Table 7. *Bond lengths in* C_4Cl_8

C(1)–Cl(7)	1·76 Å	C(2)–Cl(4)	1·76 Å
C(1)–Cl(6)	1·70		
C(3)–Cl(8)	1·72		
C(3)–Cl(5)	1·77	C(1)–C(2)	1·57
C(2)–Cl(1)	1·75	C(2)–C(3)	1·58

Table 8. *Bond angles in* C_4Cl_8

C(2)–C(1)–C(4)	88·4°	Cl(6)–C(1)–Cl(7)	109·1°
C(1)–C(2)–C(3)	88·9	Cl(1)–C(2)–Cl(4)	108·0
C(2)–C(3)–C(4)	87·8	Cl(5)–C(3)–Cl(8)	108·7

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A use for the Zoltai layer-line screen for the precession camera.

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Measurements of intensities of reflexions for structure determination are commonly made on photographs taken with the precession camera. This may be the most convenient method of scaling together different layers photographed with the Weissenberg camera if the crystals are very fine needles or plates. A disadvantage of the use of the precession camera for this purpose is the critical crystal-to-film distance which must be employed, rendering impossible the use of the multi-film pack widely used in Weissenberg photography. This difficulty is commonly overcome by taking a series of accurately timed exposures of a layer. However, this procedure may be difficult to apply if a wide range of intensities is encountered in a layer, and makes considerable demands on the operator and the stability of the X-ray generator.

A method of overcoming this difficulty is to use the double-spot eliminating screen, described by Zoltai (1963). This layer-line screen has a semicircular slit in it, instead of the normal full circle, and in use it rotates in its holder about the axis of the camera. Thus, each reflexion appears on the film only once in each complete precession cycle, and doubling of the spots on the film due to faulty camera adjustment, or misorientation of the crystal, is eliminated (Buerger, 1964).

By using the Zoltai screen, a multi-film pack may be used without any doubling of the spots on the lower films, and the normal methods of visual estimation of intensities may be employed. A standard film holder will take a pack of up to five films without any modification. The record on the lower films is slightly dilated but this effect is negligibly small, and in any case, as Zoltai points out, it is unwise to make accurate measurements of cell dimensions on photographs taken with the new screen.

Since each reflexion occurs only once in the precession cycle, twice the exposure is required with the Zoltai screen to obtain the same intensity as is given by the conventional screen. Thus, a somewhat greater overall exposure time is required for a pack of films than for a series of timed exposures of one film at a time, but a considerable saving of operator's time is effected.

If the crystal being photographed is badly shaped, the use of the Zoltai screen improves the shape of the spots, and thus facilitates visual estimation of intensities. For example, an acicular crystal mounted to rotate about a direction other than the needle axis may produce spots shaped like a cross with a conventional screen, owing to the superposition of two differently oriented elongated spots. The single elongated spot obtained with the Zoltai screen is much easier to measure than the composite spot. Thus, the use of the Zoltai screen may permit satisfactory photography of crystals which would otherwise give unsatisfactory spots.

The double-spot eliminating screen, as originally designed by Zoltai, was primarily intended for photographing zero layers. The screen containing the semicircular slit is caused to rotate in its holder about the camera axis by means of a stationary pin, fixed to the collimator assembly and lying in the camera axis, which locates in one of a series of holes drilled along a radius of the screen. Each hole corresponds to one of the available slit radii. This arrangement makes it difficult to photograph non-zero layers, since (using Buerger's (1944) notation) given a definite value of $\bar{\mu}$, there are only one or two fixed values of s which may be set if the stationary pin is to locate in one of the series of holes. In this laboratory, this difficulty has been overcome, and the screen made very much easier to adjust, by replacing the series of holes by a continuous slot. Then s is continuously variable for a fixed $\bar{\mu}$, and the nomograms commonly used for adjusting the camera may be used with the Zoltai screen in the normal way.

I wish to thank Professor Tibor Zoltai for providing me with the blueprints for the new screen, and Mr M. B. Forsyth and Mr J. A. Ducommun of the Physics and Engineering Laboratory, Department of Scientific and Industrial Research for their expert help in constructing it.

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