophy, Chemistry and Mineralogy, Architecture and Mechanics.
American Journal of Pharmacy founded, Philadelphia.

This was the first pharmacy journal in the U. S., and is still in publication. This journal published much of the early American work on pharmaceutical chemistry.

Patents: Isaac Macauley, Philadelphia, for an improvement in oil cloth. He had a factory in 1808, probably the first in this country.

The Harmony Society, under George Rapp, returned to Pennsylvania from Indiana. Operated at Economy, 18 miles below Pittsburgh; had a large cotton and woolen factory, large steam mill, brewery, distillery, tanyard, and commenced the culture and making of silk.

Manufactures from Pittsburgh estimated worth $2,500,000 in 1825 from seven steam rolling mills making bar and sheet iron, nails, axes, shovels, etc.; eight air foundries and a cupola furnace making iron castings from $\frac{1}{2}$ pound to 4 tons; a boring mill for rolls and shafts; six steam engine factories; a wire factory; eight blast furnaces north of the Allegheny River sending metal to Pittsburgh (from nearby counties). There were nine paper mills in Western Pennsylvania; seven glass works, which could undersell imported glass, and received a premium award this year from Franklin Institute.

1826

Mauch Chunk anthracite furnace erected for iron ore reduction; some 200 charcoal blast furnaces in U. S.

Journal of the Franklin Institute founded; for many years the only record of American Patents as they were issued. Oldest periodical devoted to theoretical and practical papers in mechanics and the useful arts.

A report indicated 35 salt works upon the Connemaugh and Kiskiminetas Rivers, 3 on the Alleghany, and many more in preparation. An estimated 1,200,000 bushels of salt per year.

Manual for growth and manufacture of silk prepared by Dr. Jas. Mease for distribution by U. S. Treasury.
1826 Mulberry (Morus multicaulis) imported from Philippines. (28)

1827 Grates and furnaces introduced for burning anthracite coal. (28)

Mauch Chunk railroad built for anthracite transport; mule-drawn rail cars used in coal mines. (28)

Large textile industry develops in Philadelphia and vicinity. Some 4500 weavers made almost four million dollars worth of cotton goods annually. Over two hundred dyers used about a ton of indigo weekly. (28)

American china or porcelain made in Philadelphia by Wm. E. Tucker; another company of China makers at Pittsburgh. (28)

1828 Premiums offered for silk culture and mulberry tree raising. Messrs. Weiss and Youngman raised two crops of silk worms per season in Bethlehem. Silk culture commenced at Economy by George Rapp and associates. (28)

Steam locomotive first used in U. S., Carbondale & Honesdale Railroad, a trial run for coal transport from coal mines in Luzerne County to canals of the Delaware and Hudson Canal Company. (28)

Pig lead (1000 pigs) made from perkiomen mines by S. P. Wetherill & Co., Philadelphia. (28)

Iron manufacture in Pennsylvania; 22,600 tons of bar and rolled iron, and 14,000 tons of castings. (28)

Wm. Magaw, Meadville, started paper-making from straw and hay; and obtained patent for the process. (28)

1829 Charles Lennig, first large-scale producer of sulfuric acid, introduced continuous operation, Philadelphia. (31a)

1830 Dr. J. K. Mitchell makes an improvement in manufacture of caoutchouc (a rubber cementing process), Philadelphia. (28)


1831 Jos. Elkinton starts manufacture of soap and candles (origin of Philadelphia Quartz Co.). (32)

Charles Lennig, heavy chemicals, Philadelphia. (7)
1831 Of fourteen steel furnaces in operation in U.S., six were in Pennsylvania: two in Pittsburgh, three in Philadelphia, one in York County.

Of thirty-eight sugar refineries in U.S., eleven were in Philadelphia.

American Porcelain manufactory (outgrowth of Tucker's American Queensware, 1825) established by Wm. E. Tucker and Judge Hemphill, Philadelphia.

Of twenty-three cylinder window glass plants in U.S., four were at Pittsburgh and four at Burnsville, Pa. Dyott in Philadelphia had largest manufactory of green bottles, demijohns, etc.

Patent to Moses Isaacs for making coke from anthracite.

1832 Patents: Felix Fossard, Pittsburgh, dyeing with alkaline prussiates (specimens shown - broadcloth dyed with prussiate of potash, mordanted with sulphate of iron).

Edward Evans, Salem Township, Pa., tanning without the use of lime, or sweating hides (previously known and used).

First attempt to use coke in iron manufacture made by Penna. Coke and Iron Co.

Penna. General Assembly passed an "Act to promote the Culture of Silk."

Berks County had eleven iron furnaces and twenty-two forges. At Reading, anthracite stoves (Dr. Nott's invention) were cast.

Morphine salts made by Rosengarten & Sons, Philadelphia.

1833 First Baldwin locomotive delivered in January to Philadelphia and Germantown Railroad. Lightweight (4–5 tons) gave it poor traction, so horses attached on rainy days.

Lime-sulfur insecticide and piperine manufactured by Rosengarten & Sons.

1834 Nitric, muriatic, citric and tartaric acids made in Philadelphia by John Carter and Joseph Scattergood.
1836

J. C. Booth, commercial industrial chem. lab. established, Philadelphia.

(7)


(33)

Public use of gas has its inception in Philadelphia, Feb. 8.

(19)

Pennsylvania Legislature (June 16) passed an "Act to encourage the manufacture of iron with coke or mineral coal, and for other purposes."

(28)

First Coinage by steam power in the U.S. Mint (March 23).

(28)

More chemicals and medicinals made by Rosengarten & Sons, Philadelphia: in 1834, strychnine; in 1835, veratrine; in 1836, iodides, codeine, bismuth, and silver salts.

(7)

1837

Experiments in smelting iron with anthracite coal reported successful by Baughman, Gulteau & Co., Mauch Chunk.

Consumption of anthracite in U. S., or the trade in it, amounted to 881,026 tons (1735 percent increase in ten years).

(28)

Anthracite first used in iron making by Wm. Lyman, Pottsville, in hot-blast steam-furnace. Known as the Pioneer, this furnace was managed by Mr. Lyman and Benjamin Perry, aided by David Thomas.

(1)

This furnace, blown in early in October 1839, operated with a continuous blast for ninety days, using pure anthracite and argillaceous iron ore. This operation secured a premium of $5,000 to the proprietor, the sum being subscribed by citizens of the State.

Potassium and ammonium alums, manufactured, by Charles Lennig, Philadelphia.

(7)

1839

At Germantown, Mr. Physic had 400,000 mulberry trees growing and one million silkworms; largest cocoonery in the world. Speculation in mulberry trees reached its height and reaction expected.

(28)

Rubber vulcanizing discovered by Charles Goodyear, Phila.

