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ALFRED NOBEL*

BY

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The annual awards of the Nobel Prizes for outstanding achievements in physics, chemistry, medicine, and literature as well as the Peace Prize continually remind us of Alfred Nobel. The splendour and the solemnity of the occasions when the prizes are presented to the laureates in Stockholm and in Oslo in the presence of the Royal Family remind us of the European culture of the late nineteenth century, based as it was on considerable prosperity or, in some instances, on really outstanding wealth. In these darkest days of the year, around December 10, the day of Alfred Nobel's death, when nobody would like to go to Stockholm, except possibly to get a Nobel Prize, the capital of Sweden is the centre for the biggest scientific and literary event of the year. All the civilized world is for a moment paying attention to the Nobel Prizes and to their founder.

I will come back to the Nobel Prizes at the end of my lecture, but now I will take you directly from the enlightened splendour of the Concert Hall in Stockholm to the most God-forsaken place on the British Islands, the sandhills at Ardeer, near Ardrossan, on the banks of the Firth of Clyde in Scotland, where Alfred Nobel in 1871 got the Government's permission to erect a nitro-glycerin and dynamite factory in co-operation with a group of Scottish financiers in Glasgow.

"If I had not got my work here," said Alfred Nobel, "Ardeer would certainly be the most depressing place in the world. Picture to yourself everlasting dunes with no buildings. Only the rabbits find a little nourishment here; they eat a substance which quite unjustifiably goes by the name of grass, and of which some few traces are to be found here and there. This is a wonderful sand desert, where the wind always blows, and often howls, filling the ears with sand which also drifts about the room like a fine drizzle. There lies the factory, and most of the buildings have hidden themselves behind sandhills. A few yards away the ocean begins, and between us and America there is nothing but water. Now you will have some idea of the place where I am living; as I have said, without work it would be intolerable."

The factory at Ardeer can be taken as a symbol for Alfred Nobel's creations. It, like his other enterprises, became very successful with time, but in the beginning the same hard wind as in Ardeer was blowing against the young man, sometimes with a terrible strength. There was in fact no wealth to begin with, not even a name.

*Inaugural address to the Postgraduate Medical School of the University of St. Andrews, delivered on October 9, 1958.

The name Nobel is not derived from the Latin word *nobilis*, but from a place named Nöbbelöv, in the South Swedish province of Scania. One of Alfred Nobel's ancestors, Petrus Olofsson, born 1655 in Nöbbelöv, went as a young man to study in the Swedish university town of Upsala. Having been entered in the university register under the name of Petrus Olai Nobelius, the ambitious young man fulfilled his education in law and married a daughter of the famous university chancellor Olof Rudbeck senior, who in his younger days (1653) had discovered the lymph vessels and the thoracic duct simultaneously with Bartholini.

The Nobel Family

The family, though introduced into influential circles and endowed with good hereditary genes, never became prosperous. At the time when Alfred Nobel was born, his father went bankrupt.

Nobel's father, Immanuel Nobel junior, was an inventor of genius with a quite unusual vitality. Between 14 and 17 years of age he sailed as a cabin boy in the Mediterranean with a ship from his hometown, Gäfle, an extremely hard experience for the young boy. The captain and half the crew died at sea. After receiving an incomplete technological education in Stockholm, he established himself as a building constructor, contractor, and inventor. Very soon, however, he started building beyond his means and also had a large part of his work destroyed by fire. In 1833 he went bankrupt. In order to avoid imprisonment and the insistent demands of his creditors, he moved in 1837 to Finland, then under Russian rule, and soon to Russia, where he established himself as a mechanical engineer in St. Petersburg. His wife joined him there five years later together with their two youngest sons, Ludwig aged 11 and Alfred aged 9.

