

ANECDOTES OF NAMED CHEMISTS

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(1) Chemistry contributions from non-chemists

Avogadro, Lorenzo Romano Amedeo Carlo (lawyer/jurisprudence)	1776 - 1856	Italian (b. Turin, Italy)	Avogadro number (1811)
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Black, Joseph (chemist/physician)	1728 - 1799	Scottish (b. Bordeaux, France)	discovered magnesium in 1755 Edinburgh, Scotland
Brown, Robert (botanist)	1773 - 1858	Scottish (b. Montrose, Scotland)	Brownian motion (1827)
Clapeyron, Benoît Paul Émile (civil engineer, railways, locomotives)	1799 - 1864	French (b. Paris, France)	Clapeyron equation of state (1834), Clausius-Clapeyron equation
Cronstedt, Axel Frederik, Baron (metallurgist)	1722 - 1765	Swedish (b. Södermanland, Sweden)	discoverer of nickel in 1751 Stockholm, Sweden
Dean, Ernest Woodward (chemist/oil company executive <i>Standard Oil Development Co.</i>)	1888 - 1959	American (b. Taunton, Massachusetts, USA)	Dean-Stark apparatus (<i>Ind. Eng. Chem.</i> 1920 , <u>12</u> , 486)
del Rio, Andrés Manuel (minerologist)	1764 - 1849	Spanish (b. Madrid, Spain)	discoverer of vanadium in 1801 Mexico City, Mexico
Fuller, Richard Buckminster (Bucky) (architect)	1895 - 1983	American (b. Milton, Massachusetts, USA)	buckminsterfullerene, fullerenes (1985)
Gahn, Johan Gottlieb (minerologist/ miner)	1745 - 1818	Swedish (b. Voxna, Gävleborg, Sweden)	discoverer of manganese in 1774 Stockholm, Sweden
Gregor, Rev. William (clergyman)	1761 - 1817	British (b. Trewarthenick, Cornwall, England)	co-discoverer of titanium in 1791 Creed, Cornwall, England
Hasselbalch, Karl Albert (physician)	1874 - 1962	Danish (b. ?)	Henderson-Hasselbalch equation (1908)

Lambert, Johann Heinrich (mathematician)	1728 - 1777	German (b. Mulhouse, Alsace, France)	Beer-Lambert-Bouguer law, Lambert law (1852)
Lavoisier, Antoine Laurent (law)	1743 - 1794 (executed)	French (b. Paris, France)	Lavoisier's law (1775)
Navier, Claude Louis Marie Henri (civil engineer, elastic behaviour of structural materials)	1785 - 1836	French (b. Dijon, France)	Navier-Stokes equations
Nieuwland, Julius Arthur (clergyman)	1878 - 1936	Belgian-American (b. Hansbeke, Belgium)	Nieuwland enyne synthesis (1934), invented neoprene
Raney, Murray (mechanical engineer)	1885 - 1966	American (b. Carrollton, Kentucky, USA)	Raney nickel (1927)
Reynolds, Osborne (engineer, centrifugal pumps)	1842 - 1912	British (b. Belfast, Northern Ireland)	Reynolds number (1883)
Rutherford, Daniel (physician/botanist)	1749 - 1819	Scottish (b. Edinburgh, Scotland)	discovered nitrogen in 1772 Edinburgh, Scotland

(2) Two people or one person?

Gay-Lussac, Joseph Louis	1778 - 1850	French (b. St. Léonard, Haute Vienne, France)	Gay-Lussac's law (1809), co-discoverer of boron
Lennard-Jones, Sir John Edward	1894 - 1954	British (b. Leigh, England)	Lennard-Jones potential (1924)

(3) Same surname, same person?

Dewar, Michael James Steuart	1918 - 1997	British-American (b. Ahmednagar, India)	Dewar semi-empirical methods
Dewar, Sir James	1842 - 1923	Scottish (b. Kincardine-on- Forth, Scotland)	Dewar flask (1895); Dewar benzene (1867)

Fischer, Emil Hermann Nobel Prize Chemistry 1902	1852 - 1919	German (b. Euskirchen, Rhenish Prussia, near Bonn, Germany)	Fischer projection (1891), Fischer esterification (1895), Fischer indole synthesis (1883), Kiliani-Fischer synthesis (1885/1889)
Fischer, Ernst Otto Nobel Prize Chemistry 1973	1918 -	German (b. Munich, Germany)	Fischer carbenes (1964)
Fischer, Joseph Karl Anton	1901 – 1958	German (b. Pasing, near Munich, Germany)	Karl Fischer reagent, Karl Fischer titration (1935)
Fischer, Franz Joseph Emil	1877 - 1947	German (b. Freiburg im Breisgau, Germany)	Fischer-Tropsch process (1923)

Graham, Thomas	1805 - 1869	Scottish (b. Glasgow, Scotland)	Graham's law (1833)
Graham, William Hardin	1932 -	American (b. Birmingham, Alabama, USA)	Graham reaction (1965)

Henry, Joseph	1797 - 1878	American (b. Albany, New York, USA)	henry unit of inductance (1832)
Henry, William	1774 - 1836	British (b. Manchester, England)	Henry's law (1804)

Meyer, Viktor	1848 - 1897	German (b. Berlin, Germany)	Viktor Meyer method, Viktor Meyer tube
Meyer, Kurt Heinrich	1883 - 1952	German-Estonian (b. Dorpat, Estonia)	Meyer-Schuster rearrangement (1922)

Michaelis, August Karl Arnold	1847 - 1916	German (b. Bierbergen, Hannover, Germany)	Arbuzov-Michaelis reaction (1898)
Michaelis, Leonor	1875 - 1949	German-American (b. Berlin, Germany)	Michaelis-Menten kinetics (1913), Michaelis-Menten equation, Michaelis constant, Michaelis complex

Stark, David D.	1893 -	?	Dean-Stark apparatus (<i>Ind. Eng. Chem.</i> 1920 , <u>12</u> , 486)
Stark, Johannes Nobel Prize Physics 1919	1874 - 1957	German (b. Schikhenhof, Upper Palatinate, Germany)	Stark effect, Stark-Einstein law of photochemical equivalence

Stern, Otto Nobel Prize Physics 1943	1888 - 1969	German-American (b. Sohrau, Upper Silesia, Germany, (now Zory, Poland))	Stern-Gerlach experiment (1922), Stern-Volmer plot (1919)
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Weiss, Ulrich	1908 - 1989	Czech (b. Prague, Czech Republic)	Weiss reaction (1968)
Weiss, Pierre Ernest	1865 - 1940	French (b. Mulhouse, France)	Curie-Wiess law (1895/1905)

(4) Relationships:**6. Father-son combinations**

Abderhalden, Emil (biochemist)	1877 – 1950	Swiss (b. Ober- Uzwil, St. Gallen, Switzerland)	MD 1900 Basel (G. von Bunge, Emil Fischer) Abderhalden drying pistol, Abderhalden ninhydrin reaction
Abderhalden, Rudolf (biochemist)	1910 - 1965	Swiss-German (b. Berlin, Germany)	MD 1935 Halle (Emil Abderhalden) Abderhalden ninhydrin reaction
Anschütz, Richard (chemist)	1852 - 1937	German (b. Darmstadt, Germany)	Ph.D. 1874 Heidelberg (August Kekulé)
Anschütz, Ludwig (chemist)	1889 - 1954	German (b. Bonn, Germany)	Ph.D. 1920 Marburg (Karl von Auwers)
Arbuzov, Aleksandr Erminingeldovich (chemist)	1877 - 1968	Russian (b. Arbuzov-Baran, near Kazan, Russia)	Ph.D. 1914 Kazan (Aleksandr Sayzteff) Arbuzov-Michaelis reaction (1898)
Arbuzov, Boris Aleksandrovich (chemist)	1903 - 1992	Russian (b. Kazan, Russia)	Ph.D. 1929 Kazan (Aleksandr E. Arbuzov)
Armstrong, Henry Edward (chemist)	1848 - 1937	British (b. Lewisham, England)	Ph.D. 1869 Leipzig (Adolf Hermann Kolbe) Discovery of hydrocarbons by cracking petroleum (1886)

Armstrong, Edward Frankland (industrial chemist)	1878 - 1945	British (b. London, England)	Carbohydrate chemistry (Ph.D. 1901 Berlin with Emil Fischer)
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Auger, Victor Emile (chemist)	1864 - 1949	French (b. Amboise, France)	Dr.Sc. 1890 Paris (Charles Friedel)
Auger, Pierre Victor (physicist)	1899 - 1993	French (b. Paris, France)	Ph.D. 1926 Ecole Normale Superieure (Jean Baptiste Perrin) Auger effect, Auger electron spectroscopy (1923)

Auwers, Georg Friedrich Julius Arthur von (astronomer)	1838 - 1915	German (b. Goettingen, Germany)	Ph.D. 1862 Germany
Auwers, Karl Friedrich von (son of Georg F.J.A. v. Auwers) (chemist)	1863 - 1939	German (b. Gotha, Germany)	Ph.D. 1885 Berlin (August W. Hofmann) Dienone- phenol rearrangement (1921)
Auwers, Otto von (son of Karl F. von Auwers) (physicist)	1895 - 1949	German (b. Heidelberg, Germany)	Ph.D. 1920 Marburg (F. Richarz)

Baeyer, Adolf von (chemist) Nobel Prize Chemistry 1905	1835 - 1917	German (b. Berlin, Germany)	Ph.D. 1858 Berlin (August Kekule) synthesis of barbiturates (1863); synthesis of indigo (1878); synthesis of phenolphthalein dyes (1876); Baeyer-Villiger oxidation (1899); synthesis of triphenylmethane dyes (1903)
Baeyer, Otto (physicist)	1877 - 1946	German (b. Reichenhall, Germany)	Ph.D. 1905 Leipzig (Otto Wiener)

Becquerel, Antoine César (electrochemist)	1788 - 1878	French (b. Châtillon-sur-Loing, Loiret, France)	
Becquerel, Alexandre Edmond (son of Antoine César) (physicist)	1820 - 1891	French (b. Paris, France)	Dr. Sc. 1840 Paris (Antoine César Becquerel)
Becquerel, Antoine Henri (physicist) (son of Alexandre Edmond) Physics Nobel 1903	1852 - 1908	French (b. Paris, France)	Dr. Sc. 1880s
Becquerel, Paul (biologist) (grandson of Alexandre Edmond; nephew of Antoine Henri)	1879 - 1955	French (b. Paris, France)	Ph.D. 1907 Paris

Bjerrum, Niels Janniksen (physical chemist)	1879 - 1958	Danish (b. Copenhagen, Denmark)	Ph.D. 1908 Copenhagen (Sophus M. Jorgensen)
<i>Bjerrum, Jannik</i> (physical chemist)	1909 -	Danish (b. Copenhagen, Denmark)	Ph.D. 1941 Copenhagen (Niels J. Bjerrum)

Bohr, Niels Henrik David (physicist) Nobel Prize Physics 1922	1885 - 1962	Danish (b. Copenhagen, Denmark)	Ph.D. 1911 Copenhagen (C. Christiansen) Bohr radius, Bohr orbit, Bohr magneton, Bohr theory, Bohr model of atom (1913), bohrium (element 107), Bohr correspondence principle (1921)
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Bohr, Aage Niels (physicist) Nobel Prize Physics 1975	1922 -	Danish (b. Copenhagen, Denmark)	Ph.D. 1954 Copenhagen (Benjamin Mottelson)
Boltzmann, Ludwig (physicist)	1844 - 1906	Austrian (b. Vienna, Austria)	Ph.D. 1866 Vienna (Josef Stefan) Maxwell-Boltzmann distribution and statistics (1871 - 1877)
Boltzmann, Arthur (physicist)	1881 - 1952	Austrian (b. Graz, Austria)	Ph.D. 1905 Vienna (Ludwig Boltzmann)
Bragg, Sir William Henry (physicist) Nobel Prize Physics 1915	1862 - 1942	British (b. Westward, Cumberland, England)	MA 1885 Cambridge (Sir Joseph J. Thomson) Bragg angle of diffraction, Bragg planes, Bragg reflection indices (1912)
Bragg, Sir William Lawrence (physicist) Nobel Prize Physics 1915	1890 - 1971	British (b. Adelaide, England)	MA 1911 Cambridge (Sir William Henry Bragg)
Brillouin, Marcel Louis (physicist)	1854 - 1948	French (b. Melle, Deux-Sèvres, France)	Dr.Sc. 1881 College de France, Brillouin scattering, Brillouin zone (1931)
Brillouin, Léon Nicolas (physicist)	1889 - 1969	French (b. Sèvres, Seine-et-Oise, France)	Dr.Sc. 1920 Paris (Paul Langevin) WKB or JWKB method (1926)
<i>Brook, Adrian Gibbs</i> (chemist)	1924 -	Canadian (b. Toronto, Ontario, Canada)	Ph.D. 1950 Toronto (George F. Wright) Brook rearrangement (1958)
<i>Brook, Michael Adrian</i> (chemist)	1955 -	Canadian (b. ?)	Ph.D. 1984 McGill (Tak Hang Chan)

Carnot, Lazare Nicolas Margu�rite	1753 - 1823	French (b. Nolay, Burgundy, France)	1770s Royal Corps of Engineers, Paris
Carnot, Nicholas L�onard Sadi	1796 - 1832	French (b. Paris, France)	Dr.Sc. 1814 Ecole Polytechnique, Carnot cycle (1824)

Curie, Jacques (physicist)	1856 - 1941	French (b. Paris, France)	Dr.Sc. 1889 Paris Curie law, Curie temperature, Curie point (1880)
Curie, Maurice (physicist) (son of Jacques)	1888 - ?	French (b. Paris, France)	Dr.Sc. 1923 Paris
<i>Curie, Daniel</i> (physicist) (son of Maurice)	1927 -	French (b. Paris, France)	

Erlenmeyer, Richard August Carl Emil (Emil Sr.) (chemist)	1825 - 1909	German (b. Wehen, near Wiesbaden, Germany)	Ph.D. 1851 Giessen (Justus Liebig) Erlenmeyer flask
Erlenmeyer, Friedrich Gustav Carl Emil (Emil Jr.) (chemist)	1864 - 1921	German (b. Heidelberg, Germany)	Ph.D. 1888 Goettingen (August Kekul�) Erlenmeyer flask
Erlenmeyer, Hans Friedrich (inorganic/geochemist), son of F.G.C.E. Erlenmeyer	1900 -	German (b. Strassburg, now Strasbourg, France)	Ph.D. 1922 Berlin (Emil Erlenmeyer, Jr.)