(34)
1841 Coke manufacture begun, Connellsville, Pennsylvania. (7)
Earlier accounts of converting "stone coal into coak," by John Beal, 1814. (16)
Farr, Powers & Weightman (medicinals), Philadelphia (35)

1842 J. Bishop & Co., First refiner of platinum in U. S., Malverne, Pennsylvania. (35)
J. C. Booth, first use in U. S. of polariscope for testing sugar; beet sugar and gelatin studied, Philadelphia. (35)

1843 Goodyear patents for rubber vulcanization perfected. (35)
McIlvane Bros., crude drugs. (35)
Smith, Kline & French, Pharmaceuticals, Philadelphia. (35)

1844 Petroleum discovered in salt borings, Tarentum, Pennsylvania. Refining efforts fail. Not developed, except as earlier (e.g. 1820 on) by "medicine men" as cure-all. (19)
Bromine, found in salt brines, Freeport, Pennsylvania. (35)
Manufacture of steel rails begun at Danville. (19)

1845 Bromine manufactured, David Alter, Freeport, Pennsylvania. (7)
Potassium ferricyanide made, Carter & Scattergood, Phila. (7)

1846 Bleaching powder, manufactured (first in U.S.), Charles Lennig, Bridesburg, Pennsylvania. (7)
Zinc ore (calamine, zinc hydrasilicate) discovered in Lehigh County, Pa., by Prof. Wm. T. Roepper, Bethlehem, Pa. (35)

1847 J. C. Booth appointed melter and refiner, U.S. Mint, Phila. (7)
John Lucas & Co., paint pigments, Philadelphia. (7)

1849 J. C. Booth, Encyclopedia of Chemistry, Philadelphia. (35)
Pennsylvania Salt Manufacturing Co. organized in Phila. (35)
Smokeless powder first made in the U.S., Charles Lennig, Philadelphia. (35)
1851 Converter with pneumatic blast for malleable iron and steel, William Kelly (experimental). Trials in Johnston, Cambria plant, by Kelly in 1857 and 1858. (7) (30)

1852 Smithsonian Institution report, "Recent Improvements in the Chemical Arts," J. C. Booth and Campbell Morfit. (7)

At mid-century the total U. S. annual production was ten hundred and nineteen millions of dollars, of which New York made twenty-three percent; Massachusetts and Pennsylvania next in rank, having made fifteen percent. Pennsylvania produced eighty percent of the coal and one-third of the iron, one-half of the hosiery and two-thirds of the perfumery. (28)

1853 Franklin & Marshall College, Lancaster; merger, Franklin College (est. 1787) with Marshall College (est. 1836). (19)


Beginnings of Jones & Laughlin Steel Corp.; first named The American Rolling Mills. (38)

1854 Illuminating gas research, C. M. Wetherill. (7)

Martin Nixon made paper from straw, Flat Rocks Paper Mill, along Schuylkill. (2)

1855 Horsecars operated for first time in Philadelphia. (19)

Hugh Burgess, of England, came to U. S. and employed his chemical method (developed by him and Charles Watt) of disintegrating wood with caustic soda at high temperatures. Several mills were built in southeastern Pennsylvania. Burgess built and operated a large mill at Royersford, on the Schuylkill River, in 1855 and managed it until 1895. (2)

Pennsylvania petroleum studied by Benjamin Silliman, Jr. (7)

American Iron & Steel Association organized, Philadelphia, March 6, 1855. (30)
1856 Nickel ores of Pennsylvania investigated, J. C. Booth. (7)

Bessemer steel made, Phillipsburg, N. J. (across the Delaware from Easton, Pa.) (7)

Sugar-coated pills first made by Dr. Wm. R. Warner, Philadelphia. (7)

1857 Rolled zinc sheet exhibited at Northampton County Fair by Sam. Wetherill, from metal reduced in Bethlehem. From Oct. 1853 to Sept. 1857, Gilbert-Wetherill made 4725 tons of white oxide of zinc. New workmen from Belgium made zinc profitably thereafter. (28)


First railroad bridge across the Allegheny River; wooden structure, Ohio & Penna. R. R. (39)

1858 Susquehanna University founded, Selinsgrove, Pa. (19)

Henry D. Rogers, Geology of Pennsylvania, 2 vols. (40)

Samuel Kier set up his still to refine oil; in drugstore basement, Pittsburgh. (39)

Kloman Brothers start forge works, Millvale, which led to Carnegie Steel organization. (39)

First tin plate made by C. G. Hussey & Co. (iron coated with tin). (39)

1859 E. & S. Drake struck oil; well of Seneca Oil Co., Titusville, Pa., Aug. 29. This event, 75 miles north of Pittsburgh gave birth to the petroleum industry. (39)

James Laughlin builds two blast furnaces with beehive coke ovens, north side of Monongahela River, Pittsburgh. (39)

Second blast furnace in Pittsburgh district (first to use coke) began operation, Graff Bennett & Co. (39)

Cold rolling of iron and steel was invented and patented, Bernard Lauth, partner of Benj. F. Jones. (39)
1860  J. C. Booth tried to induce iron masters of eastern Pennsylvania to apply chemical analyses of ores to control the work of their furnaces. Unsuccessful attempt to raise the annual sum of $1200 for this service. (41)

Joseph Wharton develops and improves zinc production, Bethlehem. (7)

Jones and Laughlin's American Iron Works; organization name after James Laughlin bought the interest of retiring B. Lauth. (39)

1861 About this period seven oil refineries start in Pittsburgh area and operate for eight-year period. (42)

Oldest pretzel bakery, Lititz. (Local claim.)

"Soluble glass," sodium silicate, made by Elkinton, Philadelphia. (43)

First steel converter, Johnstown. (19)

1862 Illuminating oil studied, J. C. Booth, Philadelphia. (7)

1863 First blast furnace of Bethlehem Iron Company lighted, Jan. 4; rolling mill started. First rails for Lehigh Valley R. R. rolled, Sept. 26. (8)

Moravian College and Theological Seminary incorporated, April 3, 1863. Beginnings of the men's college started in Nazareth in 1807. In 1836 it was transferred to Bethlehem. The Moravian Seminary and College for Women (first boarding school for girls in America) dates from May 2, 1742; started by Countess Benigna von Zinzendorf, in Germantown, it was transferred to Bethlehem in 1743. (8)

1864 Muhlenberg College, Allentown (chartered as Allentown Collegiate Institute and Military Academy). (19)

Andrew Carnegie, at 29, entered the iron industry, Iron City Forge Co., with Andrew Kloman and Henry Phipps, Pittsburgh. (39)

1865 First large-scale production of chemical wood pulp; Hugh Burgess, American Wood-Paper Co., Manayunk, Pa., used patent perfected in 1854 by Watt & Burgess. (2)
1865 Cyclops Mill completed; Thomas Miller and Carnegie enterprise.

Keystone Bridge Co. organized; to use iron from Union Iron Mills (new name for merged Cyclops and Iron City companies), Pittsburgh.

George Westinghouse, at 19, receives his first patent for rotary steam engine.

