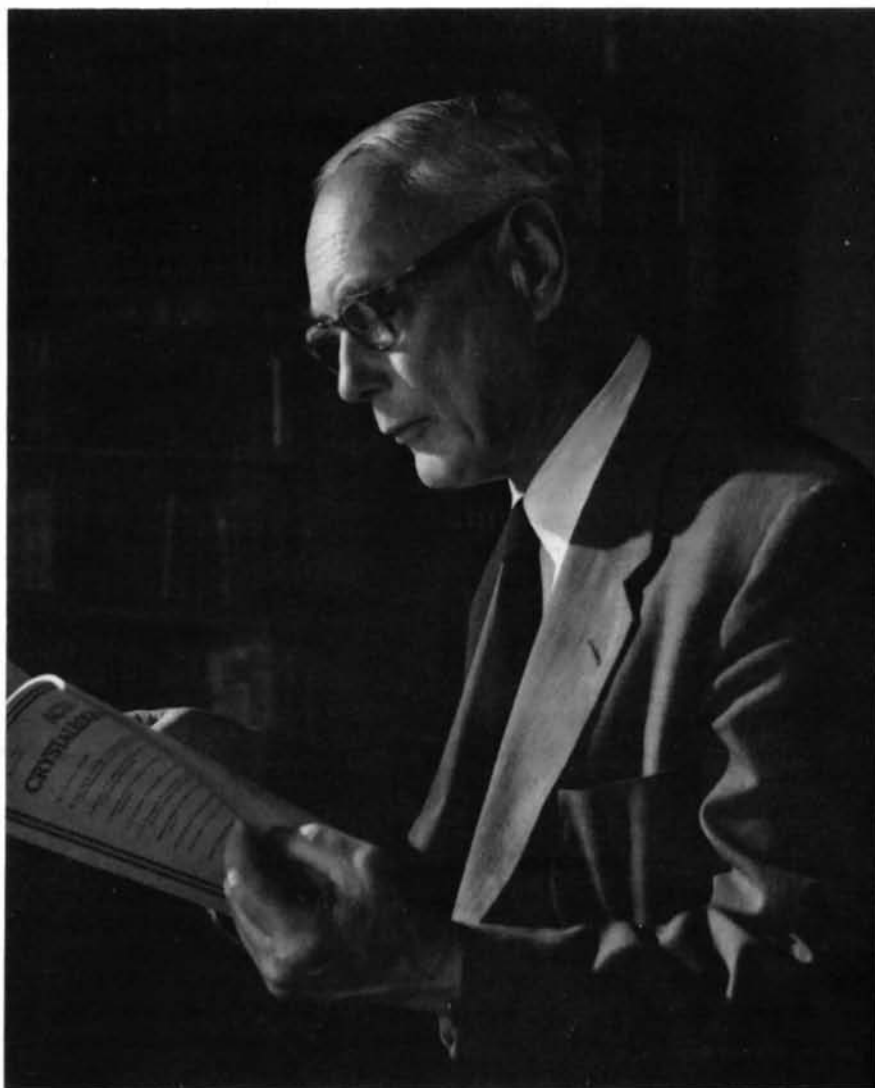


## P. P. Ewald



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### 90 years

On 23 January 1978 Professor P. P. Ewald will celebrate his 90th birthday. This is not only an occasion for family and close friends but also a day to be remembered by crystallographers all over the world.

A new field of science was born in 1912 and Professor Ewald has taken a decisive part in it ever since. It is well known how a discussion between von Laue and Ewald early in that year, concerning young Ewald's thesis on the double refraction produced by the anisotropic arrangement of optical resonators in a crystal lattice, started in Laue 'the train of thought leading to his X-ray diffraction experiment'.

The original kinematical theory of X-ray diffraction was limited to the case where the incident wave was

successively scattered by the atoms of a crystal. In a remarkable series of publications over a period of more than half a century Ewald both laid the foundations of and developed the dynamical theory of the propagation of electromagnetic waves in crystalline solids. The theory accounts in a rigorous and self-consistent way for the diffraction in a perfect crystal resulting from the interaction between the incident and diffracted beams.

When developing the dynamical theory Ewald was much ahead of his time. Concepts such as the reciprocal space and the sphere of reflection became indispensable for the crystallographer, and utilization of the theory in electron diffraction was introduced in early days. Experimental verification and widespread

application of the dynamical theory, however, had to await recent times, when perfect crystals have become more generally available.

The appreciation of the profound importance of the dynamical theory has in a remarkable way contributed to the development of crystallography and solid state physics. New and important areas in the study of crystal properties by means of diffraction and other scattering techniques have thus been opened up. The dynamical theory has been applied for the elucidation of X-ray absorption processes and for the accurate determination of bonding and charge distribution in crystals. The precision measurement of neutron scattering lengths is another important application of Ewald's theory. Generalizations of the dynamical theory are instrumental for X-ray topography studies of imperfections in crystals and are increasingly being applied in low-energy electron diffraction and in proton channeling.

Crystallography in its infancy was developed by physicists, but the implications for chemistry, mineralogy and other areas of science were soon appreciated. Ewald played a leading role in shaping crystallography into a new firmly established scientific discipline in its own right. An important step in that direction was the transformation of the forum for classical crystallography, the *Zeitschrift für Kristallographie*, into an international journal for the new crystallography. Its supplementary companion, *Strukturbericht*, co-edited by Ewald and C. Hermann, critically reported on all new crystal structures, thus efficiently disseminating the rapidly increasing knowledge in the field.

To crystallography, as to other sciences, World War II meant serious disturbance of contacts and communications between scientists in different countries. It was largely due to Ewald's initiative that the science of crystallography was reconsolidated in a remarkably

short period of time. Already in 1944 he had put forward the idea of forming an international union for the new crystallography. The plan was further developed at a meeting arranged by Sir Lawrence Bragg in London in June 1946. In the international atmosphere of that meeting it was decided to form an International Union and to revive the publication activities destroyed by the war, by launching publications under the auspices of the Union. The International Union of Crystallography was admitted as a member of the International Council of Scientific Unions on 7 April 1947. This successful and speedy result was largely due to the skilful preparative work of R. C. Evans and Ewald. Ewald continued to take a very active part in Union affairs, by serving on the Executive Committee for the years 1948–1966 and as President 1960–1963. Moreover the new journal, *Acta Crystallographica*, of which Ewald edited the first 12 volumes, soon not only developed into *the* crystallographic journal but also acquired a high reputation amongst all scientific periodicals.

Ewald's lifetime has included the entire history of modern crystallography. He played an initiating role in the first days of our science. Over many years he has contributed to a deepening knowledge of diffraction phenomena, and the insight which he has given has probably still not been fully exploited. He has done decisive work to create the framework for international cooperation and the means for communication between the crystallographers. His wisdom and personal greatness make him dear to his friends and colleagues. The crystallographers of the world with deep gratitude and respect do homage to a great man.

ARNE MAGNÉLI

President

International Union of Crystallography