

## OPENING ADDRESS

By Professor Bengt Samuelsson, Chairman of the Board of the Nobel Foundation.

Translation of the Swedish text.

Your Majesties, Your Royal Highness, Ladies and Gentlemen,

On behalf of the Nobel Foundation, I welcome you to the 1996 Prize Award Ceremony. I would especially like to welcome this year's laureates to the Nobel festivities in Stockholm. Our thoughts are also in Oslo, where the Nobel Peace Prize is being awarded today.

In 1996, one hundred years have passed since the death of Alfred Nobel. The Nobel Foundation has therefore decided that this year's Prize Award Ceremony should be specially dedicated to honoring the memory of Nobel.

With this in mind, my opening address will consist of a biographical sketch of Alfred Nobel.

Alfred Nobel was born in Stockholm in 1833. His parents were Andrietta and Immanuel Nobel. At that time, Stockholm was characterized by poverty and depression. Alfred's father, who was a building contractor, was forced into bankruptcy the same year that Alfred was born.

Immanuel Nobel was always feverishly active as an inventor. His inventions were often more imaginative than useful. When Stockholm's first natural rubber factory was established, for example, he invented a combination soldier's rucksack, mattress, floating sack and pontoon section, made of inflatable elastic rubber.

A few years after his bankruptcy, Immanuel Nobel—under heavy pressure from his creditors—fled to St. Petersburg, Russia. He left the rest of the family in Stockholm. Not until five years later was he able to send for his family. At that time, Alfred was nine years old. The following years, which he spent in St. Petersburg, were of crucial importance to his education and development.

In an almost improbably short period, Alfred's father had built up a successful mechanical engineering company in Russia. Because of their newfound prosperity, Immanuel and Andrietta Nobel were able to give their sons a first-class education. Among Alfred's teachers was Nikolai Zinin, a professor of chemistry. Alfred also received extensive training in languages. Aside from Swedish and Russian, he also mastered German, English and French. He had strong intellectual interests and was particularly devoted to literature and philosophy. During this period, Alfred gave the impression of being a mature, unusually intelligent, dreamy and introverted young man.

At the age of seventeen, Alfred was sent out on an extensive study trip that lasted two years. It took him to North America, France, Germany and Italy. It has been said that Alfred's strong interest in literature, especially poetry, contributed to his father's decision to send him on this journey. Immanuel

hoped that Alfred would thereby develop an interest in inventions and entrepreneurship—activities that were highly respected in the Nobel household. Alfred later wrote the following about his travels: “In my early youth, when I confidently left home for faraway lands beyond the sea, and when the ocean spread before me in its vastness, remarkably enough, I did not perceive this experience as new, for in my imagination I had already seen far wider oceans.”

In many respects, his journey to the French capital was crucial to Alfred’s future. In Paris he spent much of his time in the laboratory of Professor T. J. Pelouze, where his teacher Professor Zinin had also studied. The events surrounded Alfred Nobel’s stay in Paris illustrate how scientific networking operated, long before the advent of modern information technology.

The Swedish chemist Berzelius corresponded with Pelouze and knew what was happening at the latter’s Paris laboratory. One day, Berzelius received a visitor—a general in the Sardinian artillery named Carlo R. Sobrero. Berzelius advised the general to send his nephew, Ascanio Sobrero, who was interested in explosives, to Paris to study new explosive substances under the tutelage of Pelouze. Some years later, in 1846, Sobrero discovered and synthesized nitroglycerine in Turin. Afterwards Sobrero also visited Pelouze’s laboratory. When Alfred arrived in Paris for his studies in chemistry, he therefore learned about nitroglycerine and its properties.

A few years after Alfred returned home to St. Petersburg, his father was again forced into bankruptcy. Immanuel Nobel returned to Stockholm, where he devoted himself among other things to continuing the nitroglycerine experiments he had begun with Alfred in St. Petersburg. For this purpose, he established a small laboratory at Heleneborg on the outskirts of Stockholm.

Immanuel Nobel lacked the capital and scientific training to pursue these experiments. When Alfred joined him in Stockholm, he was able to supply both. During a trip to Paris in 1861, Alfred had managed to raise a loan of 100,000 francs for the commercialization of nitroglycerine. He identified the main problem in the use of nitroglycerine—detonation. In 1863 Alfred Nobel came up with his first epoch-making invention, the “Nobel patent detonator”. This was developed into a metal blasting cap and loaded with mercury fulminate and marked the introduction of what Alfred called the “initial igniter” principle. One expert described this as “the greatest discovery that has ever been made in the theory and practice of explosives”.

The development of nitroglycerine as an explosive was not risk-free, and many unexpected explosions occurred. The worst accident for the Nobel family took place in 1864 at Heleneborg. Five people died, among them Alfred’s younger brother Emil, aged 20, a recent secondary school graduate. Alfred continued his work, however. He established a company called Nitroglycerin AB in Stockholm, but in 1865 he moved to Germany and built up a nitroglycerine factory outside Hamburg. Because of the recurrent and tragic accidental explosions, Alfred Nobel now focused his efforts on developing safer forms of nitroglycerine. By adding diatomaceous earth (known in German as *Kieselguhr*), he invented a safe, easily handled explosive that could

be molded into different shapes. Nobel himself named the new explosive dynamite, from the Greek word *dynamis* meaning power.

Many previously unrealistic projects could now be implemented with the aid of dynamite. Among the first such gigantic undertakings was the St. Gotthard railroad tunnel through the Swiss Alps. With the advent of dynamite, Nobel's company began a rapid expansion. He remained at its helm, working as an inventor as well as financier and industrialist. The success of dynamite yielded its inventor and his company a substantial income.