1866 Lehigh University, founded by Judge Asa Packer, opened Sept. 1.

Andrew Carnegie acquired controlling interest in Union Iron Mills.
References

CHRONOLOGY OF CHEMISTRY IN PENNSYLVANIA - PART I


8. J. M. Levering, "A History of Bethlehem, Pa., 1741-1892" (Bethlehem, 1903)


23. E. F. Smith, The Life of Robert Hare, an American Chemist (1781-1858), J. B. Lippincott (Philadelphia, 1917)


25. F. J. Moore, A History of Chemistry (New York, 1939)


27. Wyndham D. Miles, unpublished investigation


29. Ibid., vol. 3

30. H. T. Warshow, Representative Industries in the United States (1928)

31a. James F. Curran, Bur. of Business Services, Dept. of Commerce, Harrisburg, Pennsylvania (Communication)

32. For P Q, A 125th Birthday, C. & E. News, 1532, March 26, 1956


39. M. Seidenberg, L. Mulkearn and J. W. Hess in Two Hundred Years of Pittsburgh's History, Stefan Lorant, Ed. (Garden City, N. Y., 1964)


44. Raymond Walters, Bethlehem Long Ago and Today (Bethlehem, 1923)
1866 The Bessemer and Kelly interests settled conflicting claims over their steel converter. Larger quantities of steel at lower cost resulted. (1)
Natural cement production continued along Lehigh River (started 1826). (2)
Lehigh Zinc Co. operating in South Bethlehem. Ore from Friedensville zinc mines, three miles south; worked 1853-75 without interruption. (3)
C. M. Wetherill, Prof. Chemistry, at opening of Lehigh Univ., Bethlehem. (4)
Kutztown State Teachers College (Normal School); Triel College, Greenville; Lebanon Valley College, Annville - chartered. (5)
Benj. C. Tilghman, Phila. - Sulphate process to convert wood pulp into paper; Patent 70,465. (6)
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1867 J. A. Emmons and A. S. Saxon, Crawford County. - Acetate of lime and methanol. (9)
Steel rails rolled at Johnstown; formerly wrought iron. (10)
First consignment of pig iron sold on a laboratory basis, Steelton. (11)
First practical production of Bessemer steel in America, Steelton. (12)
M. C. Lea, Phila. - "A Theory of Photo-Chemistry." (13)
M. C. Lea, Phila. - "Experiment on the Influence of Various Organic and Inorganic Bodies upon Germination and Vegetation." (14)
J. S. Doughlin, Phila. - "On Fluorescence." (15)
C. M. Wetherill, Lehigh Univ., Bethlehem. - "Experiments on Itacolumite (Articolite)." (16)
M. C. Lea, Phila. - "On a New Test for Hyposulphites." (17)
Geo. F. Barker, "Formic Acid versus Carbonous Acid." (20)
J. M. Naish, Phila. - "Pyrophosphate of soda and iron." (21)
J. M. Naish, "Solution of Citrate of Magnesia." (22)
J. M. Naish, "Solution of Acetate of Iron." (23)
J. M. Naish, "On Colchicia." (24)
Cedar Crest College, Allentown; Clarion State Teachers College (Normal School) - chartered. (25)
Chemical manufactures in Philadelphia total $7,370,000 for 1867 from firms including: John T. Lewis & Bros.; Powers & Weightman; Rosengarten; Harrison; Tacony Chemical Works (est. by Chas. Lennig, 1831); Frankford Chemical Works; Wetherill. (26)
J. M. Naish, Phila. - "Decomposition of Pure Chloroform." (27)
J. M. Naish, Phila. - "Source of HCL in Gastric Juice." (28)
J. M. Naish, "Constituent of Butter." (29)
First law relating to coal mines in Pennsylvania passed; applied to draining of mines in Westmoreland County. (29)
Merger: Bethlehem Iron Co. with Northampton Iron Co. (30)
Sawson Iron Co. built one iron furnace at Hellertown. A second furnace put in blast in 1870. Sold to Thomas Iron Co. in 1884. Thomas Co., at Hokendauqua, along Lehigh River since 1855, operated four furnaces over 70 years. (31)
First law in anthracite coal region - pertaining to ventilation, safety lamps and mine inspectors. (33)
Heinz Co. has origin in Pittsburgh. (34)
Wilson College, Chambersburg; Penna. College for Women (now Chatham), Pittsburgh; Ursinus College, Collegeville - chartered (1869). (35)
New blast furnace at Readington, along Lehigh River, by Colkermans Iron Co. - organized by W. T. Carter Co., Phila. This company owned iron mines in Northampton County, 3 in Lehigh and 3 in Berks County. (36)
J. H. Corbin, Lehigh U., Bethlehem. - "Certain Compounds of Chromium with Iron." (38)
1869  C. A. Wolle, Lehigh U., Bethlehem. - "Exam. of a supposed Hercynite, (a magnesia-iron spinel)."

W. R. Chandler, Bethlehem. - "The Ecomonical Purification of Zinc." (39)

Jos. Wharton, Phila. - "Observations upon Autumnal Foliage." (41)

1870  Between 1860-1870, Oil City, on the Allegheny River, became the oil exchange center. Some 17 million bbls. of oil were shipped from Oil City to Pittsburgh. Aggregate clearings in 1865 were nearly $6 billion dollars.

Lock Haven State Teachers College (Normal School) started. (3)

Jos. Wharton, Phila. - "On Two Peculiar Products in the Nickel Manufacture." (43)

J. M. Silliman, Lafayette College, Easton. - "Examination of Bessemer Flame, with Colored Glasses, and Spectroscopic Examination." (44)


J. E. Britton, Phila. - "Mounted Burettes for Volumetric Analysis." (46)

J. M. Wolfish, Editor of Amer. J. Pharmacy, Phila. - "Solubility of Glue in Glycerin." (47)

F. A. Genth, U. of Penna., Phila. - "North Carolina's Mineral Resources." (49)

Sam. P. Sadtler, U. of Penna., Phila. - "On Potassic-cobaltic Nitrites, with analogous and related compounds." (49)

Andrew S. McCreath regularly employed chemist at Steelton plant of Pennsylvania Steel Co. McCreath founded an analytical laboratory in Harrisburg for appraisal of minerals, alloys and metals. (Expanded and has international interests.) (50)

Anthracite coal production (1870) = 15,662,437 tons. (51)

Patents listed in The American Chemist as "chemical":

1870 101,600 A. A. Player and H. McAllister, Phila. - Utilizing Slag from Iron and Glass Furnaces. (52)


104,937 Thos. Cummings, Lancaster. - Composition for Photographic Uses. (54)

Re-issues: 4,052; 4,053 D. A. For Horon, Phila. - Manufacture of Fertilizers. (54)

106,347 W. Ennis, Phila. - Manufacture of Iron and Steel. (55)

106,988 W. Adamson, Phila. - Manufacture of Glaue. (55)

106,918 B. R. Crispe, Phila. - Fertilizer. (56)

107,122 J. E. Atwood, Pittsburgh. - Refining and Steel. (57)


108,424 J. E. Atwood, Pittsburgh. - Crucible for Melting Iron and Steel. (58)


108,615 C. Mellvain, Phila. - Copying Ink for Printing. (58)


109,737 L. P. Ashmead, "Analysis of Zinc Ore from Sinking Valley, Blair County, Pa." (Done at Lehigh Univ. under direction of Prof. C. M. Wetherill.) (59)

1871  New colleges: West Chester and Shippensburg State Teachers (Normal Schools), Chestnut Hill College, Phila. (5)

Jos. Wharton, Phila. - "Monorenda Concerning the Introduction of the Manufacture of Spelter into the United States." (Relates to Bethlehem, Pa.) (60)

Sam. P. Sadtler, U. of Penna. - "On Some Tritium-Salts." - Abstract of his Inaugural Dissertation at Gottingen, April 1871. (61)


Steel Castings made from Crucible Steel, Pittsburgh. (63)

First open hearth steel production in Pennsylvania, Pittsburgh. (64)

