

The Nobel Prizes for Research Work in Science.

HISTORY OF FOUNDATION AND CONSTITUTION OF COMMITTEES.

ALFRED BERNHARD NOBEL, engineer, chemist, inventor, industrialist, philanthropist, was born at Stockholm, Sweden, on Oct. 21, 1833; he died at San Remo, Italy, on Dec. 10, 1896, aged sixty-three years. The terms of his will, covering an immense capital sum, instituted an annual allocation of money prizes, of which the essential principle was their application for and towards the greatest benefit of mankind. From inquiries which reach us from time to time, and from comments made upon awards of the prizes, it appears that the nature and work of the Foundation are not clearly and widely understood. We think, therefore, that a useful purpose will be served by giving a sketch of Nobel's career and presenting in a compendious form, the main decisions and articles embodied in the Code of Statutes of the Nobel Foundation, which are recurrent in operation, so far as they are likely to concern scientific workers in the domains of physics, chemistry, physiology, and medicine.

The story may appropriately begin with the discovery in 1846, by Ascanio Sobrero, of Turin, of nitro-glycerine. The process of manufacture was described in a communication to the Turin Academy of Sciences in February 1847, and therein Sobrero mentions its explosive properties. In a lecture given about this date, before a scientific congress in Venice, he stated that "it is not yet possible to say anything as to the use that may one day be found for this liquid substance, which can be exploded by a shock; future experience alone will show us". Down to the early 'sixties, nitro-glycerine was regarded much in the aspect of a scientific curiosity, and its use as a powerful explosive was not contemplated. The resourcefulness, patience, and inventive genius of Alfred Nobel wholly changed the situation.

A recently issued English edition of "The Life of Alfred Nobel", by Prof. H. Schück and R. Sohlman,¹ translated from the German edition of Dr. Muelbe, supplies details of Nobel's first Swedish patent, and of those experiments and developments ensuing which revolutionised the technique of explosives. Particulars will also be found there as to the manufacture of dynamite (1863), ballistite (1888), and other explosive materials.

This "Life" is a welcome compilation, affording so far as possible an authentic account of Nobel's family history and upbringing, and of the activities which dominated his career. Hitherto, details have appeared, more or less uncertain and incomplete. But this issue bears the authority of the Nobel Institute, whilst the authors are specially qualified for their task. Two forewords, by the late Dr. Gustav Stresemann, and Sir Austen Chamberlain, respectively, are of interest in relation to the subject of international peace.

¹ "The Life of Alfred Nobel." By H. Schück and R. Sohlman. Translated from the German of W. H. v. d. Muelbe by Brian and Beatrix Lunn. Pp. ix + 353 + 18 plates. (London: William Heinemann, Ltd., 1929.) 21s. net.

It appears that owing to the reserve which was characteristic of Nobel, a biography of him could only be, in a sense, fragmentary, since extensive periods of his life's history remain as uncharted areas on a map. In 1893 the University of Uppsala conferred upon him a doctorate of philosophy. He furnished then a short autobiography, breaking silence, as follows: "The undersigned was born on the 21st October 1833; he acquired his knowledge in private studies, and did not attend any secondary school. He devoted himself particularly to applied chemistry, and discovered explosives known under the names of dynamite, and smokeless powder called ballistite and C. 89. Since 1884 he has been a member of the Royal Swedish Academy of Science, and is also a member of the Royal Society (London)² and the Société des Ingénieurs Civils in Paris. Since 1880 he has been a Knight of the Order of the Polar Star. He is an officer of the Legion of Honour."

Although a Swede, whose alternative tongue was Russian, he wrote German, French, and English in faultless style. To say that he seems never to have had leisure to live may appear paradoxical, nevertheless it has elements of truth. Owing a native kindness of heart, many deeds of sympathy with affliction sprang therefrom. He was free from methods of dictatorship, and observed strict rectitude in business operations; and he held open and fair dealings with all in his employ.

Nobel was conscious that his scientific discoveries, besides their technical and industrial applications, might have far-reaching overt implication. Incidentally, he had placed in the hands of international ways and means for new destructive agencies amongst mankind in general. The knowledge seems to have bred a haunting fear, and melancholy dread, intensified with passing years. Peace between peoples became a subjective necessity of his being. Possibly, after all, science and philosophy were in the middle distance only, and not in the foreground of his thoughts.

"I have been wondering", he wrote (1892), "why the rules governing a duel between individuals should not be applied to a duel between peoples." Disarmament, he believed, could only be achieved by very slow degrees. Somewhat later he had reached this conclusion: "I am beginning to believe that the only true solution would be a convention under which all the governments would bind themselves to defend collectively any country that was attacked". His final will provided (through prize awards) for the promotion of friendly relations between the peoples, for the abolition or reduction of standing armies, and for the formation and increase of peace congresses.

