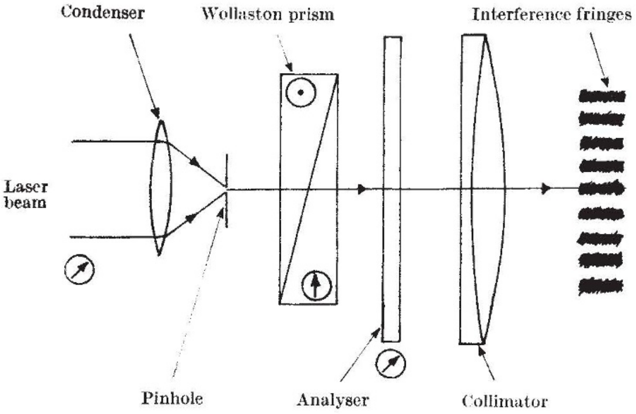

Fig. 4. Method of forming broadly spaced fringes by means of a Wollaston double-image prism: the encircled arrows indicate polarization directions.

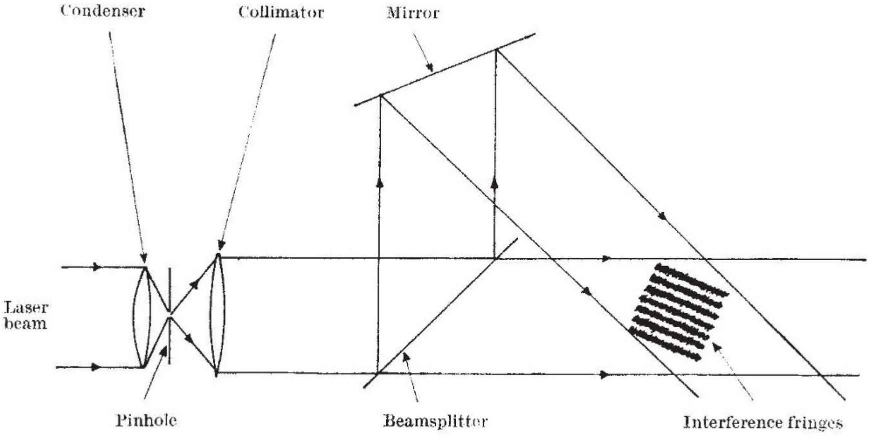

Fig. 5. Method of forming closely spaced fringes by means of a beamsplitter.

Figure 1 shows fringes at a spacing of 3 mm projected onto a card which has a ridge with an adjacent furrow, both of angle 125°. Figure 2 shows an aluminized ground glass surface, with fringe spacing of 18μ, viewed through a 0·15 N.A. microscope objective; the surface contains a ridge of angle 125°. Figure 3 shows 18μ spacing fringes on a portion of an oak leaf on the reverse of a 1966 sixpence, a metal surface with a fairly high polish. The photographs were taken with light of wavelength 6328 Å from a helium–neon laser.

The fringes can, of course, be produced by any of a number of well known methods; Fig. 4 shows a Wollaston prism arrangement suitable for large fringe spacings, while Fig. 5 depicts an arrangement of a beamsplitter and a mirror which could be used for large angles, θ, and small fringe spacings. The fringes produced by either of these methods can be observed on surfaces of widely differing optical properties, for example, polished metal, ground glass or wood.

An obvious modification is to project the same fringe system through a beamsplitter onto two nominally identical objects; if these are viewed from an appropriate angle the two fringe systems will produce a moiré pattern indicating the differences between the objects.

We are grateful to Mr J. H. Toyer for help in preparing the specimens.

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THE SOLID STATE

Permanent Magnet Properties

The claim by McCurrie[1] for a $(BH)_{\max}$ value higher than previously recorded is manifestly incorrect, although the values he quotes from other publications are probably correct. For a permanent magnet material with remanence B_r in gauss, the theoretically highest possible $(BH)_{\max}$ value in gauss-oersteds is $\frac{1}{4}B_r^2$; this limit is on the basis of no change in the intrinsic magnetization between B_r and the $(BH)_{\max}$ point. In practice, some high coercivity materials approach this limit fairly closely, as illustrated by the test values of Walmer[2] and Chaston[3] which are quoted by McCurrie, but his own tests grossly exceed this limit, as shown in Table 1.

Table 1

Source	B_r	$\frac{1}{4}B_r^2$	$(BH)_{\max}$
Walmer[2]	6,450 gauss	$10{\cdot}4 \times 10^6$	$9{\cdot}5 \times 10^6$ gauss-oersteds
Chaston[3]	7,125 gauss	$12{\cdot}7 \times 10^6$	$10{\cdot}3 \times 10^6$ gauss-oersteds
McCurrie[1] (*a*)	5,280 gauss	$7{\cdot}0 \times 10^6$	$14{\cdot}1 \times 10^6$ gauss-oersteds
McCurrie (*b*)	6,065 gauss	$9{\cdot}2 \times 10^6$	$11{\cdot}0 \times 10^6$ gauss-oersteds
McCurrie (*c*)	4,050 gauss	$4{\cdot}1 \times 10^6$	$6{\cdot}9 \times 10^6$ gauss-oersteds

It seems probable that McCurrie's reported $(BH)_{\max}$ values are in fact $(4\pi JH)_{\max}$.

$(BH)_{\max}$ has for many years been the accepted criterion of merit for permanent magnet