Eucken, Rudolf Christoph (philosopher) Literature Nobel 1908	1846 - 1926	German (b. Aurich, East Friesland, Germany)	
Eucken, Arnold Thomas (physical chemist)	1884 - 1950	German (b. Jena, Germany)	Ph.D. 1906 Berlin (Walter Nernst)

Euler-Chelpin, Hans von Chemistry Nobel 1929	1873 - 1964	German-Swedish (b. Augsburg, Germany)	Ph.D. 1895 Berlin (Hans Landolt and Hans Jahn) MD 1928 Kiel
Euler, Ulf von Physiology & Medicine Nobel 1970	1905 - 1983	Swedish (b. Stockholm, Sweden)	MD 1930 Karolinska Inst. (G. Liljestrand); Studied with H.H. Dale (London); Gustav Embden (Frankfurt)
<i>Fenn, John Bennett</i> (mass spectrometrists) Chemistry Nobel 2002	1917 - 2011	American	Ph.D. Yale 1940
<i>Fenn, John Bennett Jr.</i> (physical chemist)		American	Ph.D. 1972 Purdue (Francis K. Fong)
Fischer, Emil Hermann (chemist) Nobel Prize Chemistry 1902	1852 - 1919	German (b. Euskirchen, Rhenish Prussia, near Bonn, Germany)	Ph.D. 1874 Strasbourg (Adolf Baeyer) Fischer projection (1891), Fischer esterification (1895), Fischer indole synthesis (1883), Kiliani-Fischer synthesis (1885/1889)
Fischer, Hermann Otto Laurenz (chemist)	1888 - 1960	German (b. Würzburg, Germany)	Ph.D. 1912 Jena (Ludwig Knorr), post-doctoral at Berlin (Emil Fischer)
Frankland, Sir Edward (chemist)	1825 - 1899	British (b. Churchtown, Lancashire, England)	Ph.D. 1849 Marburg (Robert Bunsen) concept of valence (1852 - 1860), discovery of He (1868)
Frankland, Percy Faraday	1858 - 1946	British (b. London, England)	Ph.D. 1883 Würzburg (Johannes Wislicenus)

Friedel, Charles (chemist)	1832 - 1899	French (b. Strasbourg, France)	Dr.Sc. 1869 Paris (Louis Pasteur, Adolphe Wurtz) Friedel-Crafts acylation (1877), Friedel-Crafts alkylation (1877)
Friedel, Georges (crystallographer)	1865 - 1933	French (b. Mulhouse, France)	Ecole Polytechnique, Paris (Francois E. Mallard); Ecole Superieures des Mines Discovery of zeolites and water in zeolites (1896), Bravais-Friedel law (1904), Friedel's law of rational symmetric intercepts (1905); Friedel's law of mean indices (1908)

Gay-Lussac, Louis Joseph (chemist)	1778 - 1850	French (b. St. Léonard, Limousin, France)	Ecole Polytechnique, Paris 1800 (Claude Louis Berthollet) Gay-Lussac law (1809) Gay-Lussac tower (1842)
Gay-Lussac, Jules (chemist)	1810 - 1877	French (b. France)	Ph.D. 1832 Giessen (Justus Liebig)

Gmelin, Johann Friedrich (medicine/apothecary)	1748 - 1804	German (b. Tübingen, Germany)	
Gmelin, Leopold	1788 - 1853	German (b. Göttingen, Germany)	Gmelin's Handbuch der anorganische Chemie (1871 - 1886)

Goldschmidt, Hans (chemist)	1861 - 1923	German (b. Berlin, Germany)	Ph.D. 1886 Heidelberg (Robert Bunsen)
Goldschmidt, Victor Moritz (geologist)	1888 - 1947	Swiss (b. Zurich, Switzerland)	Ph.D. 1906 Oslo

Grotrian, Otto Natalius August (physicist)	1847 - 1921	German (b. Braunschweig, Germany)	Ph.D. 1870s Darmstadt, (Friedrich Kohlrausch)
Grotrian, Walter Robert Wilhelm (physicist)	1890 - 1954	German (b. Aachen, Germany)	Ph.D. 1914 Goettingen (Hermann Th. Simon) Grotrian diagrams (1928)

Haldane, John Scott (biochemist)	1860 - 1936	British-Scottish (b. Edinburgh, Scotland)	MD 1884 Edinburgh; worked with T. Carnelley (UC Dundee), J.B.S. Haldane (Oxford)
Haldane, John Burdon Sanderson (biochemist)	1892 - 1964	British-Scottish (b. Oxford, England)	MA 1919 Oxford, Haldane equation (1930)

Hoppe-Seyler, Felix (physiologist, biochemist)	1825 - 1895	German (b. Freiburg im Breisgau, Germany)	MD 1851 Berlin
Hoppe-Seyler, Georg (physiologist, biochemist)	1860 - 1940	German (b. Berlin, Germany)	Studied with Pflüger (Bonn), Frerichs and Virchow (Berlin), and Quincke (Kiel)

Ingold, Sir Christopher Kelk (chemist)	1893 - 1970	British (b. Forest Gate, London, England)	Ph.D. 1923 London (Sir Jocelyn Field Thorpe) Cahn- Ingold-Prelog convention (1951)
<i>Ingold, Keith Usherwood</i> (chemist)	1929 -	British (b. Leeds, England)	Ph.D. 1951 Oxford (Sir Cyril N. Hinshelwood)

Kipping, Sir Frederick Stanley (chemist)	1863 - 1949	British (b. Manchester, England)	Ph.D. 1887 Munich (Sir William H. Perkin)
Kipping, Frederic Barry (chemist)	1901 - 1965	British (b. Nottingham, England)	Ph.D. 1925 Cambridge (Sir William J. Pope)

Kohlrausch, Rudolf Hermann Arndt (physicist)	1809 - 1858	German (b. Göttingen, Germany)	Kohlrausch current theory (1848)
Kohlrausch, Friedrich Wilhelm Georg (physicist)	1840 - 1910	German (b. Rinteln, Germany)	Ph.D. 1863 Goettingen (Wilhelm Weber) Kohlrausch relaxation function (1863) , Kohlrausch square root law (1863) , Kohlrausch law of independent migration of ions (1879)

Königsberger, Leo (mathematician)	1837 - 1921	German (b. Posen, now Poznan, Poland)	Ph.D. 1860 Berlin (K. Weierstrass)
Königsberger, Johann Georg (physicist)	1874 - 1946	German (b. Heidelberg, Germany)	Ph.D. 1897 (Heinrich Rubens)

Kossel, Albrecht (biochemist) Physiology & Medicine Nobel 1910	1853 - 1927	German (b. Rostock, Germany)	MD 1878 Rostock Hab. 1881 Strasbourg (Felix Hoppe-Seyler)
Kossel, Walter (physicist)	1888 - 1956	German (b. Berlin, Germany)	Ph.D. 1911 Heidelberg (Philipp E.A. Lenard)

Ladenburg, Albert (chemist)	1842 - 1911	German (b. Mannheim, Germany)	Ph.D. 1863 Heidelberg (Robert Bunsen) Ladenburg benzene (1869)
Ladenburg, Rudolf (physicist)	1882 - 1952	German (b. Kiel, Germany)	Ph.D. 1906 Munich (Wilhelm C. Röntgen)

Leuckart, Carl Louis Rudolf Alexander (chemist)	1854 - 1889	German (b. Giessen, Germany)	Ph.D. 1879 Leipzig Leuckart reaction (1885)
Leuckart, Karl Georg Friedrich Rudolf (parasitologist, zoologist)	1822 - 1898	German (b. Helmstedt, Germany)	MD 1845 Goettingen (Rudolf Wagner)

Lewis, Gilbert Newton (chemist)	1875 - 1946	American (b. Weymouth, Massachusetts, USA)	Ph.D. 1899 Harvard (Theodore W. Richards) Lewis structures (1916) Lewis acid (1923)
<i>Lewis, Edward S.</i> (chemist)	1920 -	American (b. Berkeley, California, USA)	Ph.D. 1947 Harvard (Paul D. Bartlett)

Maier-Leibnitz, Hermann (engineer)	1885 - ?	German (b. Schorndorff, Germany)	Dr.Ing. 1917 TH Stuttgart (E. Moersch)
Maier-Leibnitz, Hermann Heinrich (Heinz) (physicist)	1911 -	German (b. Esslingen, Germany)	Ph.D. 1935 Goettingen (James Franck)

Masson, Sir David Orme (chemist)	1858 - 1937	British (b. London, England)	D.Sc. 1884 Edinburgh (Sir William Ramsay in Bristol) (F. Wohler, Hans Huebner in Goettingen)
Masson, Sir James Irvine Orme (chemist)	1887 - 1962	British (b. Toorak, Melbourne, Australia)	B.Sc. 1907 Melbourne (Sir William Ramsay in London)
Mendenhall, Thomas Corwin (physicist)	1841 - 1924	American (b. Hanoverton, Ohio, USA)	Western Reserve College (no degree; Charles A. Young)
Mendenhall, Charles Elwood (physicist)	1872 - 1935	American (b. Columbus, Ohio, USA)	Ph.D. 1898 Johns Hopkins (Reid, Joseph Sweetman Ames)
Menshutkin, Nikolai Aleksandrovich (chemist)	1842 - 1907	Russian (b. St. Petersburg, Russia)	Ph.D. 1869 St. Petersburg (Dmitri I. Mendeleev) Menshutkin reaction (1890)
Menshutkin, Boris Nikolaevich (chemist, historian)	1874 - 1938	Russian (b. St. Petersburg, Russia)	Ph.D. 1912 Dorpat
Meyer, Hans Horst (pharmacologist)	1853 - 1939	German (b. Insterburg, East Prussia)	M.D. 1877 Koenigsberg (Max Jaffe)
Meyer, Kurt H. (chemist)	1883 - 1952	German-Estonian (b. Dorpat, now Tartu, Estonia)	Ph.D. 1907 Leipzig (Arthur Hantzsch) Meyer-Schuster rearrangement (1922)

Mitscherlich, Eilhard (chemist)	1794 - 1863	German (b. Neuende, Oldenburg, Germany)	Ph.D. 1814 Göttingen; Stockholm (J.J. Berzelius) Mitscherlich's law of isomorphism (1821)
Mitscherlich, Alexander (chemist)	1836 - 1918	German (b. Berlin, Germany)	Ph.D. 1861 Berlin; Göttingen (Friedrich Wohler); Paris (Adolphe Wurtz)
Moureu, François Charles Léon (chemist)	1863 - 1929	French (b. Mourenx, Basses Pyrénées, France)	D.Sc. 1893 École Supérieure de Pharmacie
Moureu, Henri Bertrand Vincent	1899 - 1978	French (b. Paris, France)	D.Sc. 1930 Paris (Charles Dufraisse)
Mulliken, Samuel Parsons (chemist)	1864 - 1934	American (b. Newburyport, Massachusetts, USA)	Ph.D. 1890 Leipzig
Mulliken, Robert Sanderson (physicist) Nobel Prize Chemistry 1966	1896 - 1986	American (b. Newburyport, Massachusetts, USA)	Ph.D. 1921 Chicago (William D. Harkins) Mulliken population analysis (1955)
Neumann, Franz Ernst (mathematician, physicist)	1798 - 1895	German (b. Joachimsthal, Germany, now Jachymov, Czech Republic)	Ph.D. 1825 Berlin (Christian S. Weiss) Neumann's law (1831)
Neumann, Carl Gottfried (physicist)	1832 - 1925	German (b. Königsberg, Prussia now Kaliningrad, Lithuania)	Ph.D. 1855 Königsberg Logarithmic potential (1877)

Norris, James F. (chemist)	1871 - 1940	American (b. Baltimore, Maryland, USA)	Ph.D. 1895 Johns Hopkins (Ira Remsen)
<i>Norris, James Rufus, Jr.</i> (chemist)	1941 -	American (b. Anderson, South Carolina, USA)	Ph.D. 1968 Washington (Samuel I. Weissman)

Noyes, Arthur Amos (chemist)	1866 - 1936	American (b. Newburyport, Massachusetts, USA)	Ph.D. 1890 Leipzig (Wilhelm Ostwald)
Noyes, William Albert (chemist)	1857 - 1941	American (b. Independence, Iowa, USA)	Ph.D. 1882 Johns Hopkins (Ira Remsen)
Noyes, William Albert Jr. (chemist) (son of William Albert)	1898 - 1980	American (b. Terre Haute, Indiana, USA)	Ph.D. 1921 Sorbonne (Henri Le Châtelier)
Noyes, Richard Macy (chemist) (half-brother of William Albert Jr.)	1919 - 1997	American (b. Champaign, Illinois, USA)	Ph.D. 1942 Cal Tech (Roscoe G. Dickinson)

