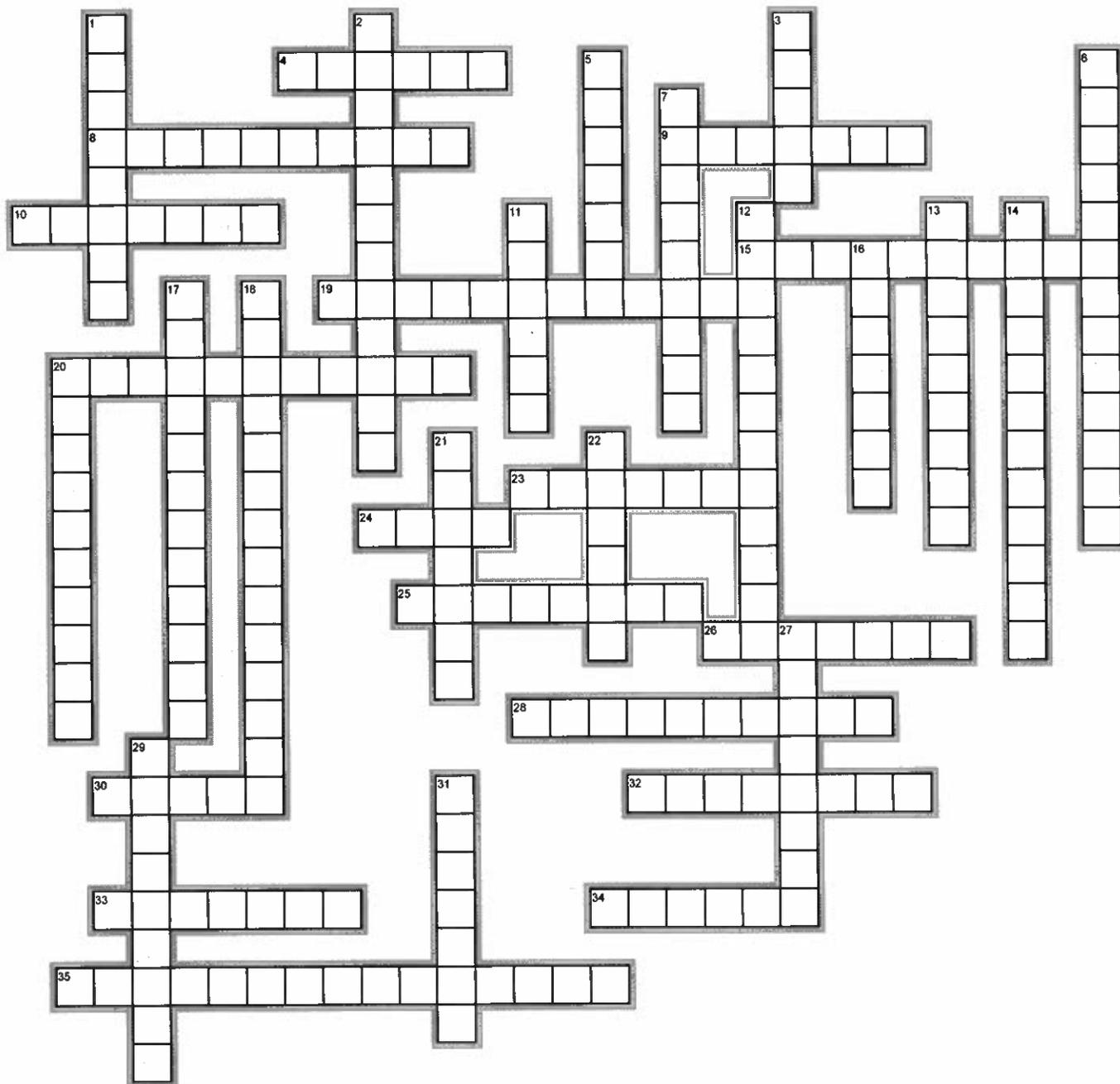


# Nobel Prizes 1920 to 1930

Dr. Thomas Manning



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## Word bank

ALCOHOLS BILE BROGLIE CHARGE CHARLESTON CHROMATOGRAPHY COAGULATE  
 COLLOID COLLOIDS ELECTRICAL ELECTRICITY EUKARYOTIC GRAVITY HAEMIN HARDEN  
 INSULIN MALARIA MICROANALYSE MICROBALANCE MUSCLES ORGANIC PANCREAS  
 PHARMACEUTICALS PHOTOELECTRIC PLANKS PORPHYRIA PORPHYRIN PROTACTINIUM  
 PYRIDOXINE SECOSTEROIDS SODDY SPECTROMETER STEROLS SUNSHINE URANIUM  
 X-RAY

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## Across

- Arthur \_\_\_\_\_ was a co-recipient of the 1929 Nobel Prize in chemistry. Some of his work on glycolysis reactions in yeast. Glycolysis is a pathway that transforms glucose into pyruvate.
- In 1924 the Nobel Prize in chemistry was not awarded. The previous decade witnessed a World War that impacted all levels of society. The roaring 20's was a period of increased wealth, a mass migration from farms to cities, the introduction of new music (jazz) and dances (the \_\_\_\_\_), and the inception of prohibition.
- The 1923 Nobel Prize for Chemistry was awarded to Fritz Pregl for his work with developing methods associated with quantitative \_\_\_\_\_ micro-analysis.
- Adolf Windaus won the 1928 Nobel Prize in chemistry for his work with \_\_\_\_\_. His work included the synthesis of vitamin D.
- Vitamin B6 is called \_\_\_\_\_ and helps form red blood cells.
- Fritz Pregl outlined his work in monographs entitled Die quantitative \_\_\_\_\_ (s). These were several hundred pages long and attracted attention internationally.
- In 1912 approximately 15 % of U.S. households had \_\_\_\_\_; by 1925, it jumped to over 60 %. The widespread distribution of power helped the chemical industry immensely.
