that these will be changed a little when the three-dimensional electron density distribution is calculated. However, exactly the same C—N distance, 1·31 A., and N—O distance, 1·36 A., have recently been found in acetoxime by Bierlein and Lingafelter[2]. So far, no other comparable C—N distance has been observed; the N—O distance, as might be expected, is appreciably shorter than the corresponding distance in hydroxylamine hydrochloride which was found[3] to be 1·45 A.

The chlorine atom and all the carbon atoms of the aldoxime molecule are situated very nearly in a plane, the deviations from an approximating plane being ± 0·03 A. or less, except for C_1, which deviates − 0·06 A. The N—O group is tilted a little out of this plane, the distance from the approximating plane to the nitrogen atom being − 0·31 A., and from the oxygen atom − 0·19 A. The molecules make two kinds of contact with each other in the direction of the *c*-axis. The chlorine atoms of neighbouring molecules, which are related by the screw axes, make van der Waals' contacts, the Cl—Cl distance being 3·63 A. The molecules related by the centres of symmetry are grouped in pairs by much shorter distances, 2·82 A. between the nitrogen and oxygen atoms of the two neighbouring molecules. It is impossible yet to say what part the hydrogen atoms play in this system; their position may become clear in the three-dimensional electron density distribution which is now being calculated.

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A New Method for Measuring Velocities of Ultrasonic Waves in Liquids

Ultrasonic velocities in liquids determined by various methods have been reported in the literature. The interferometer method[1], though widely adopted by a number of workers, permits velocity measurements only at low ultrasonic frequencies. The Debye–Sears's diffraction method[2] and the Hiedemann method[3] of visibility are applicable only for the study of transparent liquids. Elaborate technique is required for velocity determinations by the pulse method[4].

In the method described here, a small liquid cell is constructed by cementing two thin cover-glass slips on either side of an annular brass disk of uniform thickness (2·48 mm.) and inside diameter of about 1 cm. A side hole is provided for the purpose of introducing liquids in the space enclosed by the cover-slips, which can be completely filled up by about 0·25 c.c. of liquid forming, as it were, a liquid plate of thickness 2·5 mm. Ultrasonic waves generated by a wedge are transmitted through this liquid plate and communicated to water contained in a glass trough which serves as the ultrasonic cell for obtaining the Debye–Sears's diffraction pattern. Resonance frequencies of this liquid plate are determined in the usual manner employing the wedge method[5]. The low order of the fundamental resonance frequency of the liquid plate enabled a number of transmission maxima to be obtained at close intervals with a single wedge of frequency-range 3–6 Mc./sec. Using this set of transmission frequencies, the fundamental frequency and hence the velocity of sound in the liquid contained in the cell are evaluated. Results thus obtained for the velocities of sound in some liquids are shown in the accompanying table, along with those obtained by some of the other methods.

	Fundamental frequency (Mc./s.)	Velocity calculated in metres per sec. at 30° C.	Velocities obtained by other methods (23–27° C.)
Glycerine	0·390	1,950	1,986 (ref. 6)
Water	0·304	1,520	1,500 (ref. 6)
Mercury	0·285	1,425	1,440 (ref. 7)
Toluene	0·260	1,300	1,300 (ref. 6)
Ethyl alcohol	0·231	1,155	1,150 (ref. 6)
Carbon tetra-chloride	0·181	905	930 (ref. 6)

The method is simple, rapid and highly accurate, being particularly suitable for liquids, both opaque and transparent, available only in very small quantities. In addition, it permits measurements of velocities over a wide range of frequencies. Further detailed investigations are in progress.

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Abnormal Efficiencies in the Scintillation-counting of Gamma-Rays

In an earlier communication, Mayneord and Belcher[1] have shown that, under appropriate conditions of high gain and low pulse-discrimination, the counting-rates for scintillations observed in a small calcium tungstate crystal irradiated by gamma-radiation approximate to the rates of absorption of gamma-ray quanta in the crystal calculated from theoretical linear absorption coefficients.

Similar observations on small crystals of thallium-activated potassium iodide show, however, that the counting-rates in this material may be many times greater than the calculated absorption-rates. This anomalous behaviour of thallium-activated potassium iodide, first reported by Freedman, Smaller and May[2], has been studied using experimental arrangements identical to those already described[1].

Fig. 1 shows the ratios, *R*, of the observed maximum counting-rates to the calculated rates of absorption of gamma-quanta derived from Klein–Nishina, Fowler–Hulme and Heitler theories, plotted as a function of crystal mass for crystals of equal cross-section, but varying thickness. Appropriate corrections have been made for background effects and scaler dead-time. Measurements were made for the gamma-radiation from various radioisotopes.

It will be seen that the observed rates are considerably greater than those calculated, and that the ratio of the two increases with increase in energy of