David C. Saylor, Allentown. - Manufactures first Portland cement in U.S. News under "Brevities" in July 1871 The American Chemist: "W. H. Chandler, our editorial colleague, who is now in Europe, has been elected to the chair of chemistry in the Lehigh University of Bethlehem, recently made vacant by the death of Prof. C. M. Wetherill." (64)

Dr. Wetherill had a fatal heart attack, Sunday, March 5, 1871. (64)

(See also "Charles Mayer Wetherill" in Amer. Chem. 1, 468 (June 1871)
1871 The American Chemist, July 1870-April 1877, A Monthly Journal of Theoretical, Analytical, and Technical Chemistry, edited by Charles F. Chandler and W. H. Chandler, New York, William Baldwin & Co., Publishers. At its inception the Chandler brothers were both on the chemistry staff of Columbia College, School of Mines, East 49th St., New York. It is included in this Chronology because the younger brother, William, came to Lehigh University in Bethlehem, Pa., in 1871. Pennsylvania also has claim to its production through the work of some of its abstractors: Frederick Prime, Lafayette College, Easton; G. F. Barker, U. of Penna., Phila.; and J. E. Kibball, Waldron Shapleigh, E. H. S. Bailey, E. H. Williams of Lehigh University. For several years the journal was published in Philadelphia; vols. 3 and 4 by H. C. Lea and vol. 5 by Collins Printers. Vols. 6 and 7 were published in New York. Vol. 6 was done by John F. Troy & Son, July 1875 to June 1876. Vol. 7 bears no publisher's name (last issue April 1877).


E. J. Houston, Phila. - “On the Change of Color Produced in Certain Chemical Compounds by Heat.”

Patents in American Chemist:

109,420 J. Kayer Jr.; Setzler’s Store, Pa. - Preserving Eggs.
110,364 C. Houlker, Frankford. - Purifying Oils which have been used in Lubricating Machinery.
110,516 S. Van Syckel, Titusville. - Still for Petroleum and Other Oils.
110,703 R. D. Birch, Phila. - Manufacture of Copperas.
110,849 S. W. Kirk, Phila. - Separating Metals from Ores.
110,866 S. W. Kirk, Phila. - Separating Metals from Ores.
111,384 S. W. Kirk, Phila. - Separating Metals from Ores.
111,420 S. Van Syckel, Titusville. - Still for Petroleum and Other Oils.
111,516 S. Van Syckel, Titusville. - Still for Petroleum and Other Oils.
111,544 G. T. Lewis, Phila. - Manufacture of Carbonate of Lead.
111,546 G. T. Lewis, Phila. - Manufacture of Carbonate of Lead.
111,576 S. W. Kirk, Phila. - Separating Metals from Ores.
111,584 S. W. Kirk, Phila. - Separating Metals from Ores.
111,604 G. T. Lewis, Phila. - Desulfurizing and Volatilizing Lead and Silver Ores.
111,616 S. W. Kirk, Phila. - Separating Metals from Ores.
111,620 S. W. Kirk, Phila. - Separating Metals from Ores.
111,636 W. H. Hare, Phila. - Rectifying Spirits.
111,648 J. W. Campbell, Phila. - Preserving Cranberries.
111,654 W. J. M. Murray, Phila. - Printing Ink.
1871

118,440 R. Eastman, Media. - Composition of Soap. (79)


119,000 W. N. Adamson, Philadelphia, and R. A. Simonin, Phila. - Treating Flesh, Offal, etc. (79)

119,186 F. A. Simonin, Phila. - Treating Tarred Rope, Cordage and the like, for Manufacture of Paper Stock. (79)


119,188 C. A. Simonin, Phila. - Process and Apparatus for Extracting Fatty Substances. (79)

119,238 W. Morris, Phila. - Apparatus and Process for Tanning. (79)

119,242 A. I. Pleasanton, Phila. - Accelerating the Growth of Plants and Animals. (79)

119,663 T. C. Sprunger, Fayette City. - Gas Machine. (80)

119,761 J. P. Heyes, Phila. - Gas Heater. (80)

119,883 E. A. L. Roberts, Titusville. - Preventing the Clogging of Oil Wells. (80)

119,955 J. C. Weldon, Pittsburgh. - Hot Air Furnace. (80)

120,005 J. Y. Smith, Pittsburgh. - Metallurgic Pomace. (80)

120,006 J. Y. Smith, Pittsburgh. - Lining for Metallurgic Furnace. (80)

120,074 Jos. Keiner, York. - Medical Compound for Cure of Rheumatism. (80)

120,099 W. Quinn, Phila. - Flux for Recking Ores and Refining Metals. (80)

120,136 F. A. Wenderoth, Phila. - Photography. (80)

120,185 W. Quinn, Phila. - Furnace for Roasting and Smelting Ores. (81)

120,349 H. W. C. Toddle, Pittsburgh. - Refining Hydrocarbon Oils. (81)


120,556 C. L. Wheeler, Pittsburgh. - Process of Making White Lead. (81)

120,579 W. A. Piaber, Allegheny City. - Composition for Making Crucibles, Glass Melting Pots, etc. (81)

120,776 E. A. L. Roberts, Titusville. - Explosive Compounds. (81)

121,118 J. A. Richardson, Philadelphia. - Cement, and Appliances for Preparing and Using the Same. (82)

121,130 J. A. Rothe, Phila. - Manufacture of Paper-Pulp from Straw, etc. (82)

121,226 Chas. Adams, Phila. - Process for the Manufacture of Iron. (82)

121,679 T. G. Springer, Fayette City. - Manufacture of Illuminating Gas. (82)

121,728 Alfred Monnier, Phila. - Separating Metals from a Mixture of Metallic and Alkaline Sulphates. (82)

121,799 Alfred Monnier, Phila. - Treating Metallic and Alkaline Sulphates to Separate Copper, etc. (82)

121,902 E. A. L. Roberts, Titusville. - Manufacture of Nitroglycerine. (82)

121,950 D. J. Carbull, Titusville. - Liquid Soap. (82)

122,058 Chas. Lenard, Phila. - Removing Tin from Tin Dorap. (82)

122,059 E. A. L. Roberts, Titusville. - Plant for Manufacture of Bessemer Steel. (82)

122,059 J. B. Wilson, Phila. - Fluid for Extracting Grease. (82)

1872

A student chemical society was organized in 1871, shortly after Prof. Wm. H. Chandler arrived at Lehigh University, Bethlehem, Pa. (83)

1872

Jiggering (agitation of raw coal with water to separate impurities) was introduced in anthracite collieries. (84)

Frederick Prime, Jr., Prof. of Mineralogy and Metallurgy, Lafayette College, Easton, reports data (ore types, locations and analyses) of many mines in eastern Pennsylvania. Analyses were credited to James Sayley, Crane Iron Co., F. A. Genth, U. of Penna., David McCrea and A. S. McCrea. (85)

C. A. Erbley, Midvale Steel Works, near Phila. - Notes on a Furnace Furnace. (86)

C. A. Brinley, Midvale Steel Works, near Phila. - Notes on a Furnace Furnace. (86)

Largest pumping engine in the world, "The President," installed in zinc ore mines of Saucon Valley, near Bethlehem, Jan. 29, 1872. Ran continuously to Oct. 28, 1876. See (2) p. 86. (87)