- \_\_\_\_\_ 235 and \_\_\_\_\_ 238 can be detected by mass spectrometry because they have different m/z ratios, but in many cases they will have the same charge (+1).
- The 1927 Nobel Prize in chemistry was centered on the chemical composition of \_\_\_\_\_ acids. Heinrich Otto Wieland was the recipient.
- In 1925 the Nobel was awarded for the development and fundamental understanding of \_\_\_\_\_. The prize was awarded to Richard Adolf Zsigmondy.
- The theory of relativity has two components: Special relativity and general relativity. They were first proposed in 1905 and published in 1915. Special relativity applies to systems where \_\_\_\_\_ is not considered.
- In a mass spectrometer (MS), ions are generated using an \_\_\_\_\_ field and focused with a magnetic field. A neutral species, atomic or molecular, can not be focused or aimed at the MS detector with a magnetic field.
- In 1921 Frederick \_\_\_\_\_ was awarded the Nobel Prize in Chemistry for his work with isotopes and radioactivity. He worked at Oxford, which is in England.
- Vitamin D is also called the \_\_\_\_\_ vitamin. Vit. D is synthesized in the body when skin is exposed to the sun. Typically 15 minutes of sunshine 3 times a week produces enough Vit D
- Hans Karl August Simon von Euler-Chelpin was a co-recipient of the 1929 Nobel Prize in Chemistry for setting a foundation that resulted in the understanding of the processes occurring in \_\_\_\_\_ related to the supply of energy.
- de Broglie Equation has a constant symbolized by "h" and has the units Joules seconds. "h" is the \_\_\_\_\_ constant.
- LC-MS is widely used in many fields of science and technology as a chemical identification technique. Groups of molecules such as herbicides, pesticides, dyes, polymers, genetic (DNA, RNA), proteins, carbohydrates, fatty acids, elements, and \_\_\_\_\_ are widely studied both qualitatively and quantitatively by LC-MS.

