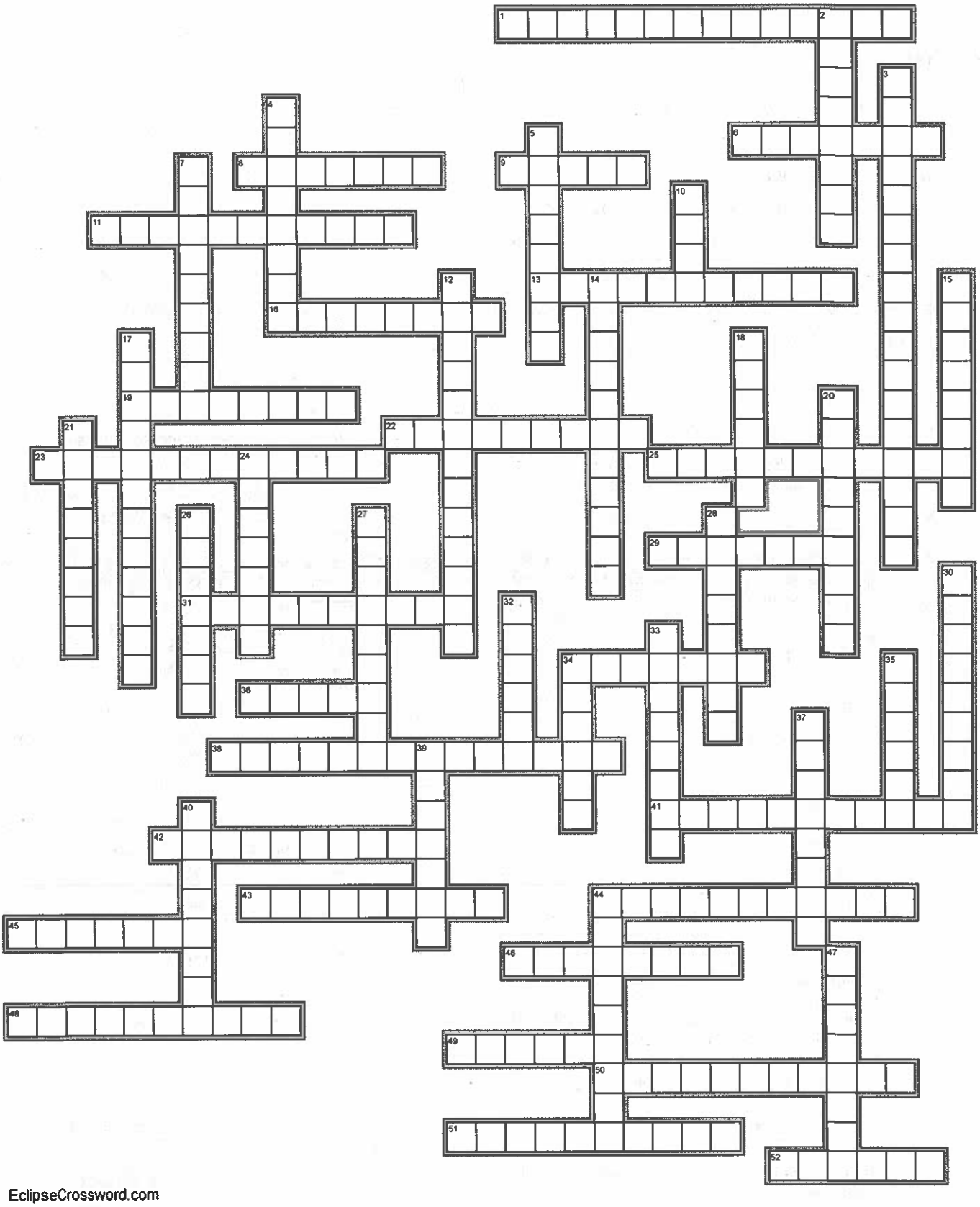
Nobel Prizes; 1981 to 1990.

Dr. Thomas Manning



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Word bank

AMYLASES ATTO BACTERIA BIOCATALYST BOHRIUM BRAGG CANAVERAL CHALLENGER CHARGE CHEMILUMINESCENCE CHEMISTRY CHOLESTEROL CHROMOSOMES COSMOS CRYSTAL DENALI DWARFS DYNAMIC ELECTRON FEMTOSECONDS FLIES FRIENDS HOFFMANN INFRARED JAPANESE KINETICS LIPASES LIPOPROTEIN MOLECULAR MONOCLONAL NUCLEIC NUCLÉAIRE ORGANIC OSMIUM PEPTIDE PEPTIDES PHENYLALANINE PHOTOSYNTHESIS PROCESSOR PRODUCTS PROTEASES PURPLE RADIOACTIVE REFUGEES RIBONUCLEIC SELECTIVITY SELENOCYSTEINE SPECTROMETER STIMULATED SUNLIGHT TRANSFER TRANSITION TUNNELING TYROSINE

