recently undertaken with the view of eliminating these possibilities. A number of quartz plates of different dimensions, obtained from well-known American manufacturers of frequency-control crystals, were plated fairly uniformly with silver, aluminium and copper by different methods such as electrochemical deposition, metal evaporation in vacuum, electroplating, etc. These plates were excited by the output of a master-oscillator power-amplifier with a buffer amplifier in between the oscillator and the crystal. The crystal was put in a liquid medium and the diffraction pattern obtained by the usual Debye–Sears method. It was noticed that the crystal could be made to oscillate at any frequency, though the intensities varied at different frequencies. The relative intensities of the diffraction lines revealed that, for the same radio-frequency feed, the crystals oscillated vigorously at their odd harmonics and less vigorously at the even and half of odd multiples. The intensities of the diffraction lines showed peaks in these regions. In going from one odd harmonic to another, the amplitude of oscillations as indicated by the diffraction lines undergoes variations as shown in the accompanying graph.

The results confirm the earlier observations that a piezo-electric quartz plate has preferred modes of oscillation at the even and half of odd multiples of its fundamental frequency in addition to the odd harmonics.

A detailed paper is being published elsewhere.

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Damping of Turbulence by a Magnetic Field

In experiments which I carried out in the summer of 1951, mercury flowing in a long narrow rectangular channel at a Reynolds number R entered a region of constant transverse magnetic field H. The pressure gradient was measured downstream of any entrance effects.

For a given fluid, the pressure gradient can be shown to be a function of the dimensionless quantities R and M, where $M = \mu Ha\sqrt{\sigma/\eta}$, and η is the coefficient of viscosity. Hartmann[1] gives the theoretical form of this function for the case of laminar flow. Lundquist[2] gives theoretical reasons for expecting the critical value of R to vary linearly with M.

My experiments covered the range $0 < M < 130$, $10^4 < R < 1{\cdot}2 \times 10^5$. With $M > 1{,}000$ R, the pressure gradient agreed with Hartmann's laminar flow solution. With $M/R < 1{,}000$, the pressure gradient was larger than that predicted by the laminar flow solution. This suggests that turbulence is present, and confirms Lundquist's predictions.

The action of the magnetic field in damping turbulence has been studied. It appears that this damping is progressive with increasing field, as surmised by Lundquist. There was no evidence for the creation of turbulence near the walls due to the high rates of shear produced by the 'Hartmann effect', as suggested by Lehnert[3].

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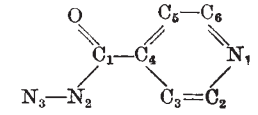
Crystal Structure of *iso*Nicotinic Acid Hydrazide

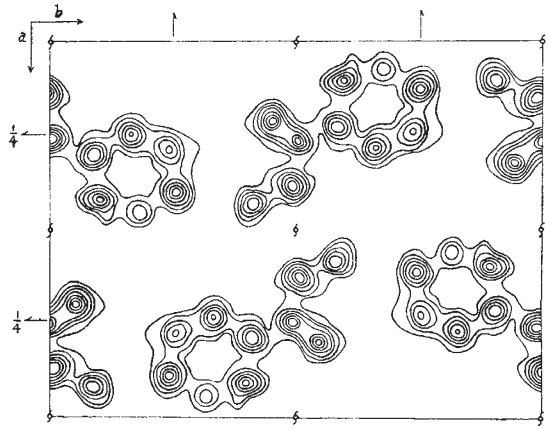
As part of a programme of X-ray diffraction studies of biologically important compounds, the crystal structure of *iso*nicotinic acid hydrazide ('Nydrazid') is being determined.

The lattice parameters and space group were determined from Weissenberg photographs about the a- and c-axes. The unit cell is orthorhombic, space group $P2_12_12_1$, with $a = 11{\cdot}33$ A.; $b = 14{\cdot}74$ A.; $c = 3{\cdot}84$ A. There are four molecules in the unit cell; calculated density 1·42 gm.cm.$^{-3}$; observed, 1·41 gm.cm.$^{-3}$.



Structural formula for *iso*nicotinic acid hydrazide

The intensities for $\{hk0\}$ were put on an 'absolute' basis[1], and an unsuccessful attempt was made to determine a set of signs for the larger F's[2]. A Patterson projection on (001) showed the orientation of the ring, and the approximate position of the molecule was obvious from the magnitudes of F_{110}, F_{120}, F_{200} and F_{210}. It was, however, immediately apparent from F_{200} and F_{210} that the 'absolute' intensities were high by a factor of c. 3. Thus the expected root-mean-square unitary structure factor is 0·16; neglecting a relatively small temperature factor, observed value is 0·04. Furthermore, calculation of the ratio $(\overline{|F|})^2/\bar{I}$ for various intervals $0{\cdot}256 < \sin\theta < 0{\cdot}745$ showed a marked decrease in value for $0{\cdot}50 < \sin\theta$, the weighted average value being



Projection on (001) for *iso*nicotinic acid hydrazide. Contours are drawn at intervals of 1 e A.$^{-2}$, contours below 2 e A.$^{-2}$ omitted