## Down

- Insulin is synthesized by a \_\_\_\_\_, and controls the glucose concentration in your serum.
- Soddy, the 1921 Nobel Laureate, was one of several scientists credited with the discovery of the element \_\_\_\_\_ in 1917. Its elemental symbol is Pa. It is an actinide and its longest lived isotope Pa-231, has a half-life of 32,000 years.
- Manne Siegbahn won the 1925 Nobel Prize in Physics for his work with \_\_\_\_\_ spectra and their generation and interaction with atoms. As a region x-rays have less energy than gamma rays, and more energy than UV, Visible and IR light (aka electromagnetic radiation).
- The 1927 Nobel Prize in Physiology or Medicine 1927 was awarded for a treatment of \_\_\_\_\_, a mosquito borne disease. Julius Wagner-Jauregg was the recipient. During World War 2, 1/2 million US troops in the Pacific and SE Asia theaters were infected with the parasitic disease.
- In 1921 Albert Einstein won the Nobel Prize in Physics for the \_\_\_\_\_ effect. He is more famous for his work developing Special Relativity and could have also won it for this work with Brownian motion. Einstein was a theoretical physicist.
- Related to 1930 Nobel Prize in Chemistry: Hemin is a \_\_\_\_\_ containing a ferric iron (Fe(III)) ion linked to a chloride ion. Porphyrins are essential for the function of hemoglobin.
- m/z or mass/\_\_\_\_\_ is used as a unit in mass spectrometry. For example, water molecule has a mass of 18 g/mol and would need a +1 charge to be detected in a mass spec. This is achieved by knocking an electron from the water molecule.  
 $\text{H}_2\text{O} + \text{electrical field} \Rightarrow \text{H}_2\text{O}^+$

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## Down

12. Francis W. Aston was awarded the Nobel chemistry prize in 1922 primarily for his invention of the mass \_\_\_\_\_. It measures the mass to charge ratio using a magnetic field operated at very low pressures (i.e.  $< 0.000001$  atm's).
13. \_\_\_\_\_ is a disorder that occurs when there is a increase of natural chemicals that produce porphyrin.
14. Pregls techniques could measure the mass percent of arbon, chlorine, hydrogen, nitrogen, and sulfur in samples very accurately and precisely. He also developed a \_\_\_\_\_ that could measure masses at the microgram level (note, there were no electronics in the 1920's).
16. In 1923 Frederick Banting and John Macleod won the Nobel Prize for Physiology/Medicine for the discovery of \_\_\_\_\_.
17. Vitamin D is a group of fat-soluble \_\_\_\_\_. They increase absorption of Ca, Mg, and phosphate in the GI tract. The most important Vitamin D's are D3 and D2.
18. Today mass spectrometers are used as a detector, while LC or liquid \_\_\_\_\_ is the method of separation in a LC-MS.
20. Yeasts are \_\_\_\_\_, single-celled microorganisms that are part of the fungus kingdom. \_\_\_\_\_ cells have a nucleus and are in animals, plants, and fungi.
21. A \_\_\_\_\_ consists of minut, insoluble particles that are evenly dispersed and suspended in another substance. An example of this is milk with protein and fat aggregates suspended in the liquid phase.
22. The 1930 Nobel Prize in Chemistry was awarded to Hans Fischer for his work with \_\_\_\_\_ (aka Hemin) and chlorophyll.
27. The sterols are a group of naturally occurring unsaturated steroid \_\_\_\_\_ with many of them being waxy solids.
29. Vitamin K prevents blood cells from sticking together, also called \_\_\_\_\_.
31. The 1929 Nobel Prize for Physics was awarded to Louis de \_\_\_\_\_ for the discovery of the wave nature of electrons. In his 1924 PhD thesis, de \_\_\_\_\_ outlined the wave nature of electrons. He also suggested all particles has wave properties.

