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BioVisionAlexandria
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The BioVisionAlexandria 2004 Conference Newsletter

November 2003
Volume 1, Issue 2

Special Issue

ALFRED NOBEL
The inventor, the industrialist

The Nobel Prize is one of the highest distinctions recognized, granting its winner instant fame. However, many do not know the interesting history and background that led to this award.

It all began with a chemist, known as Alfred Nobel, born in Stockholm, Sweden in 1833. Alfred Nobel moved to Russia when he was eight, where his father, Immanuel Nobel, started a successful mechanical workshop. He provided equipment for the Russian Army and designed naval mines, which effectively prevented the British Royal Navy from moving within firing range of St. Petersburg during the Crimean War. Immanuel Nobel was also a pioneer in the manufacture of arms, and in designing steam engines.

Immanuel's success enabled him to provide his four sons with an excellent education in natural sciences, languages and literature. Alfred, at an early age, acquired extensive literary knowledge, mastering many foreign languages. His interest in science, especially chemistry, was also apparent. His father sent him abroad for further training in chemical engineering. It was in Paris, in 1851, that Alfred met Ascanio Sobrero, the Italian chemist who had invented Nitroglycerine three years earlier. Nitroglycerine, a highly explosive liquid, was produced by mixing glycerine with sulfuric and nitric acid. It was an invention that triggered a fascination in the young scientist for many years to come.

BioVisionAlexandria 2004 aims to celebrate the outstanding scientists and scholars, in a century dominated by technological and scientific revolutions, through its **Nobel Day** on **3 April 2004!**

INSIDE

Nobel Day is dedicated to many of the scientists that were inspired to struggle against odds, to withstand disappointments and defeats, and to resolve never to give up!

ANNOUNCEMENT

We are happy to announce that the conference, formerly known as BioAlexandria 2004 is now officially **BioVisionAlexandria 2004**. BioVisionAlexandria, held in Alexandria, EGYPT, will focus on Life Sciences and Sustainable Development, giving priority to concrete actions between the South and the North. It will be held every even year, therefore alternating with the World Life Sciences Forum BioVision, held every odd year in Lyon, France.

Alfred was very interested in the practical use of nitroglycerine in construction. Nitroglycerine explosive power was much higher than that of gunpowder. However, it could explode in a very unpredictable manner if subjected to heat and pressure. It was therefore considered to be too dangerous to be used practically, and Alfred was aware that a method for the controlled detonation of nitroglycerine had to be developed for its safe use.

Alfred returned to Russia in 1852 to assist in his father's enterprise, and started experimenting with nitroglycerine with the aim of developing it into a commercially and technically useful explosive. However, when the war ended, his father went bankrupt and returned to Sweden with his sons Alfred and Emil. His other two sons remained in Russia and developed successful careers in the oil industry.

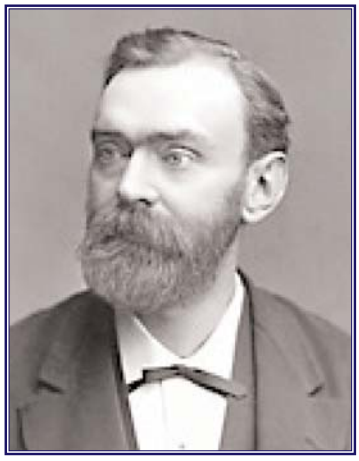
In Stockholm, Alfred concentrated on developing nitroglycerine as an explosive. This was very dangerous, leading to several explosions in the lab and killing many, including his brother, Emil. This prompted the authorities to forbid further nitroglycerine experimentation within Stockholm city limits. Alfred, still not discouraged, moved his experimentation to a large boat anchored on Lake Mälaren. In 1864, he founded the company Nitroglycerine AB, and started mass production of nitroglycerine. He discovered that when mixed with silica, nitroglycerine turned from a liquid into a paste. This paste could be shaped into rods suitable for insertion into drilling holes, therefore solving the safety problem of handling nitroglycerine. In 1867, he patented this invention under the name of dynamite. He invented a detonator (blasting cap), which could be ignited by lighting a fuse, to set off the dynamite rods. These inventions, together with the use of the diamond drilling crown, greatly reduced the cost of blasting, drilling, and other types of construction work.