Oettingen, Arthur Joachim von (physicist)	1836 - 1920	Latvian (b. Dorpat (now Tartu), Latvia)	Ph.D. 1865 Dorpat; supervisor of Friedrich Wilhelm Ostwald
Oettingen, Helmuth Al. Wold.	1871 - 1921	Latvian (b. Dorpat (now Tartu), Latvia)	

Ostwald, Friedrich Wilhelm (physical chemist) Chemistry Nobel Prize 1909	1853 - 1932	Latvian (b. Riga, Latvia)	Ph.D. 1877/8 Dorpat (Carl Schmidt, Arthur von Oettingen) Ostwald dilution law (1888)
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Ostwald, Carl Wilhelm Wolfgang (physiologist, chemist)	1883 - 1943	Latvian (b. Riga, Latvia)	Colloid chemistry, Ph.D. 1904 Leipzig
Ostwald, Walter Karl Wilhelm (engineer)	1886 - 1958	Latvian (b. Riga, Latvia)	

Pauling, Linus Carl Chemistry Nobel 1954 Peace Nobel 1962	1901 - 1994	American (b. Portland, Oregon, USA)	Ph.D. 1925 Cal Tech (Roscoe G. Dickinson)
<i>Pauling, Linus Carl Jr.</i> (physician)	1925 -	American (b. Pasadena, California, USA)	physician
<i>Pauling, Peter Jeffress</i> (physical chemist; x-ray crystallographer)	1931 -	American-British (b. Pasadena, California, USA)	Ph.D. 1960 London (Ronald S. Nyholm)
<i>Pauling, Edward Crellin</i> (geneticist)	1937 -	American (b. Pasadena, California, USA)	Ph.D. 1964 Washington

Penning, Frans Michel (physicist)	1894 - 1953	Dutch (b. Gorcum, Netherlands)	Ph.D. 1923 Leyden (H. Kammerlingh-Onnes) Penning vacuum gauge (1937)
<i>Penning, Lourens</i> (radiologist, neurosurgeon)	1922 -	Dutch (b. Leyden, Netherlands)	MD 1951 Amsterdam

Perkin, Sir William Henry (chemist)	1838 - 1907	British (b. Shadwell, South London, England)	1850s Royal College of Science (August W. Hofmann) Perkin reaction (1868) , Perkin rearrangement (1870) , Perkin triangle
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Perkin, William Henry, Jr. (chemist)	1860 - 1929	British (b. Sudbury, near London, England)	Ph.D. 1882 Wuerzburg (Johannes Wislicenus)
Perrin, Jean Baptiste (physicist) Nobel Prize Physics 1926	1870 - 1942	French (b. Lille, France)	Dr. Sc. 1897 Sorbonne
Perrin, Francis Henri Jean Siegried (physicist)	1901 - ?	French (b. Paris, France)	Dr.Sc. 1929 Paris (Jean Perrin)
Polanyi, Michael (chemist)	1891 - 1976	Hungarian-British (b. Budapest, Hungary)	Ph.D. 1915/7 Budapest (Georg Bendig) BeMaHaPoThLe principle, Bell-Evans-Polanyi principle (1938)
<i>Polanyi, John Charles</i> Nobel Prize Chemistry 1986 (chemist)	1929 -	British-Canadian (b. Berlin, Germany)	Ph.D. Manchester 1952 (Ernest Warhurst)
Rayleigh, Lord John William Strutt, 3rd Baron (physicist) Nobel Prize Physics 1904	1842 - 1919	British (b. Langford Grove, near Maldon, Essex, England)	BA 1865 Cambridge (Edward J. Routh) Rayleigh-Jeans law (1900) , Rayleigh light scattering (1871) , Rayleigh wave
Rayleigh, Robert John Strutt, 4th Baron (physicist)	1875 - 1947	British (b. Terling Place, Essex, England)	MA 1898 Cambridge (Sir Joseph J. Thomson)
Rubens, Heinrich (physicist)	1865 - 1922	German (b. Wiesbaden, Germany)	Ph.D. 1889 Berlin (August Kundt)

Rubens, Ernest Berthold (chemist)	1900 -	German (b. Charlottenburg, Germany)	Ph.D. 1923 Berlin (Wilhelm Schlenck)
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Schlenk, Wilhelm (chemist)	1879 - 1943	German (b. Munich, Germany)	Ph.D. 1905 Munich (Oskar Piloty) Schlenk tube, Schlenk equilibrium (1929)
Schlenk, Wilhelm, Jr. (chemist)	1907 - 1974	German (b. Munich, Germany)	Dr.Eng. TH Berlin-Charlottenburg (R. Pschorr) Schlenk equilibrium (1929)

Schneider, Abraham (chemist)	1919 - 1997	American (b. Boston, Massachusetts, USA)	Ph.D. 1944 Harvard (Paul D. Bartlett)
Schneider, Edwin K. (atmospheric scientist)		American (b.)	Ph.D. 1976 Harvard (R.S. Lindzen)

Siegbahn, Karl Manne Georg (physicist) Physics Nobel 1924	1886 - 1978	Swedish (b. Örebro, Sweden)	Ph.D. 1911 Lund (Johannes Rydberg)
Siegbahn, Kai M. (physicist) Physics Nobel 1981	1918 -	Swedish (b. Lund, Sweden)	Ph.D. 1944 Stockholm

Siemens, Ernst Werner von (physicist, engineer)	1816 - 1892	German-British (b. Lenthe, Hanover, Germany)	1841/2 Goettingen (no degree) siemens unit of conductance (1860)
Siemens, George Wilhelm von (engineer)	1855 - 1919	German (b. Berlin, Germany)	Dr.Eng. 1905 TH Dresden

Swarts, Theodore (chemist)	1839 - 1911	Belgian (b. Antwerp, Belgium)	Supervisor of Leo Baekeland inventor of the phenolic resin Bakelite (1901); studied under August Kekulé
Swarts, Frederic Jean Edmond (organofluorine chemist)	1866 - 1940	Belgian (b. Ixelles, Belgium)	Ph.D. 1889 Gent (Theodore Swarts); occupied same position as August Kekulé at Gent

Thomson, Sir Joseph John (physicist) Nobel Prize Physics 1906	1856 - 1940	British (b. Cheetham Hill, near Manchester, England)	BA 1880 Cambridge (Edward J. Routh) Thomson model of atom (1903)
Thomson, Sir George Paget (physicist) Nobel Prize Physics 1937	1892 - 1975	British (b. Cambridge, England)	MA 1913 Cambridge (Sir Joseph J. Thomson) electron diffraction by crystals (1928 - 1935)

Traube, Moritz (pharmacist)	1826 - 1894	German (b. Ratibor, now Raciborz, Poland)	Ph.D. 1847 Berlin
Traube, Hermann (mineralogist)	1860 - 1913	German (b. Ratibor, now Raciborz, Poland)	Ph.D. 1884 Greifswald
Traube, Wilhelm (chemist)	1866 - 1913	German (b. Ratibor, now Raciborz, Poland)	Ph.D. 1888 Berlin (August W. Hofmann) Traube synthesis of purines (1900)

Treadwell, Frederick Pearson (chemist)	1857 - 1918	American (b. Portsmouth, New Hampshire)	Ph.D. 1878 Heidelberg (Robert Bunsen)
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Treadwell, William Dupré (chemist)	1885 - 1959	Swiss (b. Zurich, Switzerland)	Ph.D. 1909 Zurich (Sir Martin O. Förster)
Van der Waals, Johannes Diderik (physicist) Nobel Prize Physics 1910	1837 - 1923	Dutch (b. Leiden, Netherlands)	Ph.D. 1873 Leiden Van der Waals' forces, radii (1911) , Van der Waals equation of state (1912)
Van der Waals, Johannes Diderik, Jr. (chemist)	1873 - ?	Dutch (b. s'Gravenhage, Netherlands)	Ph.D. 1900 Amsterdam
Van Slyke, Lucius Lincoln (dairy chemist)	1859 - 1931	American (b. Centerville, New York, USA)	Ph.D. 1882 Michigan
Van Slyke, Donald Dexter (biochemist)	1883 - 1971	American (b. Pike, New York, USA)	Ph.D. 1907 Michigan (Moses Gomberg)
Wagner-Jauregg, Julius (neurologist/psychiatrist) Physiology & Medicine Nobel 1927	1857 - 1940	Austrian (b. Wels, Austria)	
Wagner-Jauregg, Theodor (chemist)	1903 -	Austrian (b. Vienna, Austria)	Ph.D. 1926 Munich (Richard Kuhn)
Warburg, Emil Gabriel (physicist)	1846 - 1931	German (b. Altona, Germany)	Ph.D. 1867 Berlin (Gustav Magnus)
Warburg, Otto Heinrich (biochemist) Physiology & Medicine Nobel 1931	1883 - 1970	German (b. Freiburg im Breisgau, Germany)	Ph.D. 1906 Berlin (Emil Fischer)

Watt, James	1736 - 1819	Scottish (b. Greenock, Scotland)	watt unit of energy
Watt, James Jr. (marine engineer)	1769 - 1848	Scottish (b. Scotland)	

Wiedemann, Gustav Heinrich (physicist-chemist)	1826 - 1899	German (b. Berlin, Germany)	Ph.D. 1847 Berlin (Heinrich Rose, Eilhard Mitscherlich)
Wiedemann, Eilhard Ernst Gustav (physicist)	1852 - 1928	German (b. Berlin, Germany)	Ph.D. 1872/3 Leipzig (work done at Heidelberg with Gustav R. Kirchhoff)

Wiener, Ludwig Christian (geometer, mathematician)	1826 - 1896	German (b. Darmstadt, Germany)	Ph.D. 1850 Giessen
Wiener, Hermann Ludwig Gustav (mathematician)	1857 - 1939	German (b. Karlsruhe, Germany)	Ph.D. 1881 Munich
Wiener, Otto Heinrich (physicist)	1862 - 1927	German (b. Karlsruhe, Germany)	Ph.D. 1887 Stasbourg (August Kundt); supervisor of Otto Baeyer

Wilson, Edgar Bright Jr.	1908 - 1992	American (b. Gallatin, Tennessee, USA)	Ph.D. 1933 Cal Tech (Linus Pauling)
<i>Wilson, Kenneth Geddes</i> Physics Nobel 1982	1936 -	American (b. Waltham, Massachusetts, USA)	Ph.D. 1961 Cal Tech (Murray Gell-Mann)

Wislicenus, Johannes (chemist)	1835 - 1902	Swiss-German (b. Klein-Eichstedt bei Querfurt, Germany)	Ph.D. 1860 Zurich (Wilhelm H. Heintz)
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Wislicenus, Wilhelm Gustav (inorganic chemist)	1861 - 1922	Swiss (b. Zurich, Switzerland)	Ph.D. 1885 Würzburg (Ludwig Knorr, Emil Fischer)
Wislicenus, Johannes Adolph Hans (chemist)	1867 - 1951	Swiss (b. Zurich, Switzerland)	Ph.D. 1892 Leipzig (Wilhelm Ostwald)

Witt, Johannes Niklas (pharmacist and apothecary)	1808 - 1872	German (b. Heuwisch near Heide, Holstein, Germany)	
Witt, Otto Nicolaus (chemist)	1853 - 1915	German-Russian (b. St. Petersburg, Russia)	Ph.D. 1875 Zurich (Johannes Wislicenus) Origin of colour (1876)

(ii) Husband-wife combinations

<i>Brown, Herbert C.</i> Chemistry Nobel 1979	1912 -	American (b. London, England)	Ph.D. 1938 Chicago (Hermann I. Schlesinger) Hydroboration-borane rearrangement (1956)
<i>Brown, Sarah ((née Baylen)</i>			
<i>Cornforth, John Warcup</i> Chemistry Nobel 1975	1917 -	Australian (b. Sydney, Australia)	Ph.D. 1941 Oxford (Sir Robert Robinson) Cornforth rearrangement (1949)
<i>Cornforth, Rita (née Harradence)</i>			Ph.D. 1941? Oxford (Sir Robert Robinson)

Ehrenfest, Paul	1880 - 1933	Austrian (b. Vienna, Austria)	Ph.D. 1904 TH Vienna (Ludwig Boltzmann) Ehrenfest adiabatic law (1914), Ehrenfest symmetry factor (1921), Ehrenfest theorem and equation (1927)
Ehrenfest-Afanassjewa, Tatyana Alexeyevna	1876 - 1964	Ukrainian (b. Kiev, Ukraine)	Studied at Women's Univ. in St. Petersburg (Orest D. Chvolsou) and at Goettingen (Felix Klein, David Hilbert)
Euler-Chelpin, Hans von Chemistry Nobel 1929	1873 - 1964	German-Swedish (b. Augsburg, Germany)	Ph.D. 1895 Berlin (Hans Landolt and Hans Jahn) MD 1928 Kiel
Cleve-Euler, Astrid (first wife, daughter of Per T. Cleve)	1875 - 1968	Swedish (b. Uppsala, Swedish)	1898 Stockholm (botanist, geologist, chemist)
Euler-Chelpin, Elisabeth von (née Ugglä) (second wife)	1887 - ?	Swedish (b. Forsmark, Uppland, Sweden)	Studied biochemistry at Lund and Stockholm

