$$U'_h(E) = \left(1+\frac{eE}{m_0c^2}\right) \times \left[U_h(0) - \left(1+\frac{eE}{m_0c^2}\right) \sum_g{}'' \frac{U_g(0)U_{h-g}(0)}{\kappa^2 - k_g^2} \right] \quad (2),$$

where h is the index of the main reflexion and g those of weak ones; κ is the mean wave number in the crystal and k_g the wave number for the gth reflexion; $\sum_g''$ means the summation over all the reciprocal lattice points except for 0 and h. Provided strong simultaneous reflexions are not excited, it is sufficient to limit the summation over the systematic interactions (*e.g.* Uyeda, 1968). For the second order reflexion the summation term in formula (2) is positive and large, provided $U_1(0)$ of the first order is large and all $U_g(0)$'s are positive (Raether, 1962; Kimoto & Nishida, 1967). When the accelerating voltage is increased, $U'_2(E)$ for the second order decreases, vanishes at a certain voltage E_c, then changes the sign and increases the absolute value. Nagata & Fukuhara (1967) and Uyeda (1968) observed this effect in the extinction distance of the second order reflexion. The present note describes an experimental study of this effect including the change of the sign of $U'_2(E)$.

Fig. 1 shows the diffraction patterns from a single crystal of iron–20 at.% aluminum alloy taken at 200 kV (*a*), 340 kV (*b*) and 380 kV (*c*), where the accelerating voltages were determined by Kikuchi lines (Uyeda, Nonoyama & Kogiso, 1965). The 220 Kikuchi lines become gradually weak with the accelerating voltage, vanish at $E_c = 340$ kV, and then become gradually strong again. This intensity variation is in accordance with that of the absolute value of $U'_{220}(E)$. Moreover, the change of the sign of $U'_{220}(E)$ can be proved as follows. The middle line of the Kikuchi band, which was recently explained by Kainuma & Kogiso (1968), is clearly visible for the 110 band in Fig. 1(*a*) and (*c*), and vanishes in (*b*). It has an asymmetric excess-deficient profile. Note that the asymmetry of the profile is reversed at the voltage E_c. This implies the change of the sign of $U'_{220}(E)$. It is concluded, therefore, that the sign of the factor $U'_h(E)$ can be determined by observing the asymmetry of the middle line.

The same effect was also observed for the 200 reflexion of iron, the 222 of aluminium, nickel and silver, and the 400 of silver. The observed values of E_c are roughly in accordance with those calculated by formula (2). For the exact comparison of experiment with theory, calculations by many-beam theories must be carried out. It should be added that the experimental value of E_c can be determined quite accurately. Thus many-beam version of formula (2) at $E=E_c$ gives a relation between V_g's ($g = 1, 2, \ldots$). Since V_g of high order can be calculated accurately, the relation will be useful for the determination of V_g of low order.

Detailed experimental results and discussion will be reported in the near future.

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Die Ewald'sche Konstruktion im Vorlesungsversuch.

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(*Eingegangen am* 14. *Juli* 1967)

The Ewald construction is easily demonstrated by means of a simple X-ray counter diffractometer for teaching crystallography.

Im Vorlesungsversuch lässt sich das Zustandekommen des reziproken Netzes als zweidimensionaler Modellfall für das reziproke Gitter leicht mit Röntgenstrahlung demonstrieren (Riechert & Weiner, 1964). Die hierzu erforderliche Anordnung hat die Bragg'sche Gleichung in ihrer vektoriellen Form

$$\frac{\boldsymbol{\sigma}-\boldsymbol{\sigma}_0}{\lambda} = n \cdot \frac{\mathbf{n}}{d},$$

welche bekanntlich auf P. P. Ewald zurückgeht, zu ihrer Grundlage. Beim Auftreten von Röntgenreflexen werden die zugehörigen reziproken Netzpunkte durch den Eckpunkt P eines beweglichen Parallelogramms bezeichnet, dessen Seitenpaare durch die Vektoren $\boldsymbol{\sigma}_0/\lambda$ und $\boldsymbol{\sigma}/\lambda$ gebildet werden (Fig. 1).

Der Strecke OP entspricht dann der reziproke Vektor $(\boldsymbol{\sigma}-\boldsymbol{\sigma}_0)/\lambda$. Durch $\theta/2\theta$-Bewegungen – unter Koppelung von reziproker Ebene und Parallelogrammführung – sowie durch Drehen von Kristall und reziproker Ebene gegenüber der Beugungsanordnung lässt sich das reziproke Netz punktweise aufbauen.

Röntgenröhre, Kristall, Detektor sowie $\theta/2\theta$-Führung befinden sich auf der Rückseite der reziproken Scheibe. Deren Vorderseite enthält nur die beschriebene Parallelogrammkonstruktion aus Plexiglaslinealen.