John Attfield, "Chemistry - General, Medical and Pharmaceutical, including the Chemistry of the U. S. Pharmacopeia," 552p.; Henry C. Lea, publ. 1871, Phila. (Review of a British text, publ. in U.S.) (87)
Priestley Memorial in Birmingham, England; statue and prize suggested. (88)

Note on "great suit of Wetherill vs. the New Jersey Zinc Co." (89)

Report on number of grain and molasses distilleries in Penna. "in 1872, total 46; exceeded by Kentucky (94); Ohio (57); Illinois (47)." (90)

Pittsburgh oil refineries were using about 10,000 barrels of crude oil daily from the Oil Creek and Allegheny River fields. (91)

Allegheny County had 32 glass works from which came products worth $5,282,962. (92)

Pittsburgh was credited with 68 glass factories which produced one-half of the nation's total; 50 petroleum refineries with capacity of 30,000 barrels per day; 11 blast furnaces producing 144,000 tons of pig iron annually; 7 large steel works from which came 30,000 tons of steel in 1870 and cast steel valued at $3,485,413. (92)

In Allegheny County 33 rolling mills produced rolled iron worth $30,103,564 in 1870. (92)

The Isabella blast furnace, of Spang, Chalfont Co., Pittsburgh, was put in operation in 1872. It produced 50 tons of pig iron per day. The Lucy furnace, a rival, named for the wife of Thomas M. Carnegie, set a record of 500 tons a week. (93)

The Towne Scientific School, U. of Penna., inaugurated. (94)

Article: J. M. Maisch, Phila., "Monobromated Camphor." (94a)

First chemist (?) employed before 1872 by Carnegie at Lucy Furnace, Pittsburgh. (94b)

Patents (listed as "Chemical" in The American Chemist):

