Physics. — *Straight twin lamellae in aluminium single crystals.* By V. CH. DALITZ and W. G. BURGERS. (Laboratorium voor Physische Scheikunde der Technische Hogeschool, Delft.) (Communicated by Prof. J. M. BURGERS.)

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The occurrence of twin lamellae with straight boundaries, so common in recrystallized copper, nickeliron, α-brass and other metals, has been observed for aluminium only in relatively few cases. A striking example was found by ELAM (1928) in a specimen obtained by recrystallizing a stretched (10 %) single crystal. Recently LACOMBE and BERGHEZAN (1949) observed the occurrence of a few small lamellae with straight boundaries.

In the course of recrystallization experiments with aluminium single crystals deformed by extension, we happened to obtain after annealing the structure shown at about *natural size* in the accompanying photograph. Inside the large crystal 1, a set of practically parallel straight lamellae (2), extending over several centimeters, can be seen. X-rays (Laue-photographs) show that the dark and light parts stand in exact spinel twin relationship, the straight lines being (as also in the other cases mentioned) the traces of the twin plane (111) with the surface of the plate.

It is not yet known what causes the occasional formation of this banded structure type in aluminium. Twins in aluminium with *curved* boundaries may occur frequently in recrystallized polycrystalline testpieces, due to a process which was called "stimulation" by the growing crystal of lattice parts in the original matrix, which happened to possess a twin orientation with regard to the growing crystal [SANDEE (1942); BURGERS (1942)].

Several observations support the supposition that the occurrence of straight twin bands is related to the presence of a pronounced preferential orientation in the recrystallizing material, so for example the experiments performed by COOK and RICHARDS (1940) and COOK and MACQUARIE (1938) with copperstrips possessing [100] (100) orientation.

The fact that recrystallized polycrystalline aluminium seldom contains such a pronounced texture might account for the rare appearance of straight bands with this metal. A pronounced texture can, however, be obtained by deforming single crystals, as in the example shown, which (like the one found by ELAM) is produced by recrystallizing such a matrix.

In our case the direction of stretching was parallel to a [112]-direction of the original crystal. Also in some other crystals stretched parallel to this direction, straight twin bands were observed after recrystallization, although extending over a smaller length (only a few mm). We cannot say at the moment whether or not this result has a more general meaning.

LITERATURE.

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a.

b.

Fig. 1. Aluminium plate with large crystals, obtained by recrystallization of a stretched (12.5 %) single crystal.

Crystal 1 shows straight bands (2) with sides parallel to a (111)-plane. The white and dark regions have mutually orientations corresponding to that of a spinel twin with regard to that plane.

a. front view
b. back view } (Natural size).