In his workshop in St. Petersburg, Immanuel Nobel made wagon-wheels, steam-hammers, and other tools, but his chief interests soon became explosive mines, based on his own invention, using chlorate and sulphuric acid as a detonator. After Schönbein's discovery of nitrocellulose in 1846 the mines were mostly iron shells filled with this material. Immanuel's mines apparently were square boxes, filled with powder, with long iron poles sticking out from their sides. These poles, when hit by a ship, broke a glass tube with sulphuric acid inside chlorate, sulphur, and sugar, causing a small explosion which lit a fuse, and this in turn set off the powder. It was this idea, of causing a big explosion

by means of a little one, that was to be decisive in Alfred Nobel's life.

When the Crimean War was imminent the Russian Government supplied Nobel with a subsidy for the extension of his factory, and when the war broke out in 1854 the Russian High Command entrusted the mine-laying programme to Nobel. Kronstadt, the fortress Sveaborg in Finland, and the harbour of Reval in Estonia were protected with mines.

Nobel's submarine mines aroused great interest. On the second expedition of the combined Anglo-French fleet to the Baltic in 1855 the British flagship, the steamer *Duke of Wellington*, captured one of the mines. It exploded on deck and killed one man. The Britons had also seen a Russian steamer being badly damaged when running upon a mine. Rumours of the mines and the knowledge of the strong Russian defence forces on shore then prevented the British fleet from sailing into the innermost parts of the Gulf of Finland. Nobel's mines thus contributed to protect Kronstadt from a bombardment of the kind the fleet on their first expedition in June, 1854, had applied so successfully in destroying the Russian fortress at Bomarsund, on the Åland islands in the Baltic.

Immanuel Nobel had thus rendered the Russian Government very great services, and, although a foreigner, was awarded an Imperial gold medal.

But Russia is Russia. The Crimean War ended with defeat. The old Tsar Nicolaus I had passed away. The new Government disregarded the promises made by its predecessor and placed no orders of any kind in Nobel's enterprises, but, to the contrary, supported his competitors. As a consequence Nobel's workshop went bankrupt. This was in 1859. It was a terrible blow for Immanuel Nobel. Broken down and disappointed, he returned in the same year to Stockholm.

Immanuel Nobel was a genius. Only a genius can without any education in chemistry and with only a few years' technical training construct explosive mines and build steam-engines on a large scale in a foreign country. In his later years, broken by bankruptcy and struck by hemiplegia, he still made suggestions for new inventions. Famous is his prediction of the possibilities of the present-day plywood industry. His predictions have all been amply fulfilled, except in one respect. He suggested that coffins should be so built that one who only seemed dead could himself raise the lid, which should be supplied with air holes for breathing and a cord attached to a bell.

Immanuel Nobel's wife, Andrietta, a vigorous and intelligent woman, had the common sense and sweet temper necessary to hold together the marriage with a man like him. It was certainly no pleasant time when, for five years, she was left alone in Stockholm with their three children, and not much better when after that time she had to leave friends and relatives and embark for Russia. She retained her pleasant disposition all her life, however, and was greatly loved by her sons. Until her death in 1889 they used, if possible, to meet in Stockholm every year for her birthday on September 30.

Alfred Nobel was born in 1833, at the time of his father's first bankruptcy. His only formal education consisted of three terms at the elementary school of Jacob's parish in Stockholm at the age of 8 and some instruction in Russia by a private teacher. The education ended when Alfred was 16 years of age. He then had an opportunity of visiting the United States for a short

period and of travelling in Europe for a couple of years, partly in order to improve his health.

Through his father, Alfred had been introduced into the field of explosives, and he found many important problems awaiting solution. One of them was the employment of nitroglycerin as an explosive.

Nitroglycerin

An Italian, Sobrero, a pupil of Pelouze's, prepared in 1847 nitroglycerin, "piroglycerina."

Owing to the high risk of explosion, this new compound was very difficult to handle. On the one hand it burnt like an oil without explosion when directly ignited, and on the other could explode at any time during storage or if handled carelessly, particularly if the product was deficiently purified and still contained nitric and nitrous acids. Thus nitroglycerin remained a taboo for technicians for 18 years after its invention. Alfred Nobel succeeded in getting the fluid to detonate at will and to exploit its power.