It is of interest to recall that on May 21, 1875, Nobel attended the Society of Arts in London, and read a paper "On Modern Blasting Agents", and it was announced as by the founder of the nitro-

² Dr. Nobel was not a foreign member of the Royal Society of London.

glycerine industry. The chairman, Mr. (afterwards Sir) Frederick Abel, advised the audience that the great experience of Mr. Nobel, both from a practical and scientific point of view, entitled his views to very great consideration. There, were, however, debatable points. Abel summed up the discussion that took place at considerable length. At the ensuing annual general meeting (June 30, 1875) Nobel was awarded the Society's silver medal for this paper. Nobel had remarked that the foregoing was the only scientific memoir he had ever written. He did not do himself justice in this respect. Earlier, in 1865, he communicated a paper to the Paris Academy of Sciences, published with the following title: "Résultats des expériences de sautage faits avec la nitro-glycérine, à la mine de la Vielle-Montagne". Also, in 1868, he attended the meeting at Norwich of the British Association and read a paper on "Dynamite, a Recent Preparation of Nitro-glycerine, as a Blasting Agent". This was published in brief abstract.

Nobel's comparatively early death was not unexpected. From his earliest youth he had been delicate. When only twenty he underwent treatment at a spa, oftentimes repeated. Strenuous work and constant travelling from country to country naturally took their toll. In 1893 he reached the age of sixty and heart trouble became more frequent. From Paris he wrote, "It seems an irony of fate that they should be prescribing nitro-glycerine internally for me"; and this to his sister-in-law, Ludwig Nobel's wife: "You are anchored in contentment. I drift about without rudder or compass, a wreck on the sea of life; I have no memories to cheer me, no pleasant illusions of the future to comfort me."

The student of scientific biography will observe a curious parallel in the life story of Alfred Nobel and that of James Smithson, founder of the Smithsonian Institution, Washington, whose patrimony, though meagre by comparison, was designated (1826) for "the diffusion of knowledge among men". Each was unmarried, each of marked idealistic fibre. Bodily infirmities were alike common. Both careers came to a close in Italy, a land foreign to birth.

By his own wish Alfred Nobel was buried at Stockholm in a grave in the northern churchyard where his parents and a brother had been interred. Thus, the spirit of patriotism was preserved in the end.

DESIGN OF NOBEL'S WILL.

It was provided in the will (drawn on Dec. 27, 1895) that the interest on the capital sum available should be awarded annually in prizes to those persons who shall have contributed most materially to benefit mankind during the year immediately preceding. Further, that the interest should be divided into five equal amounts.

In the domain of science the appointments were three in number, specified as under:

(a) One share to the person who shall have made the most important discovery or invention in the department of physics.

(b) One share to the person who shall have made

the most important chemical discovery or improvement.

(c) One share to the person who shall have made the most important discovery in the department of physiology or medicine.

Further, the will stipulated that the prizes for physics and chemistry should be awarded by the Swedish Academy of Science, Stockholm; the prize for physiology or medicine by the Caroline Medical Institute, Stockholm. "I declare it to be my express desire", wrote Nobel, "that, in the awarding of prizes, no consideration whatever be paid to the nationality of the candidates, that is to say, that the most deserving be awarded the prize, whether of Scandinavian origin or not."

The instructions of the will settled the form and scope of the Nobel Foundation, which was ushered into being in the year 1900, after prolonged deliberations. The Royal Academy of Science, Stockholm (K. Svenska Vetenskaps-Akademie) one of the two corporate bodies with whom is vested the adjudication of the three prizes in science, was founded in 1739. The functions of the Academy are to encourage the pursuit and the development of the sciences, and also to spread a knowledge of them through scientific papers and monographs. The King is patron, and there are 100 Swedish and Norwegian members and 75 foreigners. The Caroline Medical-chirurgical Institute, Stockholm (K. Karolinska Institutet) was founded in 1815. It corresponds to a university medical faculty, and has the same standing as the medical faculties at Uppsala and Lund.

The Statutes of the Foundation provide that it is within the power of each corporation entitled to adjudicate prizes, to determine whether the prize or prizes it has to award might be granted to some institution or society.

NOBEL COMMITTEES.

An elective Nobel Committee for each of the three scientific prize sections exists to promote the obligations devolving yearly upon the Stockholm institutions, consisting of three, four, or five members. The committees receive and make suggestions respecting the grounds for allotments of prizes, whilst they have power to seek the aid of a specialist, if necessary, in furtherance of investigation. To be qualified for election on a Nobel Committee it is not essential to be a Swedish subject.

During the course of the month of September in each year the Nobel Committees are empowered to issue a circular to all those who are qualified, asking for nominations of candidates for prizes before the first day of February in the following year; such nominations to be supported by evidence, documentary and otherwise. It is essential that only duly qualified persons propose candidates. A direct application for a prize is not taken into consideration.