Fieser, Louis Frederick	1899 - 1977	American (b. Columbus, Ohio, USA)	Ph.D. 1924 Harvard (James B. Conant) Fieser's reagent (chromium trioxide/acetic acid), Fieser's solution (1924) (potassium hydroxide-water-sodium anthraquinone β -sulfonate-sodium hydrosulfite)
Fieser, Mary Peters	1909 - 1997	American (b. Atchison, Kansas, USA)	M.A. 1936 Harvard College (Louis F. Fieser)
Haber, Fritz Chemistry Nobel 1918	1868 - 1934	German (b. Breslau, now Wroclaw, Poland)	Ph.D. 1891 Berlin (Carl Liebermann) Haber nitrogen fixation process (1910), Born-Haber cycle (1919)
Haber-Immerwahr, Clara	1870 - 1915	German (b. Polkendorf, Silesia)	Ph.D. 1900 Breslau (Richard Abegg)
Hunsdiecker, Heinz	1904 - 1981	German (b. Cologne, Germany)	Ph.D. 1929 Cologne (Robert Wintgen) Borodin-Hunsdiecker reaction (1861/1942)
Hunsdiecker, Clare (née Dieckmann)	1903 - 1995	German (b. Kiel, Germany)	Ph.D. 1928 Cologne (Robert Wintgen)
<i>Karle, Jerome</i> Chemistry Nobel 1985	1918 -	American (b. New York City, USA)	crystal structure determinations; both did their doctoral theses under Lawrence O. Brockway at U Michigan in 1943
<i>Karle, Isabelle</i> (née Lugoski)	1921 -	American (b. Detroit, Michigan, USA)	

Lavoisier, Antoine Laurent	1743 - 1794	French (b. Paris, France)	LLB 1764 Paris (Guillaume F. Rouelle) Lavoisier's law (1755)
Lavoisier, Marie Anne Pierrette (née Paulze)	1758 - 1836	French (b. Montbrison, Loire, France)	
Libby, Willard Frank Chemistry Nobel 1960	1908 - 1980	American (b. Grand Valley, Colorado)	Ph.D. 1923 Yale (Robert S. Mulliken) radiocarbon ¹⁴ C dating (1952)
Libby, Leona Woods Marshall	1919 - 1986	American (b. La Grange, Illinois, USA)	Ph.D. 1923 Yale (Robert S. Mulliken)
Michael, Arthur	1853 - 1942	American (b. Buffalo, New York, USA)	Studied under A.W. Hofmann (Berlin), R. Bunsen (Heidelberg), A. Wurtz (Paris), D. Mendeleev (St. Petersburg), no degree; Michael 1,4-addition reactions (1887)
Michael, Helen Cecilia Desilver Abbott	1857 - 1904	American (b. Philadelphia, Pennsylvania, USA)	M.D. 1903 Tufts College
Needham, Joseph	1900 - 1995	British (b. London, England)	BA 1921 Cambridge (Sir Frederick G. Hopkins)
Needham, Dorothy Mary (née Moyle)	1896 - 1987	British (b. London, England)	Dr.Sc. 1939 Cambridge (biochemist)

Noddack, Walter Karl Friedrich	1893 - 1960	German (b. Bamberg, Germany)	Ph.D. 1921 Berlin (J. Eggert) co-discoverers of rhenium in 1925 (Berlin, Germany)
Noddack, Ida Eva Tacke	1896 - 1978	German (b. Lackhausen, Germany)	Ph.D. 1920 U. Berlin- Charlottenburg (D. Holde) (engineering)
Robinson, Sir Robert	1886 – 1975	British (b. Bufford near Chesterfield, Derbyshire, England)	Ph.D. 1909 Manchester (William H. Perkins, Jr.) Robinson annulation (1935)
Robinson, Gertrude Maud Walsh	1886 - 1954	British (b. Winsford, England)	M.Sc. 1908 Manchester
Staudinger, Hermann Chemistry Nobel 1953	1881 - 1965	German (b. Worms, Germany)	Ph.D. 1903 Halle (D. Voerlander)
Staudinger, Magda (née Woit)	1902 - 1997	Estonian (b. Elwa, Estonia)	Ph.D. 1920s Berlin (Gottlieb Haberlandt) biochemist, natural science
Stieglitz, Julius Oscar	1867 - 1937	American (b. Hoboken, New Jersey, USA)	Ph.D. 1889 Berlin (Johann Tiemann)
Stieglitz, Mary Rising	1889 - 1977	American (b. Ainsworth, Nebraska, USA)	Ph.D. 1920 Chicago (Julius Stieglitz)

Strassmann, Fritz	1902 -	German (b. Boppard, Germany)	Dr.Ing. 1929 Hannover (Hermann Braune) Co-discoverer of nuclear fission with Otto Hahn and Lise Meitner (1934 - 1945)
Strassmann-Heckter, Maria Caroline	1898 - 1956	German (b. Hannover, Germany)	Dr.Ing. 1934 Hannover (Gustav Keppeler)
Tarbell, Dean Stanley	1913 - 1999	American (b. Hancock, New Hampshire, USA)	Ph.D. 1951 Harvard (Paul D. Bartlett)
Tarbell, Ann Tracy		American (b. Helena, Montana, USA)	Ph.D. 1941 Columbia (Robert C. Elderfield)

(iii) Brothers combination

Ångström, Anders Jonas (physicist)	1814 - 1874	Swedish (b. Lögdö, Sweden)	Ph.D. 1839 Uppsala angstrom unit of length (1868)
Ångström, Knut Johan (physicist)	1857 - 1910	Swedish (b. Uppsala, Sweden)	Ph.D. 1885 Uppsala

Bohr, Niels Henrik David (physicist) Nobel Prize Physics 1922	1885 - 1962	Danish (b. Copenhagen, Denmark)	Ph.D. 1911 Copenhagen (C. Christiansen) Bohr radius, Bohr orbit, Bohr magneton, Bohr theory, Bohr model of atom (1913), bohrium (element 107), Bohr correspondence principle (1921)
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Bohr, Harald (mathematician)	1887 - 1951	Danish (b. Copenhagen, Denmark)	Ph.D. 1915? Copenhagen Bohr-Landau theorem (1914)
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Börnstein, Richard (physicist/chemist)	1852 - 1913	German (b. Königsberg, Prussia)	Ph.D. 1872 Goettingen (Christian Felix Klein)
Börnstein, Ernst Gustav (chemist)	1854 - 1932	German (b. Königsberg, Prussia)	Ph.D. 1877 Bonn (August Kekulé)

Compton, Arthur Holly (physicist) Nobel Prize Physics 1927	1892 - 1962	American (b. Wooster, Ohio, USA)	Ph.D. 1916 Princeton (Owen W. Richardson) Compton effect, Compton wavelength (1923)
Compton, Karl Taylor (physicist)	1887 - 1954	American (b. Wooster, Ohio, USA)	Ph.D. 1912 Princeton (Owen W. Richardson)

Curie, Pierre (physicist) Nobel Prize Physics 1903	1859 - 1906	French (b. Paris, France)	Dr. Sc. 1895 Sorbonne Curie law, Curie temperature, Curie point (1880), discovery of piezoelectricity (1880)
Curie, Jacques (physicist)	1856 - 1941	French (b. Paris, France)	Dr.Sc. 1889 Paris (Charles Friedel) Curie law, Curie temperature, Curie point (1880), discovery of piezoelectricity (1880)

de Broglie, Prince Louis Victor Pierre Raymond, 7th Duc (physicist) Nobel Prize Physics 1929	1892 - 1987	French (b. Dieppe, France)	Dr.Sc. 1924 Sorbonne (Maurice de Broglie) de Broglie's law, de Broglie wavelength (1925)
de Broglie, Louis César Victor Maurice, Duc (physicist)	1875 - 1960	French (b. Paris, France)	Dr.Sc. 1908 Paris

D'Elhuyar, Don Juan José	1754 - 1796	Spanish (b. Logroño, Spain)	1770s Freiberg School of Mines (Abraham Werner) discovered tungsten (W) in 1783 in Vergara, Spain
D'Elhuyar, Don Fausto	1755 - 1833	Spanish (b. Logroño, Spain)	1770s Freiberg School of Mines (Abraham Werner) discovered tungsten (W) in 1783 in Vergara, Spain

Du Bois-Reymond, Emil Heinrich (electrophysiologist)	1818 - 1896	German (b. Berlin, Germany)	MD 1843 Berlin (Johannes Müller; Eduard Hallmann)
Du Bois-Reymond, Paul David Gustav (mathematician)	1831 - 1889	German (b. Berlin, Germany)	Ph.D. 1859 Berlin; Königsberg (Franz Neumann)

Fabry, Charles (physicist)	1867 - 1945	French (b. Marseilles, France)	D.Sc. 1892 Paris (Jules C.A. Macé de Lépinay)
Fabry, Charles Eugène (mathematician)	1856 - 1944	French (b. Marseilles, France)	D.Sc. 1885 Paris (Charles Hermite)
Fabry, Louis (mathematician, astronomer)	1862 - 1939	French (b. Marseilles, France)	D.Sc. 1893 Paris (F. Tisserand)

Guye, Phillipe Auguste (chemist)	1862 - 1922	Swiss (b. Geneva, Switzerland)	DSc. 1884 Geneva (Carl Graebe)
Guye, Charles Eugène (physicist)	1866 - 1942	Swiss (b. St. Christophe, Switzerland)	DSc. 1889 Geneva (Charles Soret)

Hückel, Erich Armand Arthur Joseph (physicist)	1896 - 1980	German (b. Berlin- Charlottenburg, Germany)	Ph.D. 1921 Goettingen (Peter Debye), Hückel molecular orbital, Hückel MO theory (1931) , Debye-Hückel law (1923)
Hückel, Walter Karl Friedrich Bernhard (chemist)	1895 - 1973	German (b. Charlottenburg, Germany)	Ph.D. 1920 Goettingen (A.Windaus)

Kayser, Heinrich Johannes Gustav (physicist)	1853 - 1940	German (b. Bingen- am-Rhein, Germany)	Ph.D. 1879 Berlin (Hermann von Helmholtz)
Kayser, Friedrich Heinrich Emmanuel (geologist, paleontologist)	1845 - 1927	German (b. Königsberg, Prussia)	Ph.D. 1870 Berlin

Kiliani, Heinrich (chemist)	1855 - 1945	German (b. Würzburg, Bavaria, Germany)	Ph.D. 1880 Munich (Emil Erlenmeyer) Kiliani-Fischer synthesis (1885/1889)
Kiliani, Martin (chemist)	1858 - 1895	German (b. Würzburg, Bavaria, Germany))	

Levi, Giorgio Renato (chemist)	1895 - 1965	Italian (b. Ferrara, Italy)	Ph.D. 1916 Padua (Giuseppe Bruni)
Levi, Tullio Guido (chemist)	1899 - ?	Italian (b. Rome, Italy)	Ph.D. 1921 Naples (E. Cardoso)

<i>Longuet-Higgins, Hugh Christopher</i> (chemist)	1923 -	British (b. England)	Ph.D. 1948 Oxford (Ronald P. Bell)
<i>Longuet-Higgins, Michael Selwyn</i> (physicist)	1925 -	British (b. England)	Ph.D. 1951 Cambridge

London, Fritz Wolfgang (physicist)	1900 - 1954	German-American (b. Breslau, now Wroclaw, Poland)	Ph.D. 1921 Munich (philosophy) London dispersion forces, Heitler- London treatment (1927)
London, Heinz (physicist)	1907 - 1970	German (b. Bonn, Germany)	Ph.D. 1934 Breslau (Franz Eugen Simon)

Lossen, Wilhelm (chemist)	1838 - 1906	German (b. Kreuznach, Germany)	Ph.D. 1862 Goettingen (Friedrich Wohler) Lossen rearrangement (1872)
Lossen, Karl August (geologist)	1841 - 1893	German (b. Kreuznach, Germany)	B.Sc. 1866 Halle

Madelung, Erwin (physicist)	1881 - 1972	German (b. Bonn, Germany)	Ph.D. 1905 Goettingen (Hermann Th. Simon) Madelung constant, series (1918)
Madelung, Walter Otto (chemist)	1879 - ?	German (b. Bonn, Germany)	Ph.D. 1905 Strasbourg (Johannes Thiele)

Meyer, Oskar Emil (physicist)	1834 - 1909	German (b. Varel, Jade, Oldenburg, Germany)	Ph.D. 1860 Koenigsberg (Franz Neumann)
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Meyer, Julius Lothar (chemist)	1830 - 1895	German (b. Varel, Jade, Oldenburg, Germany)	MD 1854 Wuerzburg (Rudolf Virchow; work done with Robert Bunsen at Heidelberg) Ph.D. 1858 Breslau (work done with Franz Neumann at Koenigsberg)
Oppenheimer, Julius Robert (physicist)	1904 - 1967	American (b. New York, New York, USA)	Ph.D. 1927 Goettingen (Max Born) Born-Oppenheimer approximation (1927)
Oppenheimer, Frank Friedman (physicist)	1912 - 1985	American (b. New York, New York, USA)	Ph.D. 1939 Cal Tech
Przibram, Karl (physicist)	1878 - 1973	Austrian (b. Vienna, Austria)	Ph.D. 1901 Graz
Przibram, Hans Leo (biochemist)	1874 - 1944	Austrian (b. Vienna, Austria)	Ph.D. 1899 Vienna (B. Hatschek)
Reformatskii, Sergei Nikolaevich (chemist)	1860 - 1934	Russian (b. Borisoglebskoe, near Ivanovo, Russia)	Ph.D. 1890 Warsaw (Aleksandr Saytzeff) Reformatskii reaction (1887)
Reformatskii, Aleksandr Nikolaevich (chemist)	1864 - 1937	Russian (b. Borisoglebskoe, near Ivanovo, Russia)	
Rochow, Eugene G.	1909 - 2002	American (b. Newark, New Jersey, USA)	Ph.D. 1935 Cornell (Louis M. Dennis)