During the Crimean War a Russian chemist, Zinin, had called the attention of Immanuel Nobel and his son to the possibility of using nitroglycerin in his mines. No practical results came out of the discussion. After his return to Sweden Immanuel tried in 1863 to mix ordinary gunpowder with 10% nitroglycerin, but no real improvement was achieved. Alfred was more successful.

In Russia he had in 1862 placed nitroglycerin in a firmly stoppered glass tube inside a metal tube filled with black powder and ignited the latter by means of a fuse. The whole was thrown into a canal and caused a heavy underwater explosion.

Nobel's Detonator

In 1863 he went to Stockholm to join his father in the work with nitroglycerin. Here Alfred repeated his experiments from Russia, but put the components in reverse order.

Instead of putting a tube of nitroglycerin into a larger tube filled with gunpowder he dipped a small tube of gunpowder, with a fuse attached to it, into a large tube of nitroglycerin. This gave excellent results. On igniting the black powder by means of the fuse, the nitroglycerin exploded, developing its full blasting power.

Nobel's "Patent Detonator" was discovered—Alfred Nobel's greatest invention, which revolutionized the whole technique of explosives and was the most important contribution to the subsequent development of the high explosive industry.

The detonator itself was a very simple piece, a small wooden cylinder about two inches (5 cm.) long containing a tightly sealed charge of ordinary gunpowder and with a fuse attached to it. New and more efficient detonators like fulminate of mercury were later found, but the principle remained the same. This is considered to be the greatest invention of its kind after the invention of the black powder.

In 1864 he received the Swedish patent for the manufacture and use of nitroglycerin and organized in the same year a small laboratory for the production of pyroglycerin at Heleneborg, in Stockholm.

The interest in the new blasting technique was tremendous. The State Railways and different mining companies soon realized the possibilities presented by Nobel's patented blasting oil, and began using it immediately.

During the following years Alfred Nobel was occupied by acquiring patents in different countries and setting up factories, by no means an easy task.

Nitroglycerin Explosions

Manufacture of the explosive was not free from risk. The first serious accident occurred in Sweden in 1864, when Nobel's Heleneborg laboratory in Stockholm blew up on September 3. On this occasion Alfred's youngest brother, Emil, was killed.

A Hamburg paper of December 4, 1865, contained a comprehensive description of such an explosion which happened in New York. In a small hotel in Greenwich Street a German traveller had left a demijohn carefully wrapped in a box, containing 10 lb. of nitroglycerin, which he said he would fetch later. The box was left with the porter and was used alternatively as a seat and as a foot-rest in boot-polishing. One Sunday morning a waiter noticed that red fumes were issuing from it. The porter carried it out into the street and returned to the hotel. The next moment there was a terrible explosion, destroying the fronts of the neighbouring houses, breaking windows and doors, and tearing up the street to a depth of 4 ft.

On April 3, 1866, a serious explosion occurred in Aspinwall, on Panama's Atlantic coast, in which the steamer *European*, which carried a consignment of nitroglycerin for further dispatch across the Isthmus of Panama, was completely destroyed with a loss of 47 lives and great material damage. Shortly afterwards, in April, 1866, a new explosion occurred in a consignment of nitroglycerin which had been shipped on the same route and had reached San Francisco; 15 lives were lost. Yet another nitroglycerin explosion occurred in Sydney, in Australia, at the same time. Even one of Nobel's earliest factories in Krümmel, outside Hamburg, was destroyed by an explosion in the beginning of May, 1866, while he was in America trying to convince people about the harmlessness of his blasting oil and to acquire patent rights on the product.