1. *Physics and Chemistry Sections.* The right to hand in the name of a candidate appertains to:

(a) Home and foreign members of the Royal Academy of Science, Stockholm.

(b) Members of the Nobel Committees of the Physical and Chemical Sections.

(c) Men of science who have received a Nobel prize from the Academy.

(d) Professors of the physical and chemical sciences of the Universities of Uppsala, Lund, Oslo, Copenhagen, and Helsingfors, at the Caroline Institute, Stockholm, and the Royal Technical College, Stockholm, and also those teachers of the same subjects who are on the permanent staff of the Stockholm University College.

(e) Holders of similar chairs at other universities or university colleges, to the number of at least six, to be elected by the Academy of Science in the way most appropriate for the just representation of the various countries and their respective seats of learning.

(f) Other men of science whom the Academy of Science may see fit to select.

The members of the present Committee for Physics are—

Prof. Carl W. Oseen (Uppsala).

Prof. V. Carlheim-Gyllensköld (Stockholm).

Prof. Karl M. G. Siegbahn (Uppsala—Nobel prize, 1925).

Prof. Henning B. M. Pleijel (Stockholm).

Prof. Erik W. Hulthén (Stockholm).

The members of the present Committee for Chemistry are—

Prof. Henrik G. Söderbaum (Stockholm).

Prof. Theodor Svedberg (Uppsala—Nobel prize, 1926).

Prof. Knut W. Palmaer (Stockholm).

Prof. Ludwig Ramberg (Uppsala).

Prof. Hans Karl von Euler-Chelpin (Stockholm—Nobel prize, 1929).

Secretary to the above Committees—

Prof. Arne Fredrik Westgren (Stockholm).

2. *Physiology and Medicine Section.* The qualification for the right to nominate candidates is possessed by :

(a) Members of the professorial staff, Caroline Institute, Stockholm.

(b) Members of the medical class of the Royal Academy of Science, Stockholm.

(c) Nobel prize-winners in the section.

(d) Members of the medical faculties of the universities of Uppsala, Lund, Oslo, Copenhagen, and Helsingfors.

(e) Members of at least six other medical faculties, to be selected by the staff of the Caroline Institute in the way most appropriate for the just representation of the various countries and their respective seats of learning.

(f) Men of science whom the above staff may see fit to select.

The Nobel Committee of the section shall hand in its verdict and proposals for the prize award to the professorial staff of the Caroline Institute within the month of September.

The members of the present Committee for Physiology and Medicine are—

Prof. Gunnar Hedrén (Stockholm).

Dr. Hans Christian Jacobæus (Stockholm).

Dr. Hans Valdemar Gertz (Stockholm).

Dr. Einar Hammarsten (Stockholm).

Secretary to the Committee—

Dr. Göran Liljestrand (Stockholm).

Special Funds of the Sections.

The Statutes provide, within strictly defined limitations, for the establishment of Special Funds for each of the five sections of the Noble Foundation. The proceeds of any and every such fund may be employed, subject to the approval of the adjudicators concerned, to promote the objects which the testator ultimately had in view in making his bequest, *in other ways than by means of prizes.* In the domain of physical and chemical science, support in furtherance is consequently available, if judged to be of significance either in a scientific or a practical regard. Proposals for the awarding of assistance of this nature remain with the respective Nobel Committees. Similarly, such proceeds may be devoted to promoting research in medical science, and in rendering the results of that research of practical use to mankind. In this section a proposition may be made by a member either of the staff of the Caroline Institute, or of the Nobel Committee.

Obituary.

THE RIGHT HON. THE EARL OF BALFOUR,
K.G., O.M., F.R.S.

THE genuine statesman, so we read in the *Republic*, will be the man who, in contemplating the true good, makes it a pattern for ordering the State and individuals and his own conduct; who spends much of his time in philosophic reflection, and yet, when his turn comes, endures for the sake of the public welfare the toil of politics and ruling, not as though he were performing some meritorious deed but simply as a matter of duty. In writing of the great personality lost to the nation on Mar. 19 last, one can scarcely avoid recalling the well-known portraiture. For, if ever in the chequered course of human history Plato's ideal has been to some extent realised, it was in

Lord Balfour's case. Other political leaders have been classical scholars, men of letters, and even men of science. Who, however, among Prime Ministers, has ever before not only made philosophy his main pursuit as an undergraduate, but also at the age of thirty published in a technical journal an elaborate criticism of the transcendental theory of knowledge of sufficient importance to elicit replies from such eminent Kantian scholars as Edward Caird and John Watson? And, needless to add, this was the outcome not merely of a passing phase in the career of a distinguished public man; it was the prelude to a large number of subsequent efforts in the field of speculative thinking, interest in which was no less keen in the man of eighty than in the man of thirty.

Arthur Balfour came to Cambridge from Eton in