The market for dynamite and blasting caps grew very quickly, and Alfred's factory was soon exporting nitroglycerine explosives to many countries in Europe, America and Australia. He founded factories in over 20 countries in 90 different locations, and worked in them himself. Many of these companies have grown into industrial enterprises that still play a major role in today's world economy. They include AB Bofors, a globally known firearm factory in Sweden, as well as many others in France, Norway and Great Britain.

Alfred's inventions were not limited to the explosives industry only. His inventions included artificial silk, synthetic rubber and leather. He also played a major role in the development of gelatin dynamite, which is safer to handle than the original dynamite. He was granted a total of 355 patents over his lifetime. Alfred Nobel died, a very wealthy man, in San Remo, Italy, on 10 December 1896.

Nobel's will designated his fortunes to the awarding of yearly Nobel Prizes in the fields of Physics, Chemistry, Physiology and Medicine, Literature, and Peace. These prizes can be considered as an extension of his lifetime interest, for he was both the scientist and the poet. Many believe that Nobel's friendship with Countess Bertha von Suttner, a famous figure in the peace movement, is the

Immanuel Nobel



Alfred Nobel

Sites on Nobel

www.nobel.se

www.almaz.com/nobel

www.nobelchannel.com

www.nobel.no

www.nobelprizes.com

The Fields Medal is made of gold, and shows the head of Archimedes (287-212 BC) together with a quotation attributed to him: "Transire suum pectus mundoque potiri" ("Rise above oneself and grasp the world")

Nobel Prize medal

reason for including a Prize in Peace. In 1968, the Sveriges Riksbank (Bank of Sweden) introduced the Prize in Economic Sciences in his memory.

The executors of his will were two engineers who established the Nobel Foundation, an organization responsible for the financial assets left by Nobel for this purpose. The Prize, being awarded since 1901 for works of greatest benefit to mankind, consists of a medal, a personal diploma and a monetary prize. The number of prizewinners that can share a Nobel Prize was restricted, in 1968, to three.

The Nobel Prize ceremony is held in Stockholm on 10 December each year, and the King of Sweden personally hands over the Prize in each field. However, the ceremony for the Nobel Prize in Peace is held in Oslo, Norway.

The Nobel Prize is by far one of the most prestigious awards a scientist may receive, and one of the few that the general public is familiar with. It recognizes men and women, who through sheer will and determination have changed the world, sometimes single-handedly.

BioVisionAlexandria 2004 aims to celebrate these outstanding scientists and scholars, in a century dominated by technological and scientific revolutions, through its **Nobel Day** on **3 April 2004**. Nobel Day is dedicated to many of the scientists that were inspired to struggle against odds, to withstand disappointments and defeats, and to resolve never to give up! ■

Register Now at

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OTHER SCIENTIFIC ACHIEVEMENT AWARDS

Fields Medal - commonly regarded as mathematics' closest analog to the Nobel Prize (which does not exist in mathematics).

Rolf Nevanlinna Prize - Prize in mathematical aspects of information science.

Wolf Prize - In Science, the fields are Agriculture, Chemistry, Mathematics, Medicine, Physics, while in Arts, the prize rotates annually among Architecture, Music, Painting and Sculpture.

World Food Prize – It is given to individuals who have advanced human development by improving the quality, quantity or availability of food in the world.

Einstein Prize – It aims to recognize outstanding accomplishments in the field of gravitational physics.

Tyler Prize - Award for environmental science, energy and medicine that give great benefit to mankind.

Welch Prize – Award for basic chemical research.

E.O. Lawrence Award – Award given to scientists and engineers for their exceptional contributions in the field of atomic energy, broadly defined.