In America Senator Chandler, of Michigan, introduced a Bill to "regulate the transportation of nitroglycerin, or glonoin oil," providing that any death caused directly or indirectly by the transportation of this oil on any vessel or vehicle should constitute murder in the first degree and be punished with death by hanging.

These terrible accidents almost threatened to nullify the first great discovery in the explosive field.

They must have caused Alfred Nobel serious disquiet. This was the hard wind from Ardeer which I mentioned in the beginning of my lecture which now was blowing against Alfred Nobel. His brother Robert gave him the following advice: "My good Alfred," he wrote, "give up inventing as soon as possible. It only brings disappointment. You have such wide knowledge and such exceptional qualities that you should turn your attention to more serious matters." The authorities of the City of Stockholm declared after the Heleneborg explosion that if Alfred Nobel wanted to go on with the manufacture he could do it on a barge in the Lake of Mälaren, and do it by himself. And this was what Alfred Nobel did.

The "blasting oil" had become indispensable in railway construction and in the mining industry. They had to have it in spite of the risk.

Dynamite

In the meantime Alfred Nobel experimented intensively in order to make nitroglycerin less dangerous. His efforts finally led to the discovery of dynamite, blasting oil adsorbed by kieselguhr. The diatomaceous earth, a readily available raw material, took up three times its weight of nitroglycerin. The nitroglycerin was thereby stabilized but still explosive on detonation. The dynamite could be safely handled, packed in cartridge form, transported, and stored without risk. As a powder it could be filled in boreholes from which the liquid blast oil would have flown out. In 1867 this second great discovery was patented in Sweden, and in combination with the earlier detonator provided the first rational technique for the use of explosives. In 1868 Immanuel and Alfred Nobel were jointly awarded the Letterstedt Prize of the Swedish Academy of Science, an honour which Alfred set great store by all his life.

From now on the situation was changed. What for 18 years had been only a chemical curiosity, and recently threatened to become a real danger to humanity, was now transformed by the technically trained Nobel family into one of the most revolutionary factors of the age, making possible mining enterprises previously unheard of, along with railway, tunnel, and canal constructions—for example, the tunnels through the Alps.

Alfred Nobel had now to spend his time in continuous travelling from country to country, for the establishment and supervision of factories and for the acquisition and protection of patent rights. He found use for his cosmopolitan education and solid knowledge of the chief European languages, and, last but not least, for his detailed knowledge of the manufacturing processes. He had talent enough to build a world-wide organization with the capacity to produce the necessary amounts of explosives. During the years 1867 to 1874 the world production of dynamite rose from 11 to 3,120 tons a year.

In spite of these activities a new discovery followed in 1875. It was blasting gelatin, also called rubber dynamite, in which 7% of low nitrated cellulose or collodion had been dissolved in 93% of nitroglycerin, forming a viscous semi-solid mass. The mixture was not so bulky as dynamite, had a greater blasting power, and was totally consumed on ignition.

Ballistite

The next patent was on smokeless gunpowder, the "ballistite," or the Nobel gunpowder, in which nitroglycerin was mixed with an equal part of guncotton (nitrocellulose). It exploded less violently than blasting gelatin, and thereby developed a propellant ballistic force when used in firearms without splitting the barrel. This invention of a propellant explosive, made in 1887, later came to be of the greatest importance in the manufacture of ammunition for firearms and ordnance pieces.

The Cordite Lawsuit

In England Nobel had met with no success in his attempts to get a licence for manufacture. Sir Frederick Abel, an adviser of the House of Commons on matters of explosives, exerted considerable influence in keeping Nobel's nitroglycerin away from England. In 1869 a Nitroglycerin Act was introduced forbidding the import,

storage, and transport of that substance in the country. Only in 1871 was Nobel licensed to erect a nitroglycerin factory in Scotland.