122,447 F. W. Sprigg, Schuylkill Haven. - Artificial Fuel. (95)
122,651 Abram Reese, Pittsburgh. - Furnace for Manufacture of Iron. (95)
122,731 David Morgan. - Puddling Furnace. (96)
122,912 Wm. Rogers, Apollo, Pa. - Manufacture of Sheet Iron. (96)
123,099 H. W. Fawcett, Timesville, and T. McGowan, Meredith. - Preserving Wood. (96)
123,109 Isaac Kendrick, Phila. - Apparatus for Burning Hydrocarbons. (96)
123,454 J. H. Seibert, Phila. - Package for Gaustic Alkalies, Acids and Salts. (96)
123,960 V. S. Blochall, Conshohocken. - Machinery for Puddling Iron, etc. (96)
123,974 E. Bradford, Reading. - Apparatus for Separating Slate from Coal. (97)
124,059 J. R. Hayes, Phila. - Composition Pavement. (97)
124,190 H. W. Fawcett, Pittsburgh. - Composition-Metal Brake- Shoe for Railroad Cars. (97)
124,224 Wm. Sellers, Phila. - Apparatus for Puddling Iron. (97)
124,254 B. R. Crosdale, Phila. - Bag for Phosphate, etc. (98)
124,509 Thomas Price, Pittsburgh. - Composition Pavement. (98)
124,688 and 124,689 George Landers, Irwin. - Mode of Coking Fossil Coal. (98)
124,700 Wm. Sellers, Phila. - Manufacture of Cast Steel and Refined Metals. (98)
124,859 J. H. Seibert, Phila. - Package for Alkalies, Acids, etc. (98)
124,863 G. D. Nykoff, Oil City. - Apparatus for Amalgamating Ores and Precious Metals. (98)
125,017 Sam. Brown, N. Y. Oxford. - Preparing Fertilizing Materials from Earth, etc. (98)
125,017 Re-issue: 4,917 A. B. Tipler, Phila. - Preserving Wood for Railroad Ties. (98)
125,136 Richard Long, Pittsburgh. - Hot Blast Oven. (99)
125,144 J. H. Reid, Pittsburgh. - Manufacture of Bricks, Tiles, etc. (99)
125,212 G. W. Motier, York. - Manufacture of Iron from Mill Cinders. (99)
125,247 Wm. Adamson and F. A. Simonson, Phila. - Treating Vegetables for Food. (99)
125,248 " " " " " " " " " " Extracting Sugar from Sweet Potatoes and Other Vegetable Substances. (99)
125,874 Fred Zeis, Phila. - Parker Match. (100)
125,937 Jos. Lee, Phila., and Joseph Bernhard, Conshohocken. - Apparatus for Bleaching, Dying and Finishing Textile Fabrics. (101)
126,006 Wm. Adamson, Phila. - Process for Obtaining Vegetable Fibers. (101)
126,592 A. B. Tripler, Phila. - Process for Preserving Wooden Pavements from Rot. (101)
126,663 and 126,664 T. T. Woodruff, Phila. - Process and Apparatus for the Manufacture of Indigo. (102)
126,665 T. T. Woodruff, Phila. - Manufacture of Indigo. (102)
126,708 J. J. Johnston, Columbus, Ohio. - Manufacture of Steel, (102) and affiliate of S. D. Hubbard and Co., Pittsburgh, Pa.
126,709 J. J. Johnston, - Manufacture of Iron, Assignor to S. D. Hubbard Co. (102)
126,710 J. J. Johnston. - Puddling Iron, Assignor to S. D. Hubbard Co. (102)
126,712 T. S. Blair, Pittsburgh. - Process and Apparatus for Reducing the Ores of Iron. (102)
126,713 W. T. Kolski, Phila. - Purifying Gas. (102)
126,922 T. S. Blair, Pittsburgh. - Process and Apparatus for Reducing the Ores of Iron. (102)
126,923 T. S. Blair, Pittsburgh. - Manufacture of Wrought Iron and Steel from Iron Sponge. (102)
126,924 T. S. Blair. - Iron Sponge. (102)
126,989 David O. Saylor, Allentown. - Manufacture of Hydraulic Cements. (102)
127,039 J. B. Fish, Providence, Pa. - Carburetor. (102)
127,250 W. H. Leibach, Phila. - Ammonical Gas Engine. (102)
Note: Dr. P. A. Genth elected Prof. of Chemistry and Mineralogy at U. of Penn. (103)
127,580 W. O. Davis, Pittsburgh. - Apparatus for Coating Sheet Iron and Tin. (104)
127,635 S. M. Nes, York. - Manufacture of Steel. (104)
127,723 S. J. Whitting, Phila. - Apparatus for Vaporizing and Burning Hydrocarbons. (104)
127,807 W. F. Stenz, Phila. - Preparing Crude Camphor for Preserving Furs, etc. (104)
127,858 J. H. Ford, East Brandywine Township. - Slitting Paper. (104)
127,923 W. M. Brewer, Beadock's Field. - Artificial Stone. (104)
127,953 J. F. Bennett, Pittsburgh. - Process for Purifying Iron, Steel and Other Metals. (104)
128,042 E. F. Houghton, Phila. - Converting Iron into Steel. (104)
(Uses bone carbon with hydrocarbon oils.)
128,186 J. J. Seibert, Phila. - Package for Setting Up Caustic Alkalies. (104)
(Stuck from plastic materials at one operation and coated with a resins or other protective coating.)
128,189 G. L. Boring, Pittsburgh, and F. A. Cearing, Houston, Texas. - Apparatus for the Manufacture of Gas from Oils. (104)
128,342 Geo. W. Waite, Phila. - Preparing Wheat and Other Cereals for Food. (104)
128,587 W. S. Burgess, Norristown. - Blowing-Pipe Mechanism. (105)
128,635 A. C. Rand, Aurora, Ill. assignor of his right to John S. Adams, Titusville, Pa. - Burning Petroleum. (105)
128,712 E. A. Pratt, Charleston, S. C., and Geo. T. Lewis, Phila. - Treating Phosphate Rock, etc. (105)
129,283 E. H. Bruner, Phila. - Preparing Yarn for the Manufacture of Shovels. (104)
(Stapling, printing, or rolling white lead or other pigments upon the yarn.)
129,243 J. W. Middlelon, Phila. - Process and Apparatus for the Manufacture of Iron and Steel. (104)
129,251 Geo. Whitney, Phila. - Metal for Castings. (Wrought iron and pig iron, or of wrought iron, pig iron and steel.)
129,463 S. H. Crocker, Pittsburgh. - Purification of Paraffine. (105)
129,695 S. E. Benedict, Susquehanna Depot. - Calcium. (107)
129,681 Joshua Posey, Phila. - Hydrogen Lamp. (107)
Re-issue: 5,016 B. H. Lightfoot, Phila. - Treating Tanned Leather. (107)
129,635 M. H. Pollock, Phila. - Preparing Wheat for Food. (107)
130,245 T. H. Lewis, Norristown. - Treatment of Asbestos for the Production of Textile Fibers. (108)
130,380 J. S. Clem, Norristown. - Apparatus for Refined Iron and Making Steel. (108)
1874 165,493 C. L. Vasques and Sam. Crouther, Phila. - Carbureter. (122)
166,789 John Vickers and Henry Holmes, Phila. - Bating Process for Hides and Skins. (122)
167,455 F. L. Vanier, Lebanon, Pa. - Apparatus for Utilizing Waste Gases in Metallurgical Furnaces. (123)
167,664 E. S. Louison, Mauch Chunk. - Manufacture of Artificial Fuel from Coal Waste. (123)
168,290 Wm. Sellers, Phila. - Burning Gaseous Fuel in Metallurgical and Other Furnaces. (124)
168,795 Enoch Ward, Pittsburgh. - Coating Iron and Steel. (124)
168,997 Hugh Burgess, Hoyers Ford. - Compound for Purifying Water Preventing Corrosion. (125)
169,701 W. Adamson and C. F. A. Simchen, Phila. - Extracting Oil from Cotton and Other Seeds. (125)
1875 169,979 G. Bolton Jr., Allegheny. - Manufacture of Artificial Steel. (125)
150,042 W. W. Hubbell, Phila. - Forcing Pulverised borax and nitrate of potash into the melted iron. (125)
150,303 E. F. Dieteriche, Phila. - Water Repellent Dabbing for Leather. (125)
150,405 E. F. Dieteriche, Phila. - Process of Double Tinning. (125)
150,737 S. E. Daddow, St. Clair. - Artificial Fuel. (125)
150,910 J. C. Burdick, Phila. - Method of Preventing Alterations of Checks, etc. (125)
150,976 W. W. and R. H. Hubbard, Chester. - Purifying Iron. (125)
151,011 J. Reene, Pittsburgh. - Treating Refined Petroleum Wells. (125)
151,255 E. Metzger, Pittsburgh. - Making Parchment Paper. (125)
151,971 W. W. and R. H. Hubbell, Chester. - Purifying Iron. (125)
152,076 J. E. Atwood, Pittsburgh. - Process of Decarbonizing and Annealing Iron and Steel. (125)
152,575 J. A. Avil and Wm. Pugh, Phila. - Composition for Sizing and Waterproofing Paper. (125)
152,758 C. H. Johnston, New Brighton, Pa. - Apparatus for Applying Ozone for Purifying Oils, etc. (125)
152,757 J. M. Reid, Allegheny City. - Preserving Wood. (125)
152,772 S. Van-Sykel, Titusville. - Apparatus for Distilling Hydrocarbon Oils. (125)
153,136 T. E. Blair, Pittsburgh. - Manufacture of Steel by the Open Hearth Process. (130)
153,599 S. J. Whiting and J. X. Byler. - Fuel from Coal-Dust. (130)
155,990 W. E. Smith, Phila. - Methods for Preparing Flag for Use in the Manufacture of Artificial Stone. (130)
156,009 J. E. Atwood, Pittsburgh. - Chemical Compounds for Policing Metals. (130)
157,749 W. W. Goodwin, Phila. - Apparatus for Determining Specific Gravity of Gases. (130)
157,973 G. C. J. Schneider, Brie. - Safety-match Compositions. (130)
1875 158,148 H. C. Detmier, Allegheny. - Borne Liquids. (130)
158,320 J. E. Bennett, Pittsburgh. - Manufacture of Iron. (130)
161,672 Henry Dobbs, Franklin. - Compounds for Decolorizing Petroleum. (130)
162,212 Jos. Anderson, Alleghany. - Soda Water Generator. (130)
162,651 Jos. D. Patton, Trevorton. - Gas Puffer. (130)
162,850 W. E. Phillips, Phila. - Permanent Flour of Camphor. (130)
165,189 H. W. C. Toodie, Pittsburgh. - Manufacture of Gas. (130)
Re-Issue: 6,562 A. E. Carpenter, Phila. - Converting Iron into Steel. (130)
165,286 David Miles, Kingston. - Fluxes for Welding. (130)
165,378 Sarah Slater, Phila. - Compounds for Welding, Hardening and Tempering Steel. (130)
<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Inventor(s)</th>
<th>Location</th>
<th>Description</th>
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<tbody>
<tr>
<td>1875</td>
<td>John Miller</td>
<td>Phila.</td>
<td>Leather Dressing.</td>
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<tr>
<td>1875</td>
<td>R. H. Smith and J. Goldthorpe</td>
<td>Pittsburgh</td>
<td>Apparatus for the Manufacture of Illuminating Gas.</td>
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<tr>
<td>1875</td>
<td>J. M. Clark</td>
<td>Lancaster</td>
<td>Portable Carburetted Hydrogen Gas Machines.</td>
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<tr>
<td>1875</td>
<td>Albert Rieder</td>
<td>Alleghany</td>
<td>Compounds for Lining Oil Barrels.</td>
</tr>
<tr>
<td>1875</td>
<td>T. S. C. Lowe</td>
<td>Horristown</td>
<td>Process and Apparatus for the Manufacture of Illuminating or Heating Gas.</td>
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<tr>
<td>1873</td>
<td>Bessemer steel made, in Bethlehem, and used for rolling steel rails. This was the tenth Bessemer plant in the U.S. It was installed under direction of John Fritz, Supt., with Alexander Holley as consulting engineer.</td>
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<td>1874</td>
<td>Wampum Cement and Lime Co. founded at Wampum, and York, Pa. (Later the Medusa Portland Cement Co.)</td>
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<tr>
<td>1874</td>
<td>North Penna. Iron Co. at Bingen, near Bethlehem, reported 10,777 tons production - their largest output, Limestone ore was mined. Cooper and Hewitt built the last of the Durham furnaces, below Easton, along the Delaware River. In this area iron was made intermittently for 181 years from 1727 to 1908.</td>
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<tr>
<td>1874</td>
<td>Water gas introduced by Thaddeus Lowe, Phoenixville.</td>
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</tr>
</tbody>
</table>
1874 Articles: J. M. Maisch, Phila., "Balsam of Liquidambarr Styraeiflua and Orientale." (157)
Note in Amer. Chem: "The Lehigh Univ. Chemical and Nat. History Soc. has dispatched Rott. C. Bechdolt, Curator, to W. Indies and Brazil for 5 months." (159)
M. Carey Lea, Phila., "On a Combination of Silver Chloride with Mercuric Iodide." (160)
M. C. Lea, Phila., "On the Influence of Color Upon Reduction by Light." "Solubility of Certain Silver Salts in Solutions containing Sodic Citrate, etc." (162)
C. F. Himes, Dickinson College, Carlisle, "Preparing Photographic Dry-Plates by Daylight, by de-sensitizing and re-sensitizing the Silver Compounds." (163)
P. W. Hewy, M.D., F.R.S., "A Treatise on Food and Dietetics," Phila., 1874. (165)
Prof. H. Will, "Tables for Qualitative Chemical Analysis," 2nd Amer. ed. from 9th German ed. by C. F. Himes, Phila., 1874. (166)
Notice: Samuel P. Sadtler, Ph.D., elected Prof. of General Chemistry in the University of Pennsylvania. (153a)
Peak year (1874) in Penna. oil production: 10,910,303 barrels. This was reported for the 1859-1874 period, during which period the total value, at the wells was $245,904,880. This came from 10,490 wells, only 3250 of which were pumping at start of 1875. (170)
Further letters from H. C. Bolton, School of Mines, Columbia College, New York City, and Prof. Rachel L. Bodley, Woman's Medical College, Phila., Pa. (who suggested Northumberland, Pa., the location of Priestley's grave and home, as the place for Centennial Meeting); a circular to the Chemists of America, inviting them to come to Northumberland on July 31, 1874; this was signed by 37 chemists, five from Pennsylvania. (173)
Report of Centennial of Chemistry convocation at Priestley's home in Northumberland, Pa. A local committee of 34 men included two bearing the Priestley name. Joseph Priestley, M.D., was Chairman. The list of 77 chemists who attended the celebration included 16 from Pennsylvania.
Efforts to form a national chemical society which should date its origin from this Centennial Celebration. Proponents: Persifor Frazer, U. of Penna., and Wm. H. Chandler, Lehigh University. Opponents, who favored greater cooperation with the American Scientific Association or A.A.A.S.: F. W. Clarke, E. N. Horsford, E. T. Cox, E. Silliman and P. H. Vander-Weyde. The official action was to "establish a chemical section on a firmer basis with the American Association for the Advancement of Science." (175)
Prof. Henry H. Croft, Univ. College, Toronto, Canada, read a paper on "A Sketch of the Life and Labors of Joseph Priestley." (176)
E. N. Horsford, Cambridge, Mass., read portions of seventeen letters written by Priestley. Henry Coppee, LL.D., Pres. Lehigh Univ., delivered the address at the grave of Joseph Priestley; stressing his contributions in fields other than chemistry - religion, politics, education, etc. (177)
J. Lawrence Smith, Louisville, Ky., read "The Century's Progress in Industrial Chemistry." (179)
Benj. Silliman, Yale College, presented "American Contributions to Chemistry". This is an extensive list of major contributions to science: biographies; bibliographies of American chemists; over 30 names from Pennsylvania.