Rochow, Theodore G.	1907 -	American (b. Newark, New Jersey, USA)	Ph.D. 1935 Cornell (C.W. Mason)
Rose, Heinrich (chemist)	1795 - 1864	German (b. Berlin, Germany)	Ph.D. 1821 Kiel; studied in Paris with Berthollet, Vauquelin, and Gay-Lussac; in Stockholm with Berzelius
Rose, Gustav (chemist)	1798 - 1873	German (b. Berlin, Germany)	Ph.D. 1821 Berlin; studied in Stockholm with Berzelius
Saytzeff, Aleksandr Mikhailovich (also Zaitsev, Saytzev) (chemist)	1841 - 1910	Russian (b. Kazan, Russia)	Ph.D. 1866 Leipzig (Adolf Hermann Kolbe); Ph.D. 1870 Kazan (Aleksandr M. Butlerov) Saytzeff rule (1875)
Saytzeff, Mikhail Mikhailovich (also Zaitsev, Saytzev) (chemist)	1845 - ?	Russian (b. Kazan, Russia)	Discovered reduction of acid chlorides to aldehydes using hydrogen and palladium (1872) (<i>J. Prakt. Chem.</i> 1872 , <u>6</u> , 128)
Schiff, Hugo Joseph (chemist)	1834 - 1915	German (b. Frankfurt, Germany)	Ph.D. 1857 Goettingen (Friedrich Wohler) Schiff base, Schiff's reagent (1864)
Schiff, Moritz (physiologist)	1823 - 1896	German (b. Frankfurt, Germany)	MD 1843 Goettingen (Rudolf Wagner)
Schlenk, Wilhelm (chemist)	1879 - 1943	German (b. Munich, Germany)	Ph.D. 1905 Munich (Oskar Piloty) Schlenk tube, Schlenk flask, Schlenk equilibrium (<i>Chem. Ber.</i> 1929 , <u>62B</u> , 920)

Schlenk, Johann Oskar (chemist)	1874 - 1951	German (b. Munich, Germany)	Ph.D. 1899 Munich (Johannes Thiele)
Siemens, Sir Carl Wilhelm (Charles William) (physicist)	1823 - 1883	German-British (b. Lenthe, Hanover, Germany)	
Siemens, Ernst Werner von (physicist, engineer)	1816 - 1892	German-British (b. Lenthe, Hanover, Germany)	1841/2 Goettingen (no degree) siemens unit of conductance (1860)
Thomsen, Julius (Hans Peter Jorgen) (chemist)	1826 - 1909	Danish (b. Copenhagen, Denmark)	Dr. hon. Uppsala, 1877
Thomsen, Thomas Gottfried (chemist)	1841 - 1901	Danish (b. Copenhagen, Denmark)	Copenhagen, 1884 (no degree)
Thomsen, Carl August (chemist)	1834 - 1894	Danish (b. Copenhagen, Denmark)	Lecturer at Polytech. Copenhagen
Tinbergen, Jan (economist) Economics Nobel 1969	1903 - 1994	Dutch (b. The Hague, Netherlands)	Ph.D. 1929 Leiden (Paul Ehrenfest)
Tinbergen, Nikolaas (ethologist) Physiology & Medicine Nobel 1973	1907 - 1988	Dutch (b. The Hague, Netherlands)	Ph.D. 1932 Leiden (C.J. van der Klaauw)
Weber, Wilhelm Eduard (physicist)	1804 - 1891	German (b. Wittenberg, Germany)	Ph.D. 1826 Halle (Johann C.S. Schweigger) weber unit of magnetic flux (1848)

Weber, Ernst Heinrich (anatomy & physiology)	1795 - 1878	German (b. Wittenberg, Germany)	MD 1815 Wittenberg; Ph.D. 1926 Vienna (F. Ehrenhaft) Weber-Fechner law of skin stimuli sensitivity (1834)
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Wien, Max Carl Werner (physicist)	1866 - 1938	German (b. Königsberg, East Prussia)	Ph.D. 1888 Berlin (Hermann Helmholtz)
Wien, Wilhelm Carl Werner Otto Fritz Franz (physicist) Physics Nobel 1911	1864 - 1928	German (b. Gaffken bei Fischhausen, East Prussia)	Ph.D. 1886 Berlin (Hermann Helmholtz) Wien displacement (1893)

Zeleny, John (physicist)	1872 - 1951	American (b. Racine, Wisconsin, USA)	Ph.D. 1906 Minnesota
Zeleny, Anthony (physicist)	1870 - 1947	American (b. Racine, Wisconsin, USA)	Ph.D. 1907 Minnesota

Zemplén, Gyözö Victor (physicist)	1879 - 1916	Hungarian (b. Nagy-Kanizsa, Hungary)	Ph.D. 1902 Budapest (Baron Roland Eötvös)
Zemplén, Géza (chemist)	1883 - 1956	Hungarian (b. Trencsen, Hungary)	Ph.D. 1904 Budapest (Anton Karl von Than) post-doctoral at Berlin (Emil Fischer)

(iv) Brother-Sister combination

Pockels, Agnes (physicist)	1862 - 1935	Austrian (b. Venice, Italy)	
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Pockels, Friedrich Karl Alwin (physicist)	1865 - 1913	Austrian (b. Vicenza, Italy)	Ph.D. 1888 Goettingen (Waldemar Voigt) Pockels cell, Pockels effect (1889)
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Noyes, Mary Chilton (physicist)	1855 - 1936	American (b. ?)	Ph.D. 1892 Iowa State (or Ph.D. 1895 Case Western Reserve or Cornell)
Noyes, William Albert (chemist)	1857 - 1941	American (b. Independence, Iowa, USA)	Ph.D. 1882 Johns Hopkins (Ira Remsen)

(v) Uncle-Nephew combination

Hertz, Heinrich Rudolf	1857 - 1894	German (b. Hamburg, Germany)	Ph.D. 1880 Berlin (Hermann Helmholtz) Hertz unit (1889)
Hertz, Gustav L. (physicist) Physics Nobel 1925	1887 - 1975	German (b. Hamburg, Germany)	Ph.D. 1911 Berlin (James Franck, Hans Rubens)

Kharasch, Morris Selig (chemist)	1895 - 1957	Ukrainian-American (b. Kremenetz, Ukraine)	Ph.D. 1919 Chicago (Jean F. Piccard)
Kharasch, Norman	1914 -	Polish-American (b. Poland)	Ph.D. 1944 Northwestern

Neumann, Franz Ernst (mathematician, physicist)	1798 - 1895	German (b. Joachimsthal, Germany, now Jachymov, Czech Republic)	Ph.D. 1825 Berlin (Christian S. Weiss) Neumann's law (1831)
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Neumann, Ernst Richard Julius (mathematician)	1875 - ?	German (b. Königsberg, Prussia, now Kaliningrad, Lithuania)	Ph.D. 1898 Leipzig
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Schiff, Hugo Joseph (chemist)	1834 - 1915	German (b. Frankfurt, Germany)	Ph.D. 1857 Goettingen (Friedrich Wohler) Schiff base, Schiff's reagent (1864)
Schiff, Robert (chemist) (son of Moritz Schiff)	1854 - 1940	German (b. Frankfurt, Germany)	Ph.D. 1876 Zurich

(5) Knighted scientists

Abel, Sir Frederick Augustus	1827 - 1902	British (b. London, England)	Invented cordite (mixture of guncotton and dynamite, with Sir James Dewar) (1879)
<i>Baldwin, Sir Jack E.</i>	1938 -	British (b. Bow Bells, U.K.)	Baldwin's rules (1976)
Barton, Sir Derek Harold Richard Nobel Prize Chemistry 1969	1918 - 1998	British (b. Gravesend, Kent, England)	Barton reaction (1960)
Blagden, Sir Charles	1748 - 1820	British (b. Wooten-under-Edge, Gloucestershire, England)	Blagden's law (freezing point depression) (1788)
Bragg, Sir William Henry Nobel Prize Physics 1915 Bragg, Sir William Lawrence Nobel Prize Physics 1915	1862 - 1942 1890 - 1971	British (b. Westward, Cumberland, England) British (b. Adelaide, England)	Bragg angle of diffraction, Bragg planes, Bragg reflection indices (1912)

Brewster, Sir David	1781 - 1868	Scottish (b. Jedburgh, Scotland)	Brewster angle, Brewster's law, Brewster's fringes (1815)
Crookes, Sir William	1832 - 1919	British (b. London, England)	discoverer of Thallium in 1861 London, England
Davy, Sir Humphry	1778 - 1829	British (b. Penzance, Cornwall, England)	co-discoverer of Na (1807), K (1807), B (1808), Ca (1808), Ba (1808), Cd (1817)
Dewar, Sir James	1842 - 1923	Scottish (b. Kincardine-on-Forth, Scotland)	Dewar flask (1895), invention of cordite (with Sir Frederick Abel) (1879)
Gilbert, Sir Joseph Henry	1817 - 1901	British (b. Hull, England)	Development of superphosphates as fertilizers (1842)
Hamilton, Sir William Rowan	1805 - 1865	Irish (b. Dublin, Ireland)	Hamiltonian operator (1830)
Haworth, Sir Walter Norman Nobel Prize Chemistry 1937	1883 - 1950	British (b. Chorley, Lancashire, England)	Haworth formula (1929)
Hinshelwood, Sir Cyril Norman Nobel Prize Chemistry 1956	1897 - 1967	British (b. London, England)	Hinshelwood equation (1922)
Ingold, Sir Christopher Kelk	1893 - 1970	British (b. Forest Gate, London, England)	Cahn-Ingold-Prelog convention (1951)
Jeans, Sir James Hopwood	1877 - 1946	British (b. Ormskirk, near Southport, England)	Rayleigh-Jeans law (1900)
Jeffreys, Sir Harold	1891 - 1989	British (b. Fatfield, near Durham, England)	Wenzel-Kramers-Brillouin (WKB) method or JWKB method (Jeffreys- Wenzel-Kramers-Brillouin) (1926)
<i>Jones, Sir Ewart Ray Herbert</i>	1911 - 2002	British (b. Wrexham, Wales)	Jones oxidation (1946), Jones reagent

Kane, Sir Robert John	1809 - 1890	Irish (b. Dublin, Ireland)	Aldol condensation (1838)
Kipping, Sir Frederick Stanley	1863 - 1949	British (b. Manchester, England)	Development of organosilicon chemistry, silicones, plastics (1901 - 1927)
Krebs, Sir Hans Adolf Nobel Prize Physiology or Medicine 1953	1900 - 1981	German-British (b. Hildensheim, Germany)	Kreb's cycle (1935)
Larmor, Sir Joseph	1857 - 1942	Irish (b. Magheragall, Ireland)	Larmor frequency, Larmor precession (1900)
Lawes, Sir John Bennet	1814 - 1900	British (b. Rothamsted, St. Albans, England)	Development of superphosphates as fertilizers (1842)
Lennard-Jones, Sir John Edward	1894 - 1954	British (b. Leigh, England)	Lennard-Jones potential (1924)
Perkin, Sir William Henry	1838 - 1907	British (b. Shadwell, South London, England)	Perkin reaction (1868), Perkin rearrangement (1870)
Pople, Sir John Anthony Nobel Prize Chemistry 1998	1925 - 2004	British-American (b. Burnham-on-Sea, Somerset, England)	Pariser-Parr-Pople theory (1953)
Raman, Sir Chandrasekhara Venkata Nobel Prize Physics 1930	1888 - 1970	Indian (b. Trichinopoly, now Tiruchirappalli, India)	Raman spectroscopy (1928)
Ramsay, Sir William Nobel Prize Chemistry 1904	1852 - 1916	Scottish (b. Glasgow, Scotland)	co-discoverer of Ar (1894), He (1895), Ne (1898), Kr (1898), Xe (1898)
Robinson, Sir Robert Nobel Prize Chemistry 1947	1886 - 1975	British (b. Bufford near Chesterfield, Derbyshire, England)	Robinson annulation (1935)

Roscoe, Sir Henry Enfield	1833 - 1815	British (b. London, England)	Development of actinometry with Robert Bunsen (1855 - 1864)
Stokes, Sir George Gabriel, 1st Baronet	1819 - 1903	British (b. Skreen, County Sligo, Ireland)	Stokes's law of hydrodynamics, Stokes's law of fluorescence (1852), Stokes lines, anti-Stokes lines, Navier-Stokes equations, Stokes shifts
Swan, Sir Joseph Wilson	1828 - 1914	British (b. Sunderland, England)	Patented carbon process for photographic printing (1864), bromide paper (1879); invented dry plate (1871), electric lamp (1860); produced practicable artificial silk
Thomson, Sir Joseph John Nobel Prize Physics 1906	1856 - 1940	British (b. Cheetham Hill, near Manchester, England)	Thomson model of atom (1903)
Thorpe, Sir Jocelyn Field	1872 - 1940	British (b. London, England)	Thorpe reaction (1904)
Tilden, Sir William Augustus	1842 - 1926	British (b. St. Pancras, London, England)	Synthesis of isoprene and its polymerization to a rubber (1879 - 1888)
Townsend, Sir John Sealy Edward	1868 - 1957	Irish (b. Galway, Ireland)	Townsend effect (1922)
Wheatstone, Sir Charles	1802 - 1875	British (b. Gloucester, England)	Wheatstone bridge (1844)
Wilkinson, Sir Geoffrey Nobel Prize Chemistry 1973	1921 - 1996	British (b. Todmorden, Yorkshire, England)	Wilkinson's catalyst (chlorotris(triphenylphosphine) rhodium (I)) (1965)

(6) People?