Nobel came into serious conflict with the two inventors of cordite, the physicist James Dewar and Sir Frederick Abel. On the request of a Government Commission Nobel had informed Dewar and Abel, who were members of the Commission, about all the details concerning the patented procedure of manufacturing ballistite. Without regard to this, Dewar and Abel added petroleum jelly to Nobel's nitroglycerin and nitrocellulose mixture, dissolved it in acetone, so that the mass could be drawn out in threads, and patented the product under the name of cordite. Nobel felt compelled to take legal action against them. On the ground that the plaintiff, Nobel, had spoken about the "well-known soluble nitrocellulose" in his claims and the defendants had used the insoluble variety of nitrocellulose, Nobel lost the case. The lawsuit cost him £30,000, and reduced almost to nil the value of the ballistite patent.

One of the judges of the Court of Appeal, Lord Justice Kay, expressed his doubts regarding the justice of the decision. He honoured Nobel by citing the old saying that the dwarf who stands on the shoulders of a giant obviously should see further than the giant himself. "I have in this case," he said, "my sympathies with the original inventor. Mr. Nobel made a great invention, a principally new and extraordinary thing—and then two clever chemists in reading his description discover that they can use the same starting material with only a small difference in one of the components for getting a similar product with exactly the same properties. In fact, through our decision Mr. Nobel has been deprived of an extremely valuable patent." In order to ameliorate the injustice Nobel's Explosive Co., which made the cordite for the British Government, paid Nobel a royalty on its manufacture of cordite amounting to half the amount it paid for the ballistite.

A benevolent act of that kind would, if it had been shown to Nobel in the U.S.A., have made the Nobel Prizes twice as large as they are now, or still larger. In spite of the enormous use of dynamite in the New World, Alfred Nobel benefited very little from it. His fight with the country's unscrupulous financial racketeers, on which he lost much time, was very disappointing to him. The story of this hopeless fight is vividly told by Herta Pauli in her book, *Alfred Nobel, Dynamite King, Architect of Peace*, published in 1942, and by Robert Shaplen (*The New Yorker*, March 15 and 22, 1958). According to Pauli, Nobel lost all interest in his American business.

How close the ties were between Alfred Nobel and the British enterprises in the explosive field was demonstrated in 1918, when the British explosives industry was unified in a single organization, called Explosives Trades Ltd. The organization soon found that the name Nobel signified quality in the industrial world, and therefore changed its name to Nobel Industries Ltd.

Alfred Nobel's Personality

In the Biography of Nobel, edited by the Nobel Foundation in 1926 under the direction of Henrik Schück, it is said of Nobel that he once was jokingly characterized as Europe's richest tramp. Undoubtedly these words contained a certain amount of truth. During

the hectic years after his invention of the detonator he travelled from country to country. Mostly he lived in the vicinity of Hamburg, and later in Paris. Sweden, however, still remained his home country, and here he chose his collaborators, among whom the foremost was the engineer Alarik Liedbeck.

Liedbeck was sent to organize the first nitroglycerin plant at Ardeer, where he was succeeded by C. O. Lundholm. Both of them co-operated well with the local industrial and business people, to the benefit of the new enterprise. Lundholm became a naturalized British citizen.

Alfred Nobel never married. All his life he suffered from poor health. The bills for doctors and medicine for Alfred played a large part in the economy of the family during the earlier days. When things changed for the better heavy business obligations occupied all his time. It is said that King Charles XII of Sweden remained a bachelor because of the difficulty of carrying a queen with him on his endless war expeditions in Russia, Poland, and Turkey. The same applies to a certain extent to Nobel. There was also the difficulty of finding an intellectually equal partner; he could not even find a secretary who mastered languages enough to satisfy his demands. "Personally," he said, "I find the conversation of the Parisiennes the dulllest there is, while that of educated and not too emancipated Russian women is enchanting. Unfortunately they have an aversion to soap; but one must not ask too much."

