entirely neglected. At the spacing used the real coincidences averaged 1.71 per minute with a probable error of ± 0.03 per minute

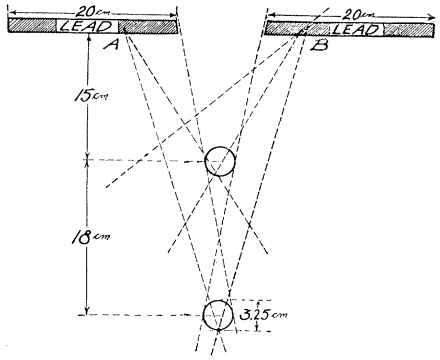

Fig. 1.

over a counting time of 1568 minutes. When blocks of lead $20\times32\times1$ cm were placed on either side of the counters in positions such that straight line paths through both counters were impossible for secondary rays originating in the lead, then the counting rate *increased* to 1.84 ± 0.03 over a counting time of 1312 minutes. The difference in the counting rates of 0.13 ± 0.04 must be attributed to some process by means of which the same primary ray ejects two or more secondaries from the lead at slightly different angles, some of these passing through one counter and others through the other counter. These secondaries may arise from the spraying out of distingegration products from a single nucleus as illustrated at *A* in the figure or they may be emitted as recoil electrons or protons at different points along the path of the primary ray as illustrated at *B*.

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April 25, 1932.

The Crystal Structure of Insulin

It has been known for some time that insulin exhibited certain optical properties of a true crystal.[1] Although numerous attempts have been made by Freudenberg[2] and others, no x-ray diffraction pattern could be obtained beyond the usual ring due to the 3.5A spacing common to proteins. Work of this kind employing the usual lengths of x-radiation, (copper $K\alpha$, 1.54A) has been done in this laboratory over a period of two years.

Recently insulin has been investigated by means of long wave x-rays, using the $K\alpha$ radiation of magnesium and aluminum. The method employed was essentially the same as previously used,[3,4] but a new type of apparatus was designed for the purpose.

The spacings found for insulin by this method are approximately 130, 100, and 80A, giving an axial ratio of 4/3:1:4/5. With the aid of microscopic data the crystal form was found to be monoclinic, with one angle between 88 and 90 degrees, the individual crystals frequently assuming a pseudo hexagonal form. The crystals were positive.

On the basis of the approximate molecular weight of 35,000 proposed by DuVigneaud,[5] and checked by others,[2] and the density of 1.315 determined by Freudenberg[2] and checked by us, the number of molecules per unit cell was found to be 26.

More complete data will be prepared for publication in the very near future, and the method will be applied to other proteins.

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K. E. CORRIGAN
Chemistry Department,
University of Illinois,
May 2, 1932.

[1] E. B. Mathews, Reported by Wintersteiner, DuVigneaud, and Jensen. Jour. Pharm. and Exp. Therapeutics **31,** 84 (1927).

[2] Freudenberg, Hoppe-Seyler's Zeits. f. physiol. Chem. **204,** 233 (1927).

[3] Clark and Corrigan, Radiology **15,** 117 (1930).

[4] Clark and Corrigan, Jour. Ind. and Eng. Chem. **23,** 815 (1931).

[5] DuVigneaud Jour. Bio. Chem. **70,** 393 (1927).

Erratum: Dissociation of the Carboxyl Group in Amino Acids and Related Substances, Produced by Absorption of Ultraviolet Light

Three typographical errors occurred in the printing of the above mentioned letter to the Editor (Phys. Rev. **40,** 115 (1932)). To correct these the word "cystine" should replace