Kugelrohr apparatus: Ger. *kugel* = ball, sphere *rohr* = tube, pipe

Aufbau principle: Ger. *aufbau* = building up, construction

(7) Often Misspelled Names

Bose, Satyendra Nath ("Satyendranath")	1894 - 1974	Indian (b. Calcutta, India)	bosons
Debye, Peter Joseph Wilhelm (Willem) (real spelling: Debije, Petrus Josephus Wilhelmus) Nobel Prize Chemistry 1936	1884 - 1966	Dutch-American (b. Maastricht, Netherlands)	Debye-Hückel law (1923), Debye unit of electric dipole moment, Debye equation for polarization, Debye length, Debye temperature, Debye T^3 law (1912)
Hasselbalch, Karl Albert ("Hasselbach")	1874 - 1962	Danish (b. ?)	Henderson-Hasselbalch equation (1908)

(8) Scientists who did not have formal advisors in their education

Ampère, André Marie	Henry, William
Bose, Satyendra Nath	Klaproth, Martin Heinrich
Brewster, Sir David	Kohlrausch, Rudolf Hermann Arndt
Cahn, Robert Sidney	Larmor, Sir Joseph
Carnot, Nicholas Léonard Sadi	Magnus, Albertus St.
Chapman, Arthur William	Maxwell, James Clerk
Charles, Jacques Alexandre César	Michaelis, Leonor
Clapeyron, Benoît Paul Émile	Michelson, Albert Abraham
Dalton, John	Moseley, Henry Gwyn Jeffreys
Davy, Sir Humphry	Müller, Franz Joseph von Reichenstein

del Rio, Andrés Manuel	Öersted, Hans Christian
Döbereiner, Johann Wolfgang	Peltier, Jean Charles Athanase
Doppler, Johann Christian	Polonovski, Michel
Ehrlich, Paul	Priestley, Joseph
Faraday, Michael	Raney, Murray
Fischer, Joseph Karl Anton	Reamur, Rene-Antoine Ferchault de
Fraunhofer, Joseph von	Siemens, Carl Wilhelm
Galvani, Luigi	Sniadecki, Jędrzej Andrzej
Glover, John	Solvay, Ernest
Gregor, Rev. William	Sommelet, Marcel
Haldane, John Burdon Sanderson	Soret, Jaques Louis
Hatchett, Charles	West, Randolph
Henderson, Lawrence Joseph	Wollaston, William Hyde

(9) Interesting Tidbits

1. **Morris William Travers** was 26 years old when he and **Sir William Ramsay** discovered elements Ne, Kr, and Xe.
2. **Sir William Ramsay** discovered the noble gas group (He, Ne, Ar, Kr, Xe) yet no element is named after him.
3. **Sir Humphry Davy** discovered 6 elements (B, Na, K, Ca, Cd, Ba) yet no element is named after him.
4. **Hieronymous Theodor Richter** was 19 when he discovered In (indium).
5. **Smithson Tennant** discovered Os and Ir (*Phil. Trans.* **1804**, 94, 411) and proved that diamond is pure carbon
6. (*Phil. Trans.* **1797**, 87, 123). He died in a horse riding accident.
7. **Frederick Soddy** coined the term *isotope*.
8. Idea of potential energy surfaces was proposed by **René Marcelin** (1885 - 1914).
9. Latent heat and specific heat were discovered by **Joseph Black** (1728 - 1799).
10. Neutron was discovered by **Sir James Chadwick** (1891 - 1974). Electron was discovered by **Sir Joseph John Thomson** (1856 - 1940).
11. Molecular orbital theory was proposed by **Charles Alfred Coulson** (1910 - 1974).
12. Theory of valence was originated by **Sir Edward Frankland** (1825 - 1899).
13. Law of conservation of charge was formulated by **Benjamin Franklin** (1706 - 1790).

14. The words galvanize and galvanometer are named after **Luigi Galvani** (1737 - 1798) although he did not invent the process or the instrument.
15. The first classifier of organic compounds was **Auguste Laurent** (1807(8) - 1853).
16. Radiocarbon dating invented by **Willard Frank Libby** (1908 - 1980).
17. Chromosome theory of heredity was proposed by **Thomas Hunt Morgan** (1866 - 1945).
18. First person to synthesize a gene was **Har Gobind Khorana** (1922 -).
19. Earliest classification of the elements (the Law of Octaves) was proposed by **John Alexander Reina Newlands** (1837- 1898). He formulated concept of periodicity in properties of elements before Mendeleev but they were not accepted at the time.
20. **Hans Christian Oersted** (1777 - 1851) discovered that an electric current produces an associated magnetic field.
21. **Friedrich Wilhelm Ostwald** (1853 - 1932) is considered the pioneering father of physical chemistry.
22. **Pierre Joseph Pelletier** (1788 - 1842) pioneered alkaloid chemistry; discovered quinine, caffeine, strychnine, colchicine, veratrine, and chlorophyll.
23. First definitive demonstration that atoms exist was made by **Jean Baptiste Perrin** (1870 - 1942).
24. The founding fathers of stereochemistry are **Jacobus Henrikus van't Hoff** (1852 - 1911) and **Joseph Achille Le Bel** (1847 - 1930).
25. **Richard Willstatter** (1872 - 1942) discovered the structure of chlorophyll.
26. **Soren Sorensen** (1868 - 1939) invented pH scale for acidity.
27. Niobium (Nb) was originally named columbium (Cb). Element francium (Fr) was originally named actinium K.
28. Element radon (Rn) was named after element radium (Ra).
29. **John Wesley Hyatt** (1837 - 1920) invented celluloid, the first man-made plastic.
30. **Frederick Stanley Kipping** (1863 - 1949) invented the term "silicone".
31. **Archer John Porter Martin** (1910 -) invented paper chromatography; was a Chemistry Nobel Laureate in 1952.
32. **Viktor Meyer** (1848 - 1897) discovered thiophene and concept of steric hindrance.
33. **Thomas Midgley** (1889 - 1944) discovered that tetraethyl lead is a good anti-knocking agent in gasoline; also introduced freons in refrigerators.
34. **Paul Hermann Müller** (1899 - 1965) invented insecticide DDT; was a Physiology & Medicine Nobel Laureate in 1948.

35. Concepts of hybridization of atomic orbitals and chemical bonding were proposed by **Linus Carl Pauling** (1901 - 1994); was Chemistry (1954) and Peace (1962) Nobel Laureate, the first to win two unshared Nobel Prizes.
36. **Joseph Louis Proust** (1754 - 1826) proposed that every true chemical compound has exactly the same composition regardless of how it is prepared (Proust's Law).
37. **Henri Victor Regnault** (1810 - 1878) invented the air thermometer and hygrometer. He discovered carbon tetrachloride.
38. **Karl William Scheele** (1742 - 1786) discovered the following compounds:
39. arsenic acid, arsine, barium oxide, benzoic acid, calcium tungstate (scheelite), citric acid, chlorine, copper arsenite (Scheele's green), gallic acid, glycerol, hydrogen cyanide, hydrocyanic acid, hydrogen fluoride, hydrogen sulfide, lactic acid, malic acid, manganese, manganates, molybdic acid, nitrogen gas, oxalic acid, oxygen, permanganates, silicon tetrafluoride, tartaric acid, tungstic acid, uric acid.
40. **Rudolf Schoenheimer** (1898 - 1941) used isotopes as tracers to study biochemical reactions.
41. **Harold Clayton Urey** (1893 - 1981) discovered deuterium and heavy water.
42. **Louis Nicolas Vauquelin** (1763 - 1829) discovered asparagine, pectin, malic acid in apples, camphoric acid, quinic acid.
43. **Alfred Werner** (1866 - 1919) invented theory of co-ordination bonding in molecules.
44. **Eugen Baumann** (1846 - 1896) discovered thyroxin, an iodine containing organic compound found in the thyroid gland.
45. **Hans Goldschmidt** (1861 - 1923) invented the welding process.
46. **Ludwig Knorr** (1859 - 1921) discovered antipyrine (1833), quinoline and pyrazole (1844).
47. **Carl Ludwig Schotten** (1853 - 1910) discovered piperidine and bile acids.
48. **Friedrich August Raschig** (1863 - 1928) discovered nitramide and chloramine.
49. **Andrew Norman Meldrum** (1876 - 1934) was a chemical educator and a chemical historian.
50. **Mikhail Semenovich Tswett** (1872 - 1919) was a Russian-Polish botanist who invented method of separation of compounds by column chromatography using a solid support (absorbent) and solvent (diluent). He performed the first separation on spinach leaves extract and obtained four separate pigments (*Ber. Deut. Botan. Gesell.* **1906**, 24, 385).
51. **Ludwig Ferdinand Wilhelmy** (1812 - 1864) was the first to formulate rate laws as differential equations, rate concentration dependence, and temperature dependence of rates. The first studied kinetic reaction was the inversion of sucrose by acid using polarimetry published in 1850 (*Ann. Physik* **1850**, 81, 413; 499). He obtained his doctorate in 1846 in

Heidelberg and then was a Privatdozent there from 1849 to 1854. Soon after he left chemistry and led a private life in Berlin.

52. **Egor Egorovich Wagner** (1849 - 1903) used the German spelling of his name (Georg Wagner) in publications.
53. **Vladimir Markovnikov** (1838 - 1904) used the spelling Markownikoff; **Sergei Reformatskii** (1860 - 1934) used the spelling "Sergius Reformatsky". **Alexandr Saytzeff** (1841 - 1910) used the spelling "Saytzeff".
54. **Carl Friedrich Mohr** (1806 - 1879) invented the technique of titration. He was an apothecary.
55. **Karl Pearson** (1857 - 1936) invented the chi-square statistical test.
56. **Eilhard Mitscherlich** (1794 - 1863) discovered isomorphism, the observation that substances of analogous chemical composition crystallize in the same crystal form.
57. **Theodor Svedberg** (1884 - 1971) invented the ultracentrifuge.
58. **Aleksandr Borodin** (1833 - 1887) was a noted composer (*Prince Igor*) as well as a chemist (Borodin-Hunsdiecker reaction, discovered by Borodin in 1861 and rediscovered by Heinz and Clare Hunsdiecker in 1942).
59. **Lord Kelvin's** real name was **William Thomson**. Kelvin is the name of a river in Scotland. Among his accomplishments include: creating the first physics lab in Britain, suggesting the process of refrigeration, playing a leading role in laying down the first transatlantic cable in 1858, urging the adoption of the metric system and cgs (centimetre-gram-second) absolute system of measurement, introducing terms "susceptibility" and "permeability", reforming the mariner's compass (1873 - 1878), and inventing a tide predicting machine. He is buried in Westminster Abbey next to **Sir Isaac Newton**.
60. **Walter Norman Haworth** coined the term "conformation".
61. **Mikhail Saytzeff** (brother of Alexandr) discovered the transformation of acid chlorides to aldehydes (*J. Prakt. Chem.* **1872**, 6, 128) before Rosenmund (*Chem. Ber.* **1918**, 51, 585), yet the reaction is known as the Rosenmund reduction.
62. **Don Fausto D'Elhuyar** is given credit for the discovery of tungsten, however, it was his older brother **Don Juan** who actually deserves the credit. **Don Fausto** was the one who had a research position in Vergara, not his brother, and he had outlived **Don Juan** by 37 years.
63. **Victor Meyer** (discoverer of oximes and thiophene), **Christian Grotthuss** (Grotthuss-Draper law, and Grotthuss chains), **Hans von Pechmann** (Pechmann reaction), **Wallace Carothers** (discoverer of neoprene and nylon), and **Ludwig Boltzmann** (Boltzmann constant and Maxwell-Boltzmann statistics) all committed suicide. **Lev Chugaev** died from

typhus in 1922; **Pierre Curie** died in a traffic accident in 1906; **Oskar Piloty** (advisor of **Wilhelm Schlenk**) died in action in World War I (He had enlisted when he found out his son also died in action in the war); **Smithson Tennant** (discoverer of osmium and iridium, and proved that diamond is a form of carbon) died in a horse riding accident in 1815.

64. Boyle's law had been known in France as Mariotte's law after **Edme Mariotte** (1620 - 1684) who had discovered it in 1676, fourteen years after **Robert Boyle**.
65. **Jacques Alexandre César Charles** discovered the relationship between volume and temperature of a gas in 1787 but did not publish his results. Instead he communicated them to **Gay-Lussac** who published what is now known as Gay-Lussac's law in 1802, six months after **John Dalton** who also deduced the law independently.
66. **Gustav Robert Kirchhoff** established the loop (voltage law) and point (current law) rules for circuit analysis in 1845 - 1856 while still a student at the University of Königsberg, Prussia. His work spanned a wide variety of subjects: electrolytes, diffraction, heat radiation, and circuit analysis and his name has been associated with laws in all four areas. He is also claimed to be a co-discoverer of the elements rubidium and cesium.
67. **Josef Loschmidt** and **Johann Balmer** were both school teachers in Austria and Switzerland respectively. They did not have formal doctoral degrees. Loschmidt's great contributions to structural organic chemistry were written in a 53-page book entitled *Chemische Studien* in 1861. He used a notation resembling Venn diagrams to depict aromatic structures, dicarboxylic acids, sugars, and sulfur compounds of varying oxidation states. He also was the first to suggest that three oxygen atoms could represent the structure of ozone, the depiction of double and triple bonds for ethylene and acetylene, and the proposal of a cyclic structure for the then as yet hypothetical cyclopropane. His ideas were largely ignored and ridiculed particularly by Friedrich August Kekulé who referred to Loschmidt's structures as "Confusionsformeln". However, Richard Anschütz, a student of Kekulé, discovered Loschmidt's book in 1910 and began to popularize his work. Loschmidt left chemistry and became a physicist largely due to the encouragement and mentorship of Viennese physicists Ludwig Boltzmann and Josef Stefan. In 1865 he determined the number of molecules in one cubic millimeter of gas under standard conditions. Avogadro's number was known as Loschmidt's number in Germany and was taught as such in German schools. Loschmidt's contributions to physics and chemistry have only recently been recognized in the form of a symposium in Vienna in July 1995 (see Fleischhacker, W.; Schönfeld, T. (eds.) *Pioneering Ideas for the Physical and Chemical Sciences*, Plenum Press: New York, 1997.)