Across

1. Sec is the 3 letter abbreviation for a less than common amino acid - what is its full name?
6. _____ are bioenzymes that break down fats so they can be absorbed by the intestines.
8. The 1986 Nobel Prize in chemistry was awarded to three scientists called 'A Magnificent Trio.' They used molecular beams, in which molecules were moving at supersonic speeds and collided. This provided a more _____ view of reactions, rather than the usual static view of the molecular world.
9. In 1901 Dr. Rontgen discovered x-rays. In 1914 Dr. von Laue discovered that x-ray diffraction caused by crystals occurs. The ____ equation (1915) was used to determine crystal structures.
11. A_____ naturally occurs in a living organism. For example; an enzyme that is involved in the conversion of organic compounds from one structure to another can be a ____.
13. Dr. Barbara McClintock, of the Cold Spring Harbor Lab (NY), won the 1983 Nobel Prize in Physiology or Medicine for her with genetics. She worked with _____and their impact on nearby genes over several generation of plant (corn).
16. Dr. Johann Deisenhofer, Dr. Robert Huber and Dr. Hartmut Michel won the 1988 Nobel Prize in chemistry for their molecular level work outlining how photosynthesis works, converting _____ into energy.
19. Dr. Kenichi Fukui developed a theory that _____orbits that are weakly connected to the nucleus are most likely to be involved in a chemical reaction.
22. Nobel Laureate Dr. Dudley Herschbach developed a gas phase technique called crossed _____ beams. This allowed scientists to study the production of new chemical species produced in the beams.
23. The Zetawatt-Equivalent Ultrashort pulse laser System (aka ZEUS), emitted an extremely high energy pulse that lasted a few _____. Femto is 10^-15. A picosecond is 1,000 femtoseconds; a nanosecond is one million femtoseconds, and a microsecond is one billion femtoseconds.
25. LDL or low-density _____, cholesterol, is called bad- cholesterol. It is the most common cholesterol in the human body.
29. One of the top songs in the 1980's was "That's What _____ Are For." The performers included Dionne Warwick, Gladys Knight, Elton John and Stevie Wonder.
31. Professor Hoffmann focused on the electronic structure of unstable molecules, and included work with _____states in reactions.
34. The 1990 Nobel Prize in chemistry was awarded to Dr. Elias J. Corey of Harvard University for his work in synthetic _____ chemistry.
36. William Golding won the 1983 Nobel Prize in literature for his novel Lord of the _____, that was published in 1954. It was assigned reading for many middle and high school students.
38. It is considered the most important chemical reaction on earth, and involves the conversion of sunlight into energy.
41. The 1987 Nobel Prize in Chemistry was awarded Dr. Donald Cram, Dr. Jean-Marie Lehn, and Dr. Charles Pedersen, for the "development and use of molecules with structure-specific interactions of high ____." (Nobelprize.com)
42. The press release in 1984 read: "The Nobel Assembly of Karolinska Institutet has today decided to award the Nobel Prize in Physiology or Medicine for 1984 jointly to; Niels K. Jerne, Georges J.F. Köhler and César Milstein. for theories concerning "the specificity in development and control of the immune system" and the discovery of "the principle for production of

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_____antibodies".

43. Part of the 1986 Nobel Prize in physics was awarded (1/2 of it) to Gerd Binnig and Heinrich Rohrer for the development of scanning _____ microscope (STM). This gave scientists and engineers the ability to see single atoms on a surface.

44. The 1985 Nobel Prize in Physiology or Medicine 1985 was awarded to Dr. Michael Brown and Dr. Joseph Goldstein for their work with _____ metabolism.

45. The transuranium elements _____ (107 protons), Hassium (108 protons), and Meitnerium (109 protons) were synthesized in the 1980s at Gesellschaft für Schwerionenforschung (GSI) lab in Germany.

46. Dr. Henry Taube was awarded the 1983 Chemistry Nobel Prize for his research related to electron-_____ reactions, with a focus on metal complexes.

48. The Space Shuttle _____ broke apart a little more than a minute after its take off, over the Atlantic Ocean. It took place on January 28, 1986. The seven astronauts aboard did not survive the explosion.

49. The book, The Color _____, which became a movie starring Oprah Winfrey, was considered one of the top 3 books of the 1980's.

50. "Sidney Altman, USA and Thomas Cech, USA for their discovery that RNA (_____ acid) in living cells is not only a molecule of heredity but also can function as a biocatalyst." (from Nobelprize.org)

51. In 1981 Dr. Arthur Schawlow and Dr. Charles Townes won the Nobel Prize for the invention of the laser. Most light sources are based on spontaneous emission, the laser is based on _____ emission of light

52. Dr. Chandrasekhar's won the 1983 Nobel Prize in physics for his research on white _____ and black holes.

Down

2. Nobel Laureate Dr. Polanyi developed chemiluminescence in molecules as a method to probe reactions in the gas phase, when they were excited and emitted _____ light. .

