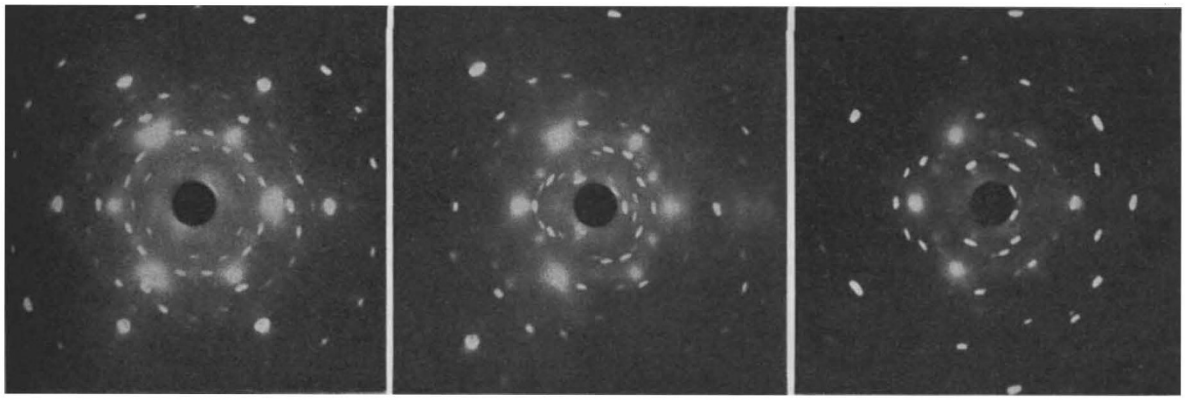

a X-RAYS ALONG [0001] AXIS. *b* X-RAYS 10° FROM [0001] AXIS. *c* X-RAYS 15° FROM [0001] AXIS.

BENZIL; UNFILTERED COPPER RADIATION; 70 MIN. EXPOSURE AT 3·5 CM.

Many Laue photographs obtained in this laboratory over a period of years, using diamond, sodium, rock-salt and other compounds, show the effect; perhaps some of the most beautiful are those of benzil, here reproduced. It is significant that these anomalous patterns are much less sensitive to crystal mis-setting than are the ordinary Laue diagrams. In our opinion, further experimental evidence is desirable before any theory can be accepted as essentially correct.

I. E. KNAGGS.
K. LONSDALE.
A. MÜLLER.
A. R. UBBELOHDE.

Davy Faraday Research Laboratory,
Royal Institution, London, W.1.
April 30.

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Optics of the Artificial Nylon Fibre

THE fibrils of which the artificial 'Nylon' fibre is composed exhibit a remarkably high double refraction. Although their diameter is only about 19 μ, they show interference colours of the third order. For the calculation of the double refraction their slightly elliptical cross-section must be taken into consideration. The large and the small diameter can easily be measured under the microscope with slightly twisted fibrils. The double refraction of the fibrils examined amounts to 0·060, the lower index n_α being 1·520 and the higher index n_γ about 1·580. It is surprising how closely these figures agree with those of silk fibroin[1] and natural cellulose fibres[2] (see table). When the fibrils are stretched they prove to be strikingly photo-elastic; the retardation may increase by 30 per cent before the fibril breaks.

	'Nylon'	Silk	Ramie
$(n_\gamma)D$	1·580	1·584	1·599
$(n_\alpha)D$	1·520	1·529	1·532
Double refraction	0·060	0·057	0·067

A. FREY-WYSSLING.
Laboratory of Plant Physiology,
Federal Technical College,
Zurich.

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Oxide Films on Alloy Steels

IN a recent communication[1], T. Tokumitu concludes that the naturally occurring oxide film on stainless steels is α-$(Fe,Cr)_2O_3$, and he bases this conclusion upon the fact that heating the natural oxide layer to 600° C. for one hour suffices to change the electron diffraction pattern from one of blurred rings which cannot be analysed, to a well-defined pattern of α-$(Fe,Cr)_2O_3$. The crystalline structure adopted by the film on heating, however, may very well be different from that of the natural oxide, and even the chemical composition may be changed, since, unless the heating is carried out in an exceedingly good vacuum or its equivalent, the film may gain oxygen, and also, as Pfeil[2] has shown in the case of thick scales, diffusion of metal atoms towards the oxide surface occurs at high temperatures.

Furthermore, the work of Jackson and Quarrell[3] shows that when the electron diffraction examination of oxide films is carried out at room temperature, the results are apt to be misleading. Thus, with 'Armco' iron and plain carbon steel specimens, oxide films formed and examined at temperatures of 350°, 600° and 950° C. gave patterns corresponding to Fe_3O_4, FeO and Fe_3O_4 respectively, but on examination at room temperature all three surfaces gave the pattern which is generally attributed to Fe_3O_4. Indeed, it was possible to correlate the oxide structure with the temperature of formation by using the new high-temperature technique and to show, for example, that, on cooling, the Fe_3O_4 formed above the A_3 critical point of the metal specimen passed through two transformations corresponding to $Fe_3O_4 \rightarrow FeO \rightarrow Fe_3O_4$. In view of the possibility of such changes occurring in other cases, it is not advisable to attach