68. **Rudolf Clausius** deduced that light scattering is responsible for the blue colour of the sky during the day and red at sunrise and sunset (*Ann. Physik* **1849**, 76, 161; 188).
69. **Pierre Bouguer** had discovered that light transmission decreases with the thickness of a transparent sample in 1729. This law was later rediscovered by Lambert, a mathematician, and then by Beer, who published in 1852 what is now known as the Beer-Lambert-Bouguer law. Beer's 1852 paper is the one that is often cited in older textbooks. Bouguer's contribution is rarely mentioned and the law is known as either "Beer's law" or "the Beer-Lambert law".
70. The **Leyden jar** is named after the University of Leyden where Peter von Muschenbrock invented it in 1746. It was also invented independently by Dean von Kleist in Camil, Germany in 1745.
71. **Walter Gilbert's** educational pathway is an excellent example of cross-disciplinary studies and changing career paths. He studied physics and chemistry at Harvard College in 1953. He then did a Ph.D. in mathematical physics at Cambridge University in 1957. During his first faculty position (1957 - 1964) at Harvard as a theoretical physicist he began research in molecular biology with James D. Watson. He fully switched to biophysics in 1964. His name is associated with the DNA sequencing method along with **Allan Maxam**.
72. **Erik Clemmensen** of the Clemmensen reduction reaction also invented preservative processes for canned goods.
73. **John Joseph Griffin** was a bookseller-publisher who also was a dealer in scientific apparatus. The company name was J.J. Griffin & Sons of Covent Garden which later became Griffin & George Ltd. The common beaker is often named the Griffin beaker.
74. **Felix Richard Allihn**, whose name is attached to the Allihn condenser, was a glassblower whose enterprise was based in Berlin, Germany under the name Warmbrunn, Quilitz, & Co. **Henri Vigreux** was also a glassblower and a distillation column is named after him.
75. **Pierre Maurice Marie Duhem's** original doctoral thesis in 1884 challenged **Pierre Eugene Marcelin Berthelot's** principle of maximum work which stated that the criterion of reaction spontaneity is the heat of reaction. Duhem suggested that free energy was the criterion, an assertion that was later confirmed by **Willard Josiah Gibbs** and **Hermann von Helmholtz**. Berthelot had considerable influence and had Duhem's thesis refused resulting in Duhem choosing another thesis topic on the theory of magnetism (1888). Duhem later published his original thesis ideas as a book, "Le Potentiel Thermodynamique", 1886. Fortunately, Duhem's contribution was given credit in the naming of the Gibbs-Duhem equation.

76. **August Kekule** did his initial studies in architecture in Giessen in 1847 before beginning his studies in chemistry under Heinrich Will. It is not surprising then how he was able to transfer his skill in architecture to molecular architecture.
77. **Sir William Rowan Hamilton** was an Irish mathematician who defined the Hamiltonian operator named after him. His work lay dormant for over 100 years before the rise of quantum mechanics!
78. Two Russian scientists, **Aleksandr Saytzeff** and **Nikolai Menshutkin**, appear to have obtained “double Ph.D.” degrees from different institutions. Saytzeff originally worked for Hermann Kolbe in Leipzig and obtained his doctorate in 1866. When he returned to Kazan his degree was not recognized and he then obtained a second doctorate in 1870 under the direction of **Aleksandr Butlerov**. Obtaining his degree in a foreign university was somehow frowned upon although Butlerov himself obtained his doctorate in St. Petersburg for work he had done in Giessen under Justus Liebig in the late 1830’s. Kolbe was instrumental in influencing the Russians in his “second” thesis defense. Menshutkin first obtained his Dr. Phil. degree in 1862 at St. Petersburg. Between 1863 and 1865 he then went to Germany and France to gain hands-on experimental experience under Adolf Strecker in Tübingen (2 semesters), Charles Wurtz in Paris (1 year), and Hermann Kolbe in Marburg (1 semester). When he returned to St. Petersburg his original doctoral degree was not recognized even though he had obtained it in Russia. His biographers give little information as to why, except to hint that the decision may have been politically motivated. The phrase “he was sent down” was used to describe this demotion. At St. Petersburg he obtained his master and doctorate degrees in 1866 and 1869, respectively.
79. **James Prescott Joule** came from a wealthy brewing family. His papers on the relationship between heat and electric current were initially rejected by the *Royal Society*. He then published them in a newspaper called the *Manchester Courier* whereupon **Lord Kelvin** read them and brought them back to the attention of the Royal Society whereupon they were accepted.
80. **Josiah Willard Gibbs** (1839 – 1903) was awarded one of the first Ph.D. degrees in the United States from Yale University in 1863. He was appointed as a professor there in 1871 and for 9 years was not paid a salary. Once he had a job offer from Johns Hopkins University in Maryland, Yale began to pay him. He gained little recognition for his work during his lifetime mainly because of his inability to communicate his ideas so that others could understand the concepts he was discussing, and also because he had published in an obscure journal called the *Transactions of the Connecticut Academy of Science* **1875 – 8**.

Lord Kelvin for example was unimpressed by Gibbs work. However, if it had not been for Dutch physical chemist **Hendrik Roozeboom's** (1854 - 1907) popularization of Gibbs phase rule in intelligible terms, he may not have received any recognition at all. Roozeboom's experimental verification of the rule was published in 1887 (*Rec. Trav. Chim. Pays-Bas* **1887**, 6, 262). Gibbs' papers were translated into German by Friedrich Ostwald in 1892 and into French by Henri Le Chatelier in 1899. **James Clerk Maxwell** (1831 – 1894) was the only reported person to have understood Gibbs work at the time because he worked out the maths himself.

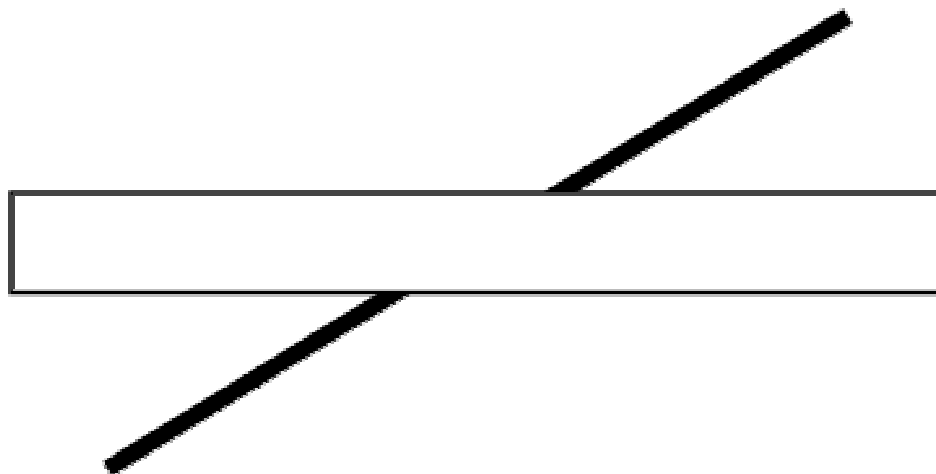
81. **John William Draper** whose name is associated with the Grotthuss-Draper law of photochemical absorption by molecules obtained his early professional training in medicine, earning an M.D. degree in 1836 from the University of Pennsylvania. He was also one of the pioneers of photography. In 1840 he took the very first portrait photograph. It was of his sister Dorothy Catherine. He also took the first astronomical photograph, a daguerrotype of the moon. He was also elected the first president of the *American Chemical Society* in 1876.
82. **Svante Arrhenius** did not have an easy time defending his doctoral thesis in 1884 at the University of Uppsala. He had originally snubbed that university citing that he couldn't find an appropriate advisor to work for. There were only two possible choices an inorganic chemist, **Per Theodor Cleve**, (discoverer of holmium and thulium), and **Tobias Thalen**, a spectroscopist. He went to work under the direction of **Eric Edlund** at the Physical Institute for the Swedish Academy of Sciences. **Friedrich Ostwald** played a significant role in supporting Arrhenius' research ideas. Arrhenius was also involved in immunochemistry, cosmology, origin of life, and causes of the Ice Age. He was the first to coin the term "greenhouse effect" in a paper entitled "On the Influence of Carbonic Acid in the Air Upon the Temperature of the Ground", published in *Philosophical Magazine* **1896**, 41, 237.
83. **Friedrich Ostwald** was the first to realize what a catalyst is in his paper in *Zeitschrift fur Physikalische Chemie* **1894**, 15, 705. He denied the existence of atoms, ions, and molecules until **Sir Joseph John Thomson's** experiments on cathode rays, and **Jean Baptiste Perrin's** experiments on Brownian movement. He became disillusioned with chemistry and academic life in his late forties.
84. **Adolf Baeyer** discovered barbiturates in 1863. The name originated from the first name of his girlfriend at the time, Barbara. This relationship evidently didn't last as he married Adelheid Bendemann, the daughter of his father's friend, in 1868.
85. The following scientists were also clergymen: **Thomas Bayes** (Bayes theorem), **St. Albertus Magnus** (discoverer of arsenic), **Reverend William Gregor** (discoverer of

- titanium), **Albert Abraham Michelson** (Michelson-Morley experiment), and **Julius Arthur Nieuwland** (Nieuwland alkyne coupling reaction).
86. **John Lennard-Jones** was the first to introduce the concept constructing molecular orbitals as a linear combination of atomic orbitals (LCAO approximation) (*Trans. Faraday Soc.* **1929**, 25, 668).
87. **Louis Pasteur** was the first to propose the principle of optical activity based on structure and the definition of enantiomeric structures as non-superimposable mirror images (*Ann. Chim. Phys.* **1848**, 24, 442).
88. **William Christopher Zeise**, a pharmacist, discovered xanthates (1823), thiols (1833), and sulfides (1836).
89. **Evans blue** is named after **Herbert McLean Evans** (MD 1908, Johns Hopkins) who was an anatomist, embryologist, and endocrinologist. This is the only compound named after someone who did not synthesize the compound or who did not know its chemical structure! He learned about azo dye chemistry from Edwin Goldmann who was a student of **Paul Ehrlich**. Ehrlich did not want to disclose the structure of this naphthalenesulfonic acid dye to Evans so Evans in disgust left Ehrlich's lab and continued his work with the compound in Breslau with Werner Schulemann. This dye is used to measure blood volume in mammals.
90. The **Leyden jar** or capacitor is named after Leyden University. Dean von Kleist of the Cathedral of Camin, Germany and Peter von Muschenbrock, a professor at Leyden University are credited with its invention in 1745-1746. (Ref.: Dummer, G.W.A. *Electronic Inventions and Discoveries: electronics from its earliest beginnings to the present day*, 3rd edition, Pergamon Press: Oxford, 1983)
91. **Tjalling Charles Koopmans**, of Koopmans theorem fame (Koopmans, T., *Physica* **1933**, 1, 104), began his education in quantum mechanics under the direction of **Hans Kramer** (Jeffreys-Wentzel-Kramer-Brillouin method) at the University of Utrecht in the Netherlands. His interests changed to economics under the direction of Jan Tinbergen (Economics Nobel 1969 shared with Ragner Frisch). Jan Tinbergen himself obtained a Ph.D. in quantum physics under **Paul Ehrenfest** (Ehrenfest theorem) in 1929 at Leiden. Koopmans completed his Ph.D. in 1936 with a thesis "Linear Regression Analysis of Economic Time Series". He later went on to win the Economics Nobel in 1975 shared with the mathematician Leonid Kantorovich.
92. **Geza Zemplen** originally studied physics at Berlin in 1905 and took a Ph.D. degree in that subject. He then learned chemistry from **Emil Fischer**, the great carbohydrate chemist. Zemplen went on to study sugars and has the Zemplen degradation of sugars (Zemplen, G.

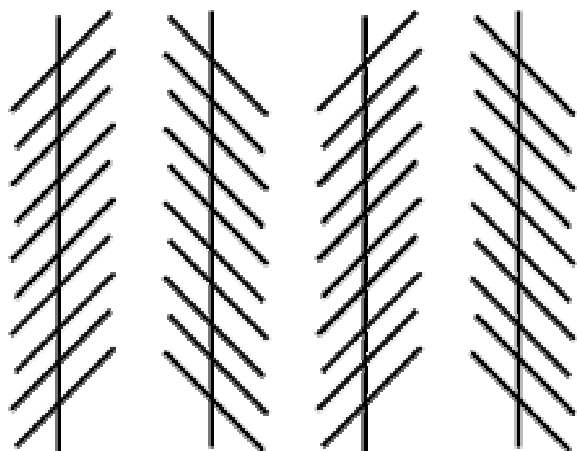
Chem. Ber. **1926**, 59B, 1254) and Zemplen saponification reaction (Zemplen, G.; Kuntz, A. *Chem. Ber.* **1924**, 57B, 1357) named after him.