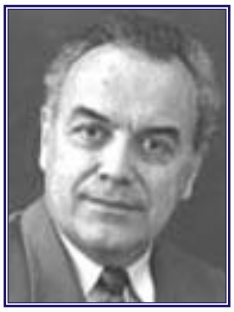
King Faisal Prize - Awards for Medicine, Science, Islamic Studies, Service to Islam, and Arabic Literature.

MEET THESE NOBEL LAUREATES IN BioVisionAlexandria 2004!

Werner Arber (Nobel 1978)

Werner Arber is a Swiss microbiologist born in 1929. A professor at the University of Geneva (1960–70) and later at the University of Basel (1971–). Arber's research focuses on microbial evolution, with special attention to the molecular mechanisms by which bacterial viruses (bacteriophages) transfer genes to other bacteria. He also explored host defenses against such transfer and identified "restriction" sites where the viral DNA is attacked. The discovery that this process is controlled by a class of enzymes, each of which cuts the DNA at the same point every time, is the basis of recombinant DNA techniques and opened new paths to genetic engineering.

For this work, Arber received the **1978 Nobel Prize in Physiology or Medicine** in (with Daniel Adams and Hamilton Smith).



Werner Arber

He is Vice President of the Swiss Science Council, President of the International Council of Scientific Unions (since October 1996) and of the recently appointed International Scientific Advisory Board of UNESCO. Arber is also well known for his personal involvement in the debate on problems posed by genetic manipulation.

Jean Dausset (Nobel 1980)

Jean Dausset is a French hematologist and immunologist, born in 1916, whose "discoveries concerning genetically determined structures on the cell surface that regulate immunological reactions", earned him a share (with George Snell and Baruj Benacerraf) of the **1980 Nobel Prize in Physiology or Medicine**.

Dausset's introduction to immunohematology was during the Tunisian Campaign of World War II, where he performed blood transfusions in the army. After the war he resumed his medical studies, receiving his degree in 1945, and devoted himself to research. He expanded on the work of Jean Bernard and Marcel Bessis, who had developed a transfusion system for the complete replacement of blood in infants. He adapted the system for adults and obtained successful results with many cases of leukemia and kidney failure caused by induced abortions.

Dausset investigated the immunological reactions of patients who had received many blood transfusions, and correctly hypothesized that a specific genetic variation among people was responsible for the different levels of reaction to transfusions. He established the correlation between the survival of tissue grafts and the incompatibility of leukocyte groups and then defined the major histocompatibility complex, now known as Human Leukocyte Antigen (HLA), thus determining the laws of human transplants.

Jean Dausset

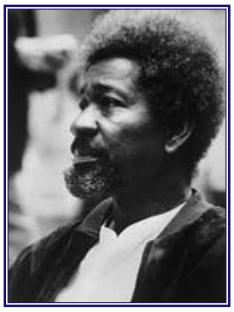
In 1977, he was named Professor of Experimental Medicine at the Collège de France, a post once held by Claude Bernard – the father of modern experimental medicine. In 1982, he became President of the Mouvement Universel de la Responsabilité Scientifique (MURS). He was also a member of the French Ethics Commission for eight years. In 1984, he created the Centre d'Etude du Polymorphisme Humain (CEPH), making available to the international scientific community the invaluable material gathered during the course of his genetic studies.

Wole Soyinka (Nobel 1986)

Wole Soyinka, a playwright, poet, novelist, and critic, is considered to be one of Africa's finest writers. Born in Nigeria in 1934, his work serves as a record of twentieth-century Africa's political turmoil and struggle to reconcile tradition with modern culture.

Soyinka attended University of Ibadan and University of Leeds where he earned his doctorate. He taught drama and literature at various universities in Nigeria and has been a visiting professor at the universities of Cambridge, Sheffield, and Yale.

Soyinka has been imprisoned several times for his criticism and attitude to his country's civil war and from the 1970s has lived long periods in exile. Soyinka's plays range from comedy to tragedy, and from political satire to the theatre of the absurd. He has combined influences from Western traditions with African myth, legends and folklore, and such techniques as singing and drumming.