Without a family of his own he felt homeless. To his brother Ludwig's wife he once wrote: "What a contrast there is between us. You, surrounded by love, caressing and caressed, anchored in contentment. I, a vagabond, without compass and rudder, like a useless wreck, broken by fate. Without any light memories from the past, without the false but beautiful mirages of the future, created by illusion, without family, which is our only life after death, without friends for the natural cultivation of the heart, without enemies for the cultivation of the gall."

When Ludwig asked for biographical information about their father and Alfred himself, the latter answered: "Why do you want to torment me with biographical essays? No one reads essays except about actors and murderers, preferably the latter, whether they have carried out their impressive deeds at home or in the field of battle." To this he added: "Important things and contractual duties nowadays lie waiting on my desk for weeks, even months, owing to lack of time. In such circumstances it is quite impossible for me to write biographies if they are not as short as a police description; but these are, I think, the most eloquent. For example: Alfred Nobel, a poor semi-alive creature, which should have been suffocated by the doctor as soon as he with a yell made his entry into life. His greatest merits: to keep his nails clean and never be a burden to anybody. Greatest fault: to lack a family, good temper, and good stomach. His greatest and only demand: not to be buried alive. Greatest sin: not to worship Mammon. Important events in his life: none."

Nobel and the Peace Movement

During the first twenty years following his discovery of the detonator and of dynamite Alfred Nobel's activities were exclusively limited to the manufacture of nitroglycerin and dynamite, including the rubber dynamite for application in the fields of mining and

in road, canal, and tunnel constructions. The most remarkable improvements in people's living conditions had thereby been achieved. Nothing could be more misleading than to label Alfred Nobel as a "merchant of death," as has been done. His fortune was collected during these first twenty years. It was not until the middle 'eighties that his gunpowder manufacture was any part of his business.

Being highly intellectual and strongly influenced by the humanistic tendencies of contemporary literature, with a keen eye for the weaknesses of the political systems of his time, Alfred Nobel could not avoid getting involved in the discussion about war and peace. His discoveries had opened unlimited possibilities for destructive wars, and the great Powers cultivated a hostile attitude towards each other. He said, "If in thirty years we shall not have succeeded in reorganizing the world, it will inevitably relapse into barbarism." As it actually did.

Nobel himself thought that the only chance of peace lay in the opposing powers hesitating before the risks involved. When Bertha von Suttner, who in 1889 published *Lay Down Arms*, asked for money for the Peace Congress in Berne in 1892, she received a sum, but Nobel did not believe that the congress could be of any particular value. "I believe," he said, "that my factories will put an end to war sooner than your congresses. When the day dawns, when two army corps can destroy each other in one second, all civilized nations will surely recoil from war in horror and disband their armies." At least, he said, the governments would postpone hostile actions for a year or two, hoping that the air would clear in the meantime, some politicians might possibly die, and common people would have time to think it over before starting the bloody business. If this should fail, an international court and a collective defence system should be applied against an aggressor. "Wars will become impossible when all states bind themselves absolutely to take action against the first aggressor." Nobel expressed his great esteem for Bertha von Suttner's writings against war and armaments, but he still retained his belief that in some situations a collective attack on an aggressor might become necessary.

Even if Nobel did not trust very much in the efficiency of peace congresses he finally decided to design the Peace Prize in his will "for the person who shall have done the most effective work for promoting friendly relations between the peoples, for the abolition or reduction of standing armies and for the formation and popularization of peace congresses." Being a practical man, he fully understood that the best way of putting dynamite under the warmongers was to create friendly relations among the inhabitants of neighbouring countries, a principle successfully applied for the first time in the history of Europe nine years after his death, when the union between the Scandinavian brother-countries Sweden and Norway was dissolved. It was an intelligent step Nobel took when he put the awarding of the Peace Prize in the hands of the Norwegians, the "rebels" that urgently demanded to have the union with Sweden broken.