Rev. Hart, Lafayette College, Easton, "New Experiment for Showing the Gas in the Interior of a Flame."


Natural gas first used in manufacturing, Pittsburgh.

Bessemer process used to make steel for rails. First rails rolled at Edgar Thompson Steel Works, under supervision of Capt. Wm. R. Jones, Pittsburgh.

Indiana State Teachers College, Indiana, Pa., chartered.


T. M. Morgan, "Paraffins existing in Pennsylvania petroleum."

How Chemistry laboratory for women students opened at Woman's Medical College of Penna. (Phila.). Sixteen ladies pursue a course in analytical chemistry under Prof. Rachel Bodley.

The Priestley Memorial Album: Description of a red leather bound book of pictures, autographs and carte de visite from the "Centennial of Chemistry in Northumberland, 1874; forwarded to Dr. Joseph Priestley (April 1875) to commemorate the 100th anniversary of the discovery of oxygen by his illustrious ancestor.


"On the Influence of Color upon Reduction of Light."

"Explosive Properties of Methyl Nitrate."

T. M. Morgan (under direction of C. Schorlemmer), "On Paraffins of Penna. Petroleum."

Bergen Point Zinc Co. of Bergen Point, N. J., begin mining zinc ores; at Friedensville. In 1875 they produced 500 tons of spelter and 1000 tons of zinc oxide from ores of the Correll mine. Nearby the Lehigh Zinc Co. produced 1205 tons of spelter.

David Alter, M.D., Freeport, Pa., "Early Indications of Spectroscopy in America." Reprint of papers of 1854, 1855 in Amer. J. Soc. xviii, 55 and xix, 2134.) The paper title is given with a foreword by Henry Wurtz, who states that Alter's papers were "three or four years before the discoveries of Bunsen and Kirchoff."

J. E. Loughlin, Phila., "Preparation of Urea."

"Preparation and Testing of Potassium Cyanide."

Reports: Chas. M. Cres'son, M.D., "Results of Examination of Water from the River Schuylkill." 16pp. Phila., 1875 (no details).

Some analyses by Dr. Cres'son for 1872 on p. 1795; vol. 111; Schaefer & Westcott's History of Philadelphia, 1884.


American Chemical Society founded, April 6, 1876, New York, N. Y. Thirty-five chemists from New York and vicinity met in rooms of the N. Y. College of Pharmacy in response to invitations announcing proposals for organizing a society. Chairman of the meeting was Prof. Charles P. Chandler. Constitution and by-laws approved.
1876

Organization meeting of ACS, April 20. Twenty-seven resident members attended. Seventy-four non-residents had requested membership.

Officers elected: President, John W. Draper; Vice Presidents, J. Lawrence Smith, Frederick A. Genth, E. Hilgard, J. W. Mallet, Charles F. Chandler, Henry Morton; Corr. Secy., George F. Baker; Recording Secy., Isidor Walz; Treas., W. M. Habirshav.

Seven regular meetings were held in 1876, with average attendance about 30 or less. V. Pres. Chandler served as Chairman. Technical papers were delivered at all these sessions. A special (reunion) dinner was held in Phila., June 15, to honor foreign chemists attending the 1876 Centennial Exhibition.


Centennial Exposition of 1876, Philadelphia. Included first extensive exhibit of American chemical industries. This was a national and international exhibition; located in Phila. because in that city 100 years before these States were declared "free and independent," and because Phila. is "the industrial capital of America." Philadelphia's exhibits numbered 2,368; of which the distribution was: mining and metallurgy, 67; manufactures, 710; education and science, 205; art, 210; machinery 400; agriculture, 677; horticulture, 71. Alex. Graham Bell's new telephone exhibited.

Dr. A. E. Foote, Bryn Athyn, Pa., exhibits minerals; wins first prize.

Concentrated alum made, Penna. Salt Mfg. Co.

Natural gas pipe line, Titusville.