Wole Soyinka

His background, upbringing and education have given him unusual conditions for a literary career. He has his roots in the Yoruba people's myths, rites and cultural patterns, which in their turn have historical links to the Mediterranean region. Through his education in his native land and in Europe he has also acquired deep familiarity with western culture.

Soyinka has published over 20 works in a career that spans five decades. He is known for his novels, autobiographical works, poetry, and criticism, and in 1986, he became the first African writer ever to be awarded the **Nobel Prize in Literature**. He writes in English and his literary language is marked by great scope and richness of words. Soyinka has founded various theater groups has produced his own plays and taken part as actor.

Jean-Marie Lehn (Nobel 1987)

Jean-Marie Lehn is a French chemist, born in 1939, who received his Ph.D. from University of Strasbourg in 1963. A professor at Louis Pasteur University (1970-78) and later at the Collège de France (1979–), Lehn did groundbreaking research in the creation of artificial enzymes.

Lehn expanded on the work of Charles J. Pedersen, in synthesizing crown ethers, a class of two-dimensional, ring-shaped organic compounds that are capable of selectively recognizing and combining with other molecules. In the course of his efforts to synthesize three-dimensional molecules that would possess similar reactive characteristics, Lehn created a molecule that combines with the important neurotransmitter, Acetyl Choline, in the brain. This raised the possibility of creating artificial enzymes that function better than the natural enzymes found in the human body.

Jean-Marie Lehn

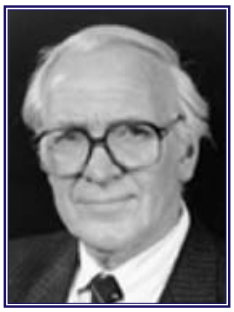
He shared the **1987 Nobel Prize in Chemistry** with Pedersen and Donald J. Cram for the development and application of molecules with highly selective, structure specific interactions, i.e. molecules that can “recognize” each other and choose which other molecules they will form complexes with. This laid the foundation for the active interdisciplinary area of research within chemistry that has now come to be termed host-guest chemistry or supramolecular chemistry.

Sir James Black (Nobel 1988)

Sir James Black is a British pharmacologist, born in 1924, who (along with George H. Hitchings and Gertrude B. Elion) received the **1988 Nobel Prize in Physiology or Medicine** for his development of two important drugs, propranolol and cimetidine.

Black's drug discoveries arose out of his research on the interactions between certain cell receptors in the body and chemicals in the bloodstream that attach to them. Black wanted to find a drug that would relieve angina pectoris, i.e., the spasms of intense pain felt in the chest when the heart is not receiving enough oxygen.

It was known that beta-receptors in the heart muscle, when stimulated by the hormones adrenalin and noradrenalin, cause the heartbeat to quicken and increase the strength of the heart's contractions, thus increasing that organ's oxygen requirement. Black developed propanolol, a drug that blocked the beta-receptor sites, thus preventing adrenalin and noradrenalin from attaching to them. The resulting inhibition reduced the heart's demand for oxygen and could thus help relieve anginal pain.



Sir James Black

Black used a similar approach to develop a drug for stomach and duodenal ulcers, which are caused mainly by the stomach's over-secretion of gastric acids. He developed the first clinically useful H2-receptor antagonist, cimetidine, that could block the histamine receptors which stimulate the secretion of gastric acid in the stomach. This revolutionized the treatment of gastric and duodenal ulcers.

Sir James joined King's College London in 1984. He was knighted in 1981, elected a Fellow of the Royal Society in 1976, a Fellow of the Royal College of Physicians in 1977 and appointed a Fellow of King's College London in 1989. He is currently also Chairman of the James Black Foundation.

Sherwood Rowland (Nobel 1995)

Sherwood Rowland, born in 1927, is an American chemist who shared the **1995 Nobel Prize in Chemistry** with chemists Mario Molina and Paul Crutzen for research on the depletion of the Earth's ozone layer. Rowland specializes in the research areas of radiochemistry, photochemistry, and atmospheric chemistry.

Rowland, while working with Molina, discovered that man-made chlorofluorocarbon, CFC propellants accelerate the decomposition of the ozonosphere, which protects the Earth from biologically harmful ultraviolet radiation.