The Will

When Nobel, in the 'nineties, felt that it was time to write his will and dispose of a fortune amounting to 33 million Swedish crowns, he decided that the money

should be used for the benefit of society. The witnesses to the will later said that they have heard him say on the occasion of signing: "At heart I am a social-democrat, in moderation. I especially believe large inherited fortunes to be a misfortune which only serves to stupefy humanity. A person who owns a large fortune should, therefore, only allow a small part of it to fall to his relatives." He considered it wrong to leave even direct heirs more than they need for education, or to let them have a larger sum than they have earned themselves. To act differently, he thought, would mean encouraging indolence and preventing a healthy development of the individual's capacity to create an independent position for himself.

The content of his will is very well known. He stated that:

"With the residue of my convertible estate I hereby direct my Executors to proceed as follows: They shall convert my said residue of property into money, which they shall then invest in safe securities; the capital thus secured shall constitute a fund, the interest accruing from which shall be annually awarded in prizes to those persons who shall have contributed most materially to benefit mankind during the year immediately preceding. The said interest shall be divided into five equal amounts, to be apportioned as follows: One share to the person who shall have made the most important discovery or invention in the domain of Physics; one share to the person who shall have made the most important Chemical discovery or improvement; one share to the person who shall have made the most important discovery in the domain of Physiology or Medicine; one share to the person who shall have produced in the field of Literature the most distinguished work of an idealistic tendency; and, finally, one share to the person who shall have most or best promoted the Fraternity of Nations and the Abolishment or Diminution of Standing Armies and the Formation and Increase of Peace Congresses."

Nobel made up his will and signed it on November 27, 1895. It is known that his distaste for lawyers was so great that even on this exceptional occasion he refused to ask for legal advisers, consequently many formalities were overlooked.

But it was not only against the law people he could be sarcastic. He had all his life to pay attention to his health, and came thereby in contact with medical men and medical problems. He was well aware of the weaknesses of the medical sciences. When in his older days he consulted, as he put it, two "fakultets-åsnor," one of them told him that he was suffering from rheumatic gout and the other spoke about gouty rheumatism. Both prescribed for him to take his own blasting oil, nitroglycerin, to find relief from his cardiac pain.

As to his will, the question came up of where Nobel had his domicile. Since his ninth year he had not been registered anywhere. It is not surprising that the French tax-collecting department, "le Fisc," showed a special interest in his fortune. Fortunately, he became registered in Sweden in 1894, when he bought the Bofors arms firm. But for this formality, his fortune would certainly have stayed in France to be liquidated during the economic chaos in Central Europe which followed in the period after his death.

Nor were the governing bodies who should award the Prizes asked beforehand if they were able or willing to accept the offer. It thus happened that the Swedish Academy of Science, which now awards the Prizes for Physics and Chemistry, felt unable to select

representatives even for preliminary discussions with the executors of Alfred Nobel's will until it was evident that the will would become legally recognized. Leading conservative politicians in Sweden declared the will as an infringement of the legal rights of Nobel's heirs.

Meanwhile some of Nobel's heirs in Sweden had brought an action against the executors, claiming that the will should be declared invalid. The executors of the will appointed by Nobel, Mr. Ragnar Sohlman and Civ.eng. Rudolf Lilljequist, would have met an almost insurmountable resistance from the authorities and the heirs had not the nephew of Alfred Nobel, Ludwig's son Emanuel Nobel, in February, 1898, declared that he, although the death of Alfred Nobel had heavily shaken the financial ground of the naphtha enterprises in Russia, was willing to do his best to see that his uncle's will should be respected. The action of Emanuel Nobel on this occasion deserves to be remembered. Such a disregard of what was considered the rights of the heirs as Alfred Nobel had shown was in fact unheard of. Because of the extraordinarily good relations which had always prevailed within the family, Emanuel felt convinced that deeper motives had induced his uncle's decision. He therefore, when the highest representative of the State claimed that Alfred Nobel had been "influenced by peace fanatics and particularly by women" and advised him to act in favour of the heirs' rights, responded: "Your Majesty! It is not my intention to take any action through which members of my family in the future could be blamed by the most highly deserving scientists of the time for having deprived them of something which duly ought to be theirs."