3. The emission of light (electromagnetic radiation) that happens when a chemical reaction results in the production of energy. Photons (individual packets of light) are emitted when the excited molecules electrons relax to their ground state.

4. _____ are bioenzymes that can break down starches into sugar molecules.

5. Dr. Corey was credited with the synthesis of over 100 natural _____ (medicinal agents that come from living species, from bacterium to trees).

7. The 1984 Nobel Prize in physics was awarded for research into the weak force (the four fundamental forces are gravity, weak force, electromagnetic force, strong nuclear force). Dr. Carlo Rubbia and Dr. Simon Van der Meer were affilated with CERN in Geneva, Switzerland. In French, CERN stands Conseil Européen pour la Recherche _____ .

10. An ____second or a ____meter is 10^-18 seconds or meters. ____ is a 1000 times smaller than a femto.

12. This amino acid has an aromatic ring, and is abbreviated (when using one letter abbreviations), with an F.

14. One of the biggest man-made environmental disasters in the history of humanity took place in the mid-1980's. On April 26th, 1986 in the Ukraine region of the USSR, the Chernobyl nuclear reactor explosion resulted in the wide spread distribution of _____ species across parts of Asia and Europe.

15. ArgAsnAspCysGluGlnGlyHisIleLeuLysMetPheProSerThrTrpVa is a list of 19 of the 20 common amino acids 3 letter abbreviations. Which amino acid abbreviation is missing?

17. Professor Yuan Lee extended the molecular dynamics work of Dudley Herschbach. One added feature was the use of a mass ____ to identify the molecular products of the molecular beam reactions.

18. Dr. Carl Sagan, a well regarded astronomer, published the book entitled _____. It complimented his Public Broadicasting Series (PBS) series on the same topic. It was well received by the general public.

20. In the early 1980's the IBM PC hit the market. For its time, it was very unique and powerful with a 16-bit 8088 _____ operating at 4.77 MHZ (megahertz). IBM stands for International Business Machines.

21. The United Nations High Commissioner for _____ (UNHCR) received the Nobel Peace prize twice, 1954 and 1981.

24. The 1985 Nobel Prize in chemistry was awarded to Dr. Hauptman and Dr. Karle for the development of equations that used data from x-rays that were past through an ordered _____. The equations helped scientists solve the structure of the crystal.

26. Amino acids are linked together to form a _____ . They can increase in size and have a specific structure/geometry and form proteins.

27. _____ are bioenzymes that can break down proteins.

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Down

28. The 1986 Nobel Prize in Chemistry was awarded to Dr. Dudley Herschbach, Dr. Yuan Lee and Dr. John Polanyi for their work in chemical _____.

30. Before NPR had the Science Friday podcast, Dr. Roald Hoffman had a PBS series entitled "The World of _____" (1988). He followed that with a broadcast entitled "Entertaining Science" which was held at the Cornelia Street Cafe, in Greenwich Village (NYC).

32. Mass spectrometers measure the m/z or mass/_____ ratio of an ion. For example, water has a m/z ratio of 18 with a +1 charge after being ionized in the mass spectrometer.

33. Dr. Kenichi Fukui was a _____chemist. He is the first person from a Pacific Eastern Rim nation to win the Nobel Prize in chemistry.

34. Dr. Taube worked with two elements Ruthenium (Ru) and _____(Os). Electrons can move from a atomic orbital (AO) to a pi bond-acceptor molecule (called backbonding).

35. In the 1980's President Jimmy Carter signed the Alaska National Interest Lands Conservation Act (ANILCA), which instantly resulted in 43 million acres becoming federally protected. The National Park System (NPS) gained Glacier Bay, _____, Lake Clark, Gates of Arctic, St. Elias, Katmai, Kenai Fjords, and Kobuk Valley national parks.

37. The 1984 Nobel Prize in chemistry was awarded Professor Bruce Merrifield of the Rockefeller University (NY). He developed a simple technology for the synthesis of _____ and proteins.

39. Dr. Aaron Klug won the 1982 Nobel Prize in chemistry for " development of crystallographic electron microscopy and his structural elucidation of biologically important _____ acid-protein complexes." (from NobelPrize.com)

40. Roald _____, the 1981 chemistry Nobel Prize winner, was a child in Poland when the Nazi's invaded. He hid in an attic for 18 months with his mother. He survived WW2 but many of his family members died in concentration camps. He moved to the U.S. in 1949 and was a Professor at Cornell when he won the Prize.

44. The Solar Maximum Mission (aka, "SolarMax") was deployed into space by a Delta rocket in February of 1980. It was launched from Cape _____ (Kennedy Space Center). Its mission focused on solar measurements during the peak of the solar cycle.

47. Photosynthetic processes in _____ are simpler than in algae and plants.