Die Anordnung basiert letzlich auf der Ewald'schen Konstruktion und lässt sich daher leicht zu deren Demonstration benutzen. Hierzu wird eine Scheibe aus Plexiglas mit aufgezeichnetem Ewaldkreis (Radius $AO \equiv \boldsymbol{\sigma}_0/\lambda$) im Punkte A befestigt (Fig. 2). Das Ende des Vektors OP liegt – *per definitionem* – immer auf diesem Kreis. Nach Einstellen der – für einzelne Reflexserien spezifischen Glanzwinkel Θ – tritt beim Drehen des Kristalls und seiner reziproken Ebene Röntgenintensität in der Beugungsrichtung nur dann

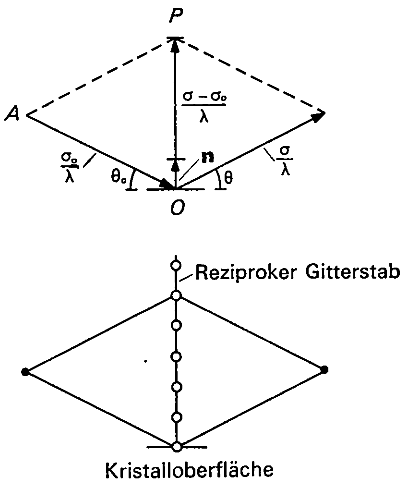

Fig. 1. Die Bragg'sche Gleichung in vektorieller Form.

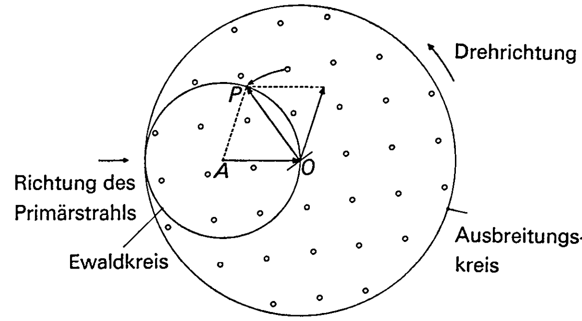

Fig. 2. Die Ewald'sche Konstruktion im Vorlesungsversuch.

auf, wenn ein reziproker Netzpunkt durch den Ewaldkreis tritt. In dieser Form entspricht die Anordnung der Äquatorschicht des Drehkristallverfahrens.

Das reziproke Netz dreht sich bei dem beschriebenen Demonstrationsversuch gegenüber dem Ewaldkreis in Übereinstimmung zu den röntgenographischen Aufnahmeverfahren, bei denen das reziproke Gitter sich durch die Ewaldkugel dreht.

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Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the General Secretary of the International Union of Crystallography (G. Boom, Laboratorium voor Technische Natuurkunde der Rijksuniversiteit, Westersingel 34, *Groningen, The Netherlands). Publication of an item in a particular issue cannot be guaranteed unless the draft is received* 8 *weeks before the date of publication.*

International Union of Crystallography Inter-Congress Meeting, 1968

The Commission on Crystallographic Apparatus of the International Union of Crystallography is organizing a meeting on *Accurate Determination of X-ray Intensities and Structure Factors*, to take place in Churchill College, Cambridge, England, from 24 to 28 June 1968.

The meeting will provide a forum for the assessment of measurement of X-ray structure-factor (F) values derived from small and large single crystals and powders by conventional procedures, and from perfect crystals by the Pendellösung technique. The various sources of error in the different procedures, and their correction or elimination will be considered. Comparison of experimental values with those based on theoretical calculations should provide a valuable commentary on the current state of solid-state studies, particularly in relation to features of structure studies dependent on the absolute accuracy of experimentally determined structure factors.

As the meeting is organized as one of specialists, with restricted attendance, participation is by invitation only. Any crystallographer who could contribute to the discussion and wishes to be considered by the Organizing Committee should apply to the Chairman, Dr A. McL. Mathieson, Division of Chemical Physics, C.S.I.R.O., P.O. Box 160, CLAYTON, Victoria 3168, Australia.

As a record of the meeting for future reference, it is proposed to publish the (invited) lectures plus discussion in an issue of *Acta Crystallographica* Section A.

International Union of Crystallography Eighth General Assembly and International Congress of Crystallography

The Eighth General Assembly and International Congress of Crystallography of the International Union of Crystallography will be held in the United States of America in August 1969. The provisional time table is as follows.

From August 7 to 11 inclusive, a Topical Meeting on *The Crystallography of Biologically Important Substances* will be held at the Center for Crystallographic Research, Roswell Park Memorial Institute, Buffalo, New York. From August 13 to 21 inclusive, the General Assembly and International Congress, comprising the principal scientific sessions and the work of the Union's Commissions, will take place at the State University of New York at Stony Brook, Long Island, New York. From August 23 to 27 inclusive, there will be Topical Meetings of crystallographic interest at Stony Brook, and on *The Chemical and Physical Aspects*