Emanuel Nobel called the executors "solicitors of the soul." He participated in the preliminary discussions between them and the representatives of the Swedish Academy and the Karolinska Institutet. A proposal was made on June 5, 1898, according to which the heirs should be allotted one and a half years' income to the estate, provided they recognized the will and waived any further claims upon the estate. To this they agreed, and thereby the estate was saved for the Nobel Foundation, whose Articles were approved by His Majesty the King in June, 1900. The following year, 1901, the first Nobel Prizes were awarded.

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The Department of Scientific and Industrial Research will take over part of the former Royal Ordnance Factory at Thorp Arch, near Boston Spa, Yorkshire, for the use of the new National Lending Library for Science and Technology. Present plans are that the library will begin work at Thorp Arch in 1961, becoming fully operational during the following year. The new library—the nucleus of which already exists in the D.S.I.R. Lending Library Unit now at Chester Terrace, Regent's Park, London—will cover all subjects in science and technology, except for some fields of medicine. One important activity will be the expansion of work on the translation of Russian scientific literature, now organized by the Lending Library Unit in collaboration with the National Science Foundation in the United States.

ACUTE PANCREATITIS

ANALYSIS OF 100 PATIENTS

BY

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For a good many years the General Infirmary at Leeds has accepted most of the emergency surgical patients from this city (population 508,000) and the immediately surrounding countryside. The number of acute surgical admissions, excluding head injuries, has been fairly constant over the past six years at 2,300 to 2,600 per annum. During this period 100 patients with acute pancreatitis have been admitted. A further 41 patients have been seen whose serum amylase was raised but in whom the diagnosis of acute pancreatitis was either doubtful or erroneous. It is with this series of 141 patients that the present communication deals.

Aetiology

There are two schools of thought about this unsolved question. The first school is the older, and its two chief exponents have been Opie (1903) and Rich (see Rich and Duff, 1936). At necropsy on a patient who had died of acute pancreatitis Opie found a stone in the ampulla of Vater, blocking the common orifice of biliary and pancreatic ducts and converting them into a continuous channel. He postulated that an increase in biliary pressure would force bile up the pancreatic duct, where it would activate trypsinogen and cause pancreatic necrosis. The second part of this theory he proved by causing acute pancreatitis in dogs by injecting their own bile into their pancreatic ducts. The first postulate, that pressure in the biliary duct must exceed that in the pancreatic duct, has been more difficult to establish. In fact, the most reliable work on biliary and pancreatic duct pressures (Parry, Hallenbeck, and Grindlay, 1955) shows that biliary secretory pressure in dogs almost never exceeds pancreatic secretory pressure. These results may not be applicable in man, however, since the anatomy of the ducts is so different in dogs, the main pancreatic duct opening a centimetre or more below the common bile duct.

It was soon realized that it is unusual to find a stone impacted at the ampulla of Vater in patients with pancreatitis. In the present series 26 patients died. Of these, 22 were examined *post mortem*, and in five a stone was found impacted at the ampulla of Vater. In addition, in one patient operated on during an attack of acute pancreatitis a stone was found at the ampulla and removed. In the remaining cases it has been postulated that the common biliary-pancreatic pathway is established by spasm of the sphincter of Oddi. This is the theoretical background to sphincterotomy in the treatment of chronic relapsing pancreatitis.

In 1936 Rich and Duff published their researches on the pathology of pancreatitis and described a form of pancreatic duct mucosal hyperplasia which they believed could cause obstruction. They postulated that over-secretion by the pancreas against a blocked duct could cause pancreatitis. On the other hand, pancreatography in patients with pancreatitis shows that obstruction to the duct anywhere except at the sphincter of Oddi is exceedingly uncommon (Doubilet, Poppel, and Mulholland, 1957; Pollock, 1958).

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