New colleges: Grove City College, Venango County Pine Grove Academy started; Juniata College, Huntingdon, opened.

Chemistry papers from Pennsylvanians at the AAAS Meetings in Buffalo, N. Y., Aug. 23, 1876:

W. H. Chandler and Frank Johnston, "Disposition of Phosphorus in the Blast Furnace."

W. H. Chandler and E. H. S. Bailey, "Determination of Nitric Acid."


S. P. Sadtler, U. of Penna., "On the Chemical Composition of Pennsylvania Petroleum."

These foregoing were part of a total of 20 papers. Chairman of the Chemistry Section was Dr. Geo. F. Barker, of U. of Penna., who delivered an address of 6,000-8,000 words in which he reviewed and explained "the conception which the science of today holds concerning the molecule and the atom."
REFERENCES

CHRONOLOGY OF CHEMISTRY IN PENNSYLVANIA - PART II


3. Ibid., p.73, 74.


10. Ibid. I, p.22.


13. " " " " " " Bill Journ. [2], xlv, 91.

14. " " " " " " [2], xiii, 197.

15. " " " " " " [2], xiii, 339.

16. " " " " " " [2], xiv, 68.


18. Printed for the Lehigh University students, Allentown, Pa., 1867.


20. Ibid., 19, September 1867.


22. Ibid., 21, p.1, 1867.

23. " " " " " " [2], p.97.

24. " " " " " " [2], p.97.

25. " " " " " " [2], p.97.


26a. The American Chemist, vol. 5, Dec. 1875, 193. (Also titles, dates of 47 papers by W. C. Lea.)


31. " " " " " " [2], p.32.


33. Ibid. 19, 1943.


35. Ibid. 5.

36. " " " " " " [2], p.32.


38. " " " " " " [2], xlviii, 49-55.

39. " " " " " " [2], xlviii, 49-55.


42. Ibid. 19, p.375.


44. Ibid., c, p.297-307.

45. J. Franklin Inst., March 1870.

46. Ibid., May 1870.

47. Amer. J. Pharm., 1870, p.513.


52. Ibid., vol. 1, p. 29.

53. " " " " p. 79.

54. " " " " p. 80.

55. " " " " p. 158.

56. " " " " p. 159.

57. " " " " p. 167.

58. " " " " p. 237.

59. " " " " (Describes 96pp. report in Amer. J. Pharm., Jan. 1879)


61. Ibid., Nov. 1871. (Also Amer. Chemist V, 297, Dec. 1874)

62. B. L. Miller, ibid. 2, p. 92-94. (Bibliography on Zinc, Allentown Quadrangle)


64. The American Chemist II, 11, July 1871.

64a. " " " " 1, 1 and 239.


68. Ibid.

69. " " 256 (Mar. 1871).

70. " " 257 (Mar. 1871).

71. " " 257 (Apr. 1871).

72. " " 435 (May 1871).

73. " " 436 (May 1871).

74. " " 477 (June 1871).

75. " " vol. 2, 39 (July 1871).

76. " " 76 (Aug. 1871).

77. " " 117 (Sep. 1871).

78. " " 118 (Sep. 1871).


80. " " 158 (Nov. 1871).

81. " " 238 (Dec. 1871).

82. " " 278 (Jan. 1872).


84. Ibid., 29, p. 22.

85. " " 2, p. 52.


87. " " 3, 2, 358 (April 1872).

88. " " 3, 359 (April 1872).

89. " " 3, 390 (Feb. 1872).

90. " " 3, 390 (Feb. 1872).

91. Ibid., 34, p. 466.

92. J. Cutler Andrews, Chap. 4 - "Pittsburgh" - Ibid. 34, pp. 146, 150-164.

93. S. K. Stevens, Chap. 5 - "Pittsburgh" - Ibid. 34, pp. 198, 199.

94. Ibid. 26, p. 1940 - "History of Philadelphia."

95. Amer. J. Pharm. 1872, p. 357.


98. " " 2, 358 (Mar. 1872).


100. " " 2, 439 (May 1872).

101. " " 2, 474 (June 1872).

102. " " 3, 39 (July 1872).

103. " " 3, 40 (July 1872).


106. " " 3, 117 (Sep. 1872).

107. " " 3, 158 (Sep. 1872).


110. " " 3, 157 (Nov. 1872).

111. " " 3, 239 (Dec. 1872).

112. " " 3, 239 (Dec. 1872).

144. " " " 3, 317 (Feb. 1873).
145. " " " 3, 436 (May 1873).
146. " " " 3, 39 (July 1873).
148. " " " 4, 139 (Oct. 1873).
149. " " " 4, 232 (Dec. 1873).
150. " " " 4, 279 (Jan. 1874).
151. " " " 4, 319 (Feb. 1874).
152. " " " 4, 398 (Apr. 1874).
153. " " " 4, 439 (May 1874).
154. " " " 4, 479 (June 1874).
155. " " " 5, 33 (July 1874).
156. " " " 5, 152 (Oct. 1874).
158. " " " 5, 273 (Jan. 1875).
159. " " " 5, 279 (Jan. 1875).
160. " " " 5, 313 (Feb. 1875).
161. " " " 5, 355 (Mar. 1875).
162. " " " 5, 463 (June 1875).
163. " " " 5, 464 (June 1875).
164. " " " 5, 498 (July 1875).
165. " " " 6, 79 (Aug. 1875).
166. " " " 6, 199 (Nov. 1875).
167. " " " 6, 240 (Dec. 1875).
168. " " " 6, 278 (Jan. 1876).
169. " " " 6, 279 (Jan. 1876).
170. " " " 6, 320 (Feb. 1876).
171. " " " 6, 400 (Apr. 1876).
172. " " " 6, 440 (June 1876).
173. " " " 6, 490 (Aug. 1876).
175. " " " 7, 376, 463.
176. " " " 7, 163.
177. " " " 7, 184.
178. " " " 7, 200, 376, 463.
179. " " " 7, 120-184.
180. " " " 7, 163.
181. " " " 7, 184.
182. " " " 7, 200, 376, 463.
183. " " " 7, 163.
184. " " " 7, 184.
185. " " " 7, 200, 376, 463.
186. " " " 7, 120-184.
187. " " " 7, 163.
188. " " " 7, 184.
189. " " " 7, 200, 376, 463.
190. " " " 7, 163.
191. " " " 7, 184.
192. " " " 7, 200, 376, 463.
193. " " " 7, 163.
194. " " " 7, 184.
195. " " " 7, 200, 376, 463.
196. " " " 7, 163.
197. " " " 7, 184.
198. " " " 7, 200, 376, 463.
199. " " " 7, 163.
200. " " " 7, 184.
201. " " " 7, 200, 376, 463.

Ibid. 3, p. 468.

The American Chemist, vol. 6, 78 (Aug. 1875).


The American Chemist, vol. 5, 466 (June 1875).

Sill. Journ. 1875 (also, J. Chem. Soc. 11, xiii, 301 (Apr. 1875).

B. L. Miller, ibid. 2, p. 75.

The American Chemist, vol. 5, 410-412 (May 1875).


Ibid. 9, p. 63.

The American Chemist, vol. 6, 284 (Feb. 1875).


The American Chemist, vol. 7, 162 (Nov. 1876).

The American Chemist, vol. 7, 164 (Nov. 1876).