93. The **Celsius** temperature scale (1742) originally had the boiling point of water set at 0 degrees and the freezing point of water set at 100 degrees. The Uppsala Observatory reversed these limits in 1747.
94. **Archibald Scott Couper** (1831 - 1892) was a Scottish organic chemist who worked under Adolphe Wurtz in Paris in 1858. He wrote a paper in that year entitled *On a New Chemical Theory* in which he argued that carbon was di- or tetravalent and that its atoms could link to form chains. He asked Wurtz to forward the paper to the French Academy of Sciences but Wurtz procrastinated thus allowing Kekulé to publish his own paper on the subject first in May 1858 (*Ann. Chem. Pharm.* **1858**, 106, 129). Couper's paper presented by Jean-Baptiste Dumas appeared in June 1858 (*Compt. Rend.* **1858**, 46, 1157). An English translation also appeared in *Phil. Mag.* **1858**, 16[4] 104. Couper became angry with Wurtz about his apparent loss of priority on his ideas. Wurtz reacted by dismissing Couper from his laboratory. Couper returned to Edinburgh and suffered a permanent depression. He was institutionalized in a mental asylum and was under the care of this mother until he died. Richard Anschütz, a former student of Kekulé, discovered Couper's works and began to popularize them (see Anschütz, R. *Proc. Roy. Soc. Edinburgh* **1909**, 29[4], 193; *Arch. Gesch. Naturwiss. Tech.* **1919**, 1, 219.)
95. **Victor Louis King** (1886 - 1958) was an American doctoral student of **Alfred Werner** in Zurich (Ph.D. 1912) who co-discovered optically active co-ordination compounds. After 1000 recrystallizations he was able to resolve the enantiomorphs of various cis-amminechlorobis(ethylenediamine)cobalt(III) salts. Yet, with all this effort the publication in *Chem. Ber.* only mentions Werner's name as the author; King is mentioned as the author of the experimental section only (see *Chem. Ber.* **1911**, 44, 1887). See also Kauffman, G.B. in *Co-ordination Chemistry: a century of progress*, ACS Symp. Ser. 565, ACS: Washington, 1994, Chapter 1.
96. **Johann Christian Poggendorff** (1796 - 1877) was a German physicist and bibliographer who compiled the biographical-bibliographical reference *Biographisch-Literarisches Handwörterbuch der exakten Naturwissenschaften* in 1863. This reference includes the names of scientists in Europe since the mid-1800s. There are 7 complete "Bands" (I, II, III, IV, V, VI, VIIA, VIIB) with an eighth started in 1999. Each entry includes the full name of the scientist, where and when they completed their doctoral degrees, biographical and obituary references and a list of their publications in scientific journals. In Bands V, VI, and

VIIA most entries also include the name of the scientist's doctoral advisor. Familial relationships between scientists are also noted (e.g., father-son, brothers, uncle-nephew). Poggendorff was also editor of *Annalen der Physik und Chemie* from 1824 to 1877. His name is also associated with the optical illusion called the Poggendorff illusion which he discovered in 1860 after receiving a letter from the astronomer F. Zoellner. Zoellner had described an illusion he noticed in a fabric design in which parallel lines that were intersected by a pattern of short diagonal lines appear to diverge. Poggendorff's illusion was first mentioned in the literature in 1896 (Burmester, E. *Z. Psychologie* **1896**, 12, 355). Important papers describing and explaining this illusion including variations are: (a) Gillam, B. *Perception and Psychophysics* **1971**, 10, 211; (b) Weintraub, D.J.; Krantz, D.H. *ibid.* **1971**, 10, 257; (c) Goldstein, M.B.; Weintraub, D.J. *ibid.* **1972**, 11, 353; (d) Day, R.H. *Quart. J. Exp. Psychol.* **1973**, 25, 535; (e) Fineman, M.B.; Melingonis, M.P. *Perception and Psychophysics* **1977**, 21, 153; (f) Greene, E. *Perception* **1988**, 17, 65.



Poggendorff's illusion



Zoellner's illusion

97. **Tripes** exam at Cambridge University: (taken from *The Shorter Oxford English Dictionary on Historical Perspectives*, C.T. Onions (ed.), Oxford University Press, 1972, pp. 2249 - 2250.) (a) a bachelor of arts appointed to dispute in a humorous or satirical style, with the candidates for degrees at Commencement; so called from the three-legged stool on which he sat (b) a set of humorous verses originally composed by the "Tripes" and (till 1894) published at Commencement after his office was abolished (c) the list of candidates qualified for the honour degree in mathematics, originally printed on the back of the paper containing these verses (1659) (d) the final honours examination for the BA degree in mathematics, consisting of two parts (formerly, first and second tripes; now the Mathematics Tripes Parts I and II); later extended to the subsequently founded honours examination in other subjects (1842). **Wrangler** (taken from *The Shorter Oxford English Dictionary on Historical Perspectives*, C.T. Onions (ed.), Oxford University Press, 1972, pp. 2455.) one who has placed in the first class in the mathematical tripes at Cambridge University, 1750; **to wrangle**: to dispute or discuss publicly, as at a university, for or against a thesis, etc. (1570) **wrangership**: the position or rank of a wrangler at Cambridge University.
98. The following scientists obtained degrees in medicine *before* embarking on studies and careers in the physical sciences:

SCIENTIST	YEAR OF MD DEGREE	UNIVERSITY
Baumann, Eugen	1872 (MD)	Tuebingen
Bechamp, Pierre Jacques Antoine	1856 (MD)	Strasbourg

Berthollet, Claude Louis Comte	1778 (MD)	Paris
Berzelius, Jöns Jakob	1802 (MD)	Uppsala
Black, Joseph	1754 (MD)	Edinburgh
Blagden, Sir Charles	1768 (MD)	Edinburgh
Bouveault, Louis	1892 (MD)	Sorbonne
Brandt, Georg	1726 (MD)	Rheims
Cannizzaro, Stanislao	1842 (MD)	Palermo
Crawford, Adair	1780 (MD)	Glasgow
Ehrlich, Paul	1874 (MD)	Breslau
Ehrlich, Paul	1878 (MD)	Leipzig
Fick, Adolph Eugen	1851 (MD)	Marburg
Galvani, Luigi	1762 (MD)	Bologna
Gmelin, Leopold	1812 (MD)	Goettingen
Helmholtz, Hermann von	1842 (MD)	Berlin
Hempel, Walter Mathias	1872 (MD)	Leipzig
Henderson, Lawrence Joseph	1902 (MD)	Harvard
Henry, William	1807 (MD)	Edinburgh
Hess, Germain Henri	1825 (MD)	Dorpat
Jencks, William Platt	1951 (MD)	Harvard
Krebs, Sir Hans Adolf	1925 (MD)	Freiburg
Lohmann, Karl Heinrich Adolf	1834 (MD)	Berlin
Menten, Maud Leonora	1907 (MD)	Toronto
Michaelis, Leonor	1897 (MD)	Freiburg
Miller, William Hallows	1841 (MD)	Cambridge
Mosander, Carl Gustav	1825 (MD)	Uppsala
Ringer, Sydney	1863 (MD)	London
Roebuck, John	1742 (MD)	Leiden
Rutherford, Daniel	1772 (MD)	Edinburgh
Savart, Félix	1816 (MD)	Strasbourg
Seebeck, Thomas Johann	1802 (MD)	Goettingen
Sniadecki, Jędrzej Andrzej	1793 (MD)	Pavia
Sobrero, Ascanio	1832 (MD)	Giessen
Tennant, Smithson	1796 (MD)	Cambridge
Tennant, Smithson	1796 (MD)	Cambridge
Wallis, John	1640 (MD)	Cambridge
Wöhler, Friedrich	1823 (MD)	Heidelberg
Wollaston, William Hyde	1787 (MD)	Cambridge
Wurtz, Charles Adolphe	1843 (MD)	Strasbourg

99. The following scientists were instrumental in bringing chemistry knowledge from one country to another:

To United States from Germany			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Eben N. Horsford	Giessen	1844	Justus Liebig
Georg F. Merck	Giessen	1848	Justus Liebig
Charles F. Chandler	Goettingen	1856	Friedrich Wohler, Heinrich Rose
Henry A. Weber	Munich	1868	Justus Liebig
Ira Remsen	Goettingen	1870	Rudolf Fittig
Harmon N. Morse	Goettingen	1875	Hans Hubner
Edgar Fahs Smith	Goettingen	1876	Friedrich Wohler
John U. Nef	Munich	1886	Adolf Baeyer
Michael I. Pupin	Berlin	1889	Hermann von Helmholtz
Julius Stieglitz	Berlin	1889	Johann Tiemann
William Albert Noyes	Munich	1889 (post-doc)	Adolf Baeyer
Arthur A. Noyes	Leipzig	1890	Friedrich Ostwald
John L.R. Morgan	Leipzig	1895	Friedrich Ostwald
Moses Gomberg	Munich Heidelberg	1896 – 7 (post-doc) 1898 (post-doc)	Johannes Thiele Victor Meyer
William C. Bray	Leipzig	1905	R.T.D. Luther
Irving Langmuir	Goettingen	1906	Walther Nernst
Walter Abraham Jacobs	Berlin	1907	Emil Fischer
Rudolf J. Anderson	Berlin	1911	Emil Fischer
George E. Gibson	Breslau	1911	Richard Abegg
Julius Robert Oppenheimer	Goettingen	1927	Max Born
Edward Teller	Leipzig	1930	Werner Heisenberg
John Bardeen	Princeton	1936	Eugene Wigner
To United States from Italy			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR

Leo James Rainwater	Columbia	1946	Enrico Fermi
Owen Chamberlain	Chicago	1948	Enrico Fermi
Chen Ning Yang	Chicago	1948	Enrico Fermi
Tsung-Dao Lee	Chicago	1950	Enrico Fermi
Jerome I. Friedman	Chicago	1956	Enrico Fermi
To United States from Britain			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Owen W. Richardson	London	1904	Sir J.J. Thomson
William F.G. Swann	London	1910	
John A. Pople	Cambridge	1951	Sir John Lennard-Jones
To United States from France			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Guy Ourisson	Harvard	1952	Louis F. Fieser
To Britain from Germany			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Lyon Playfair	Giessen	1840	Justus Liebig
Alexander Williamson	Giessen	1845	Justus Liebig
Sir Edward Frankland	Marburg	1849	Robert Bunsen
Benjamin C. Brodie	Giessen	1849	Justus Liebig
Sir William H. Perkin	Royal College of Science, London	1850's	August W. Hofmann
Sir William Crookes	Royal College of Science, London	1854	August W. Hofmann
Thomas E. Thorpe	Heidelberg	1868	Robert Bunsen
Henry E. Armstrong	Leipzig	1869	Adolf Kolbe
Sir William	Tubingen	1872	Rudolf Fittig

Ramsay			
Francis Robert Japp	Heidelberg	1875	Robert Bunsen
William H. Perkin, Jr.	Wurzburg	1882	Johannes Wislicenus
Samuel Cox Hooker	Munich	1885	Eugen Bamberger
Frederick Stanley Kipping	Munich	1887	Sir William H. Perkin
Sir Jocelyn Field Thorpe	Heidelberg	1895	Karl von Auwers
Ian M. Heilbron	Leipzig	1910	Arthur Hantzsch
Sir Walter N. Haworth	Goettingen	1910	Otto Wallach
Hans Thacher Clarke	Berlin	1911 – 3 (post-doc)	Emil Fischer
Sir Eric K. Rideal	Bonn	1912	R. Auschutz
To Russia from Germany			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Nikolai N. Zinin	St. Petersburg	1840	Work done in Giessen under Justus Liebig
Aleksandr M. Saytzeff	Leipzig	1866	Adolf Kolbe
Vladimir N. Ipatieff	Munich	1896 (no degree)	Adolf Baeyer
To Germany from Sweden			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Heinrich Rose	Kiel	1821	Jons Jakob Berzelius
Friedrich Wohler	Heidelberg	1823 (post-doc)	Jons Jakob Berzelius
To France from Germany			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR

Jean Charles Galisard de Marignac	Giessen	1840	Justus Liebig
Charles Adolphe Wurtz	Giessen	1842	Justus Liebig
To Canada from Germany			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Maud Leonora Menten	Berlin	1913 (post-doc)	Leonor Michaelis
Gerhard Herzberg	TU Darmstadt	1928	Hans Rau
To Canada from Britain			
SCIENTIST	UNIVERSITY	DEGREE YEAR	ADVISOR
Charles Samuel Hanes	Cambridge	1929	F.F. Blackman
John Charles Polanyi	Manchester	1952	Ernest Warhurst

100. Birthplace cities that changed their names after World War II:

Old Name	New Name
Aix-la-Chapelle, France	Aachen, Germany
Breslau, Germany	Wroclaw, Poland
Brünn, Germany	Brno, Czech Republic
Christiania, Norway	Oslo, Norway
Danzig, Germany	Gdansk, Poland
Dorpat, Germany	Tartu, Estonia
Gleiwitz, Upper Silesia	Gliwice, Poland
Insterburg, Prussia	Chernyakhovsk, RSFSR
Kattowitz, Germany	Katowice, Poland
Königsberg, Germany	Kaliningrad, RSFSR
Leningrad (Petrograd), U.S.S.R.	St. Petersburg, Russia
Lwow, Poland	L'vov, Ukraine
Posen, Germany	Poznan, Poland
Ragnit, Prussia	Neman, RSFSR

Ratibor, Germany	Raciborz, Czech Republic
Reval, Prussia	Tallinn, Estonia
Stettin, Germany	Szczecin, Poland
Strassburg, Germany	Strasbourg, France
Tilsit, Prussia	Sovetsk, RSFSR

Note: RSFSR = Russian Soviet Federated Socialist Republic