In 1873 Nobel moved to Paris. He had known that city well ever since his youthful study trip there. At that time, Paris was not only a center of culture but also played a major role in the international business world. Nobel bought an elegant mansion on the Avenue Malakoff, built a stable for his fine imported Russian horses and, as always, installed a laboratory next to the house.

Another important invention was made at his private laboratory in Paris: blasting gelatin. The kieselguhr in dynamite dampened its explosive effect and had other drawbacks. Nobel therefore looked for new ways of making nitroglycerine safe and effective. In 1875 he did further work on an earlier idea—dissolving cellulose nitrate or guncotton in nitroglycerine. This method did not work, however. One day, Nobel happened to cut a finger and applied collodion to the wound. That night, he woke up because of the pain. It occurred to him that he could mix cellulose nitrate with a lower degree of nitration, precisely the kind found in collodion, with nitroglycerine. He hurried down to his laboratory at four o'clock in the morning and made the first batch of blasting gelatin. This ingenious invention was, in many respects, the ideal explosive. It had a greater explosive power than pure nitroglycerine and was not especially sensitive to shock. The product was soon being made at most of Nobel's dynamite factories and was the most effective explosive for several decades.

Another discovery that Nobel made in Paris was of decisive importance for the remaining course of his life. In the 1880s there was great interest in developing a less smoky military explosive. In this field, too, Nobel left his competitors behind by patenting a smokeless gunpowder in 1887. He named it *ballistite*. The discovery attracted great attention among military officials in various countries. Nobel offered his patent to the French gunpowder monopoly, which turned him down. As a result, it was the Italian government that bought the patent for ballistite. This led, in turn, to a campaign in France against Nobel. Among other things, he was accused of industrial espionage. Nobel decided to leave France, and he moved to Italy in 1891. There he settled in a villa in San Remo. As usual, he built a laboratory where he could continue his experiments.

Alfred Nobel's 60th birthday in 1893 was a full work day, without celebrations. His journal revealed that he spent the day working on: "patents for the soundless discharging of a gun", "elimination of disturbing sounds in the phonograph" and "thinking about purchasing the Swedish mill Bofors".

It did not take him long to move from thought to action. In 1894 he

bought AB Bofors-Gullspång in western Sweden, including an iron mill and a weapons factory. He established his residence in the nearby Björkborn manor house. To be able to perform his usual experiments, he built a laboratory there. Its work was led by his trusted young assistant, Ragnar Sohlman.

Alfred Nobel searched indefatigably for new ideas and projects that could lead to the development of new techniques or products. In this way, he thought he could promote economic growth and improved living standards. Despite his huge success as an inventor and world-class industrialist, Alfred Nobel was often preoccupied with thoughts about the purpose of his life.

During his final years, Nobel developed the idea of creating a prize that would encourage scientific progress, thereby improving the human condition. In his last will and testament, dated November 27, 1895, Nobel specified how the portion of his estate to be used for such prizes would be distributed.

The Physics and Chemistry Prizes are connected to Nobel's activities as an inventor and entrepreneur. Because of his work in a wide variety of fields, he understood the role of new advances in physics and chemistry in leading to various kinds of technical progress. He entrusted the task of choosing the laureates in physics and chemistry to the Royal Swedish Academy of Sciences.

Nobel had a great interest in the medical sciences. He had even established a medical research laboratory in Sévran, outside Paris, where he and the Swedish physiologist J.E. Johansson worked with projects related to blood transfusion. Nobel entrusted the Karolinska Institute with the task of awarding a Prize in Physiology or Medicine. The fact that Nobel included physiology in the medicine prize indicates that he realized the role of basic research in bringing about medical progress.

Since his youth, Alfred Nobel had been strongly interested in literature. He owned a library that included literary works in most major world languages. When he allowed the Nobel Prizes to include Literature as well, as with the other prizes this reflected Nobel's interests, personality and belief that the fields covered by his prizes were important to the future of humanity. In his youth, he was especially drawn to poetry. Among other things, he wrote a poem in English, called "A Riddle". It begins as follows:

"You say I am a riddle—it may be  
For all of us are riddles unexplained.  
Begun in pain, in deeper torture ended,  
This breathing clay what business has it here?  
Some petty wants to chain us to the earth,  
Some lofty thoughts to lift us to the spheres  
And cheat us with that semblance of a soul  
To dream of immortality, till Time  
O'er empty visions draws the closing veil"

Nobel entrusted the Swedish Academy with the task of awarding the Prize in Literature.

The origins of the fifth Prize—for efforts to promote the brotherhood of nations—can be traced to Nobel's great interest in the peace movement.

At an early age, he had been influenced by Shelley in this area, but it was

probably his friendship with Bertha von Suttner that was most important. von Suttner awakened Nobel's interest in the working methods and goals of the new peace movement. The understanding he thereby gained was probably a major influence on the wording of his 1895 will, which shifted the focus of the Peace Prize outlined in an earlier will. The Norwegian Parliament, or Storting, appoints a committee which awards the Peace Prize.

The first Nobel Prizes were awarded in 1901. Today the prizes that have been awarded so far represent developments in the various Nobel Prize fields stretching across nearly a whole century. As their impact has grown, the Nobel Prizes have focused international attention on the sciences, literature and peace, and they have epitomized the value of creative and intellectual activity to humanity. Today, as we honor the memory of Alfred Nobel, we honor a man of many outstanding qualities. Nobel was not only a scientist and inventor, but also a business leader and a humanist. Through his will and his donation, he demonstrated that his vision was to work for the benefit of humanity. His donation has very much fulfilled its purpose.