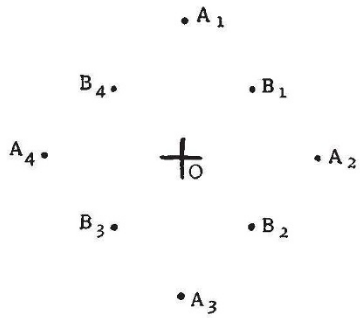
We may therefore regard this diagram as the diffraction figure of a two-dimensional lattice, which would be identical with a plane 100 of an aluminium crystal.




Likewise, the study of the variation of the streaks described in the previous paragraph with the crystal orientation shows that these traces may be imputed to diffraction by such a two-dimensional lattice.

These new experiments enable us to determine more closely the structure of the plane groups which we have described; it seems that the copper atoms should gather in patches in the 100 planes of the solid solution during hardening and should thus produce three rectangular systems of two-dimensional lattice of small extent.

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July 21.

[1] *C.R.*, **206**, 1641 (1938) and *C.R.*, **206**, 1972 (1938).

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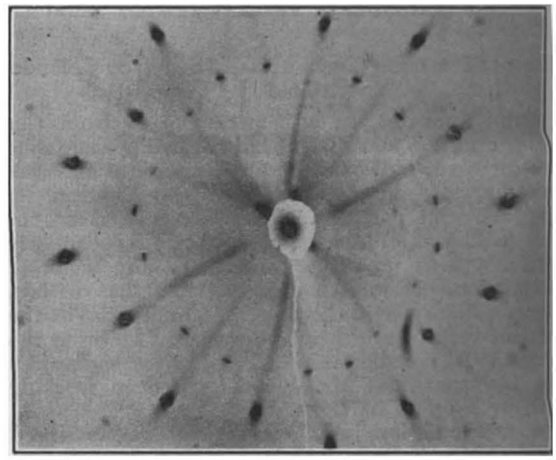
THE results reported by M. Guinier are of interest to us as similar work has been in progress during the past two years in this Laboratory, and we have arrived at virtually the same conclusions as those given by M. Guinier. A paper describing the results of my experiments was communicated to the Royal Society on May 10, and a brief abstract has already appeared[1]. Pending the publication of the full account, the following summary may be of interest.

The 'two-dimensional' diffraction effect, to which M. Guinier refers, produces a series of elliptical streaks on the Laue photographs of single crystals of an alloy of aluminium with 4 per cent of copper aged at room temperature. The accompanying photograph is of a crystal aged for six months at room temperature, orientated with a (110) direction parallel to the X-ray beam. The elliptical streaks make their appearance an hour after quenching the alloy; at first they are broad and faint, and in the course of a week, during which the alloy is hardening spontaneously, they become stronger and narrower, indicating that the area of the regions rich in copper is increasing.

If the alloy, age-hardened at room temperature, is heat-treated at 200° C., the first effect is a rapid reduction of hardness; the Brinell number falls from a figure of about 100 to 60 in ten minutes. At the same time the streaks disappear almost completely. Further heat-treatment leads to a rise in hardness to about 100 in a few hours; during this period the streaks reappear, but they are now quite narrow, showing that the plates of copper-rich metal are of considerable extent, of the order of $10^3$ A., but still very thin, less than 10 A. If the heat-treatment is continued, the hardness falls slowly and the streaks on the Laue photographs begin to break up into ill-defined spots, which on further heat-treatment become increasingly sharper, and ultimately a new set of Laue spots, indicating the presence of well-developed crystals of a second phase, makes its appearance.



In addition to the metallurgical interest of these observations, the results suggest that application of X-ray methods may throw light on the details of the mechanism of chemical reactions in the solid state.

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[1] *Proc. Roy. Soc.*, A, **166**, S72 (June 16, 1938).

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## The Swelling of Birch Wood

M. HASSELBLATT[1] has measured the maximum linear tangential swelling of birch wood in a number of different liquids. An analysis of his results shows that they appear to fit the relation

$$s = a\sqrt{\varepsilon - 1},$$

where $s$ is the swelling measured as an extension per