Rowland and Molina theorized that CFC gases combine with solar radiation and decompose in the stratosphere, releasing atoms of chlorine and chlorine monoxide that are able to destroy large numbers of ozone molecules. Their research initiated a federal investigation of the problem. Research on CFCs and stratospheric ozone eventually led, in the 1970s to the regulation of use and manufacture of CFC-based aerosols in the US, Canada and Scandinavia. The discovery of the so-called hole in the ozone layer over Antarctica in the mid-1980s, supported their theory further. In 1987, the Montreal Protocol of the United Nations Environment Program became the first international agreement to control and reduce atmospheric damages by banning CFC production after 1996. Measurements of CFCs in the lower atmosphere confirm that the global response to this protocol has been remarkable.

Sherwood Rowland

He is currently the elected Foreign Secretary of the National Academy of Sciences. Rowland also received the Tyler World Prize in Ecology and Energy and the Albert Einstein Prize.

Ahmed Zewail (Nobel 1999)

Ahmed H. Zewail, born in Egypt in 1946, won the **1999 Nobel Prize in Chemistry** for his groundbreaking work "showing that it is possible with rapid laser technique to see how atoms in a molecule move during a chemical reaction."

Linus Pauling Professor of Chemical Physics, Professor of Physics at the California Institute of Technology (CalTech) and Director of the NSF Laboratory for Molecular Sciences, he is internationally recognized for his efforts in a field which he pioneered, known as femtochemistry. This technique uses ultrafast lasers to probe chemical reactions as they actually occur in real time.

Reactions can take place in a millionth of a billionth of a second, therefore, Zewail's research has, with state-of-the-art lasers, made it possible to observe and study this motion for the first time, and has allowed scientists to explore nature at its fundamental level.

Ahmed Zewail

Specifically, Zewail seeks to better understand the way that chemical bonds form and break. With the development of laser techniques, he and his team have been able to obtain greater insights about the exact nature of chemical bonds. The field has had wide-ranging impact on chemistry and photobiology all over the world.

His other honors include the Robert A. Welch Prize, the Wolf Prize, the King Faisal Prize, and the Peter Debye Award. From Egypt he received the Order of the Grand Collar of the Nile, the highest state honor, and postage stamps were issued to pay tribute to his contributions to science and humanity.

The Lady Laureates

In 1903, only two years after the Nobel Foundation was established, a Nobel Prize was awarded to a woman, Marie Curie, for the first time. Women have been winning Nobel Prizes ever since. In fact, one woman, Bertha von Suttner was influential in convincing Alfred Nobel to set aside a Prize for peace. Later, this same woman won the first Nobel Prize in Peace (1905).

Women have won Prizes in all categories with the exception of Economics (which was established in 1968 and first awarded in 1969). Female laureates in Literature and in Peace are many, with 9 and 11 laureates of each, respectively. However, when it comes to the science categories, only a total of 11 women have captured prizes in Chemistry, Physics or Medicine over 102 years of Nobel history.

For more on some of these outstanding women:
http://www.nobel.se/peace/articles/heroines

List of Female Laureates

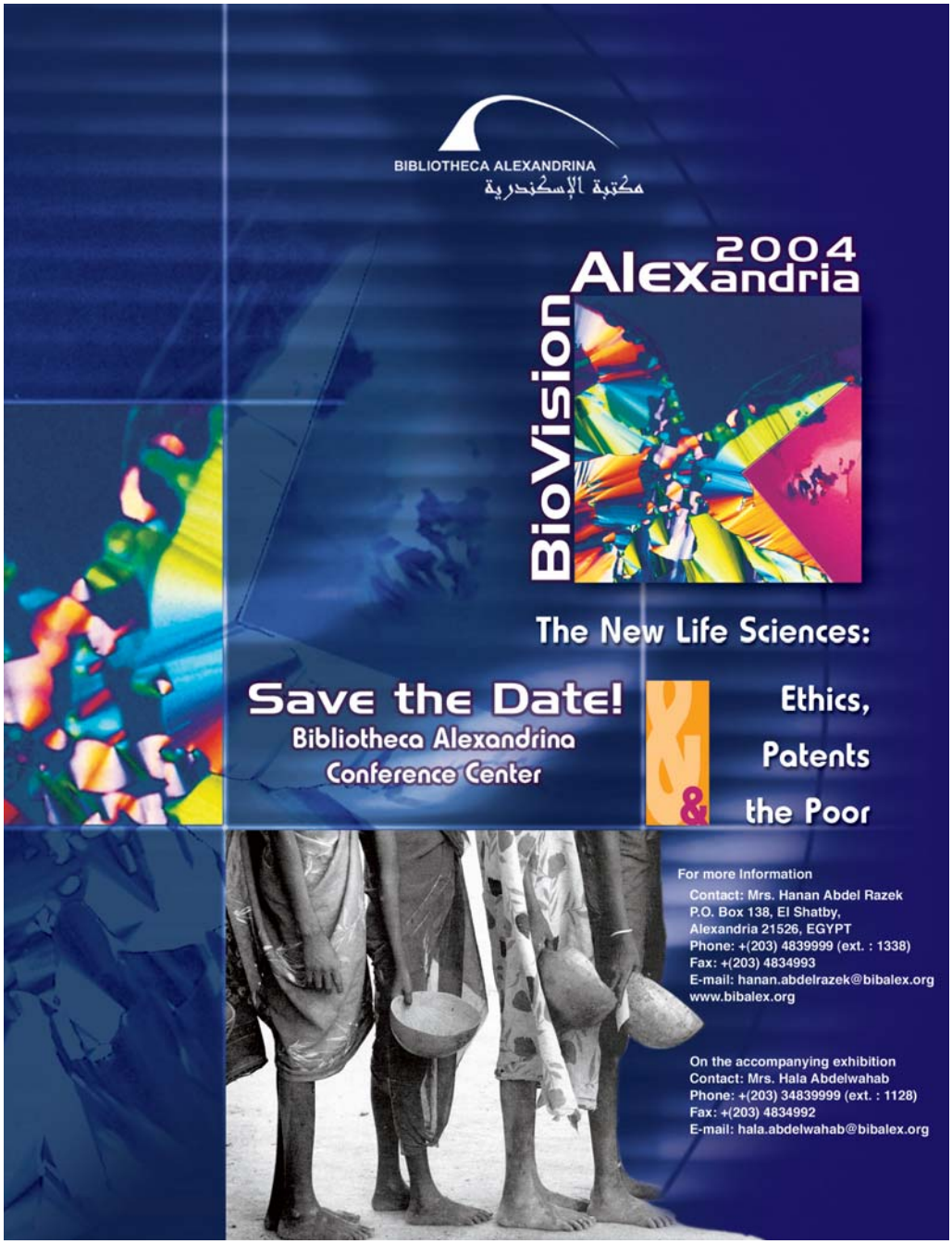
Physics
1903, Marie Curie
1963, Maria Goeppert-Mayer

Chemistry
1911, Marie Curie
1935, Irène Joliot-Curie
1964, Dorothy Crowfoot Hodgkin

Physiology or Medicine
1947, Gerty Cori
1977, Rosalyn Yalow
1983, Barbara McClintock
1986, Rita Levi-Montalcini
1988, Gertrude B. Elion
1995, Christiane Nüsslein-Volhard

Literature
1909, Selma Lagerlf
1926, Grazia Deledda
1928, Sigrid Undset
1938, Pearl Buck
1945, Gabriela Mistral
1966, Nelly Sachs
1991, Nadine Gordimer
1993, Toni Morrison
1996, Wislawa Szymborska

Peace
1905, Bertha von Suttner
1931, Jane Addams
1946, Emily Greene Balch
1976, Betty Williams
1976, Mairead Corrigan
1979, Mother Teresa
1982, Alva Myrdal
1991, Aung San Suu Kyi
1992, Rigoberta Mench' Tum
1997, Jody Williams
2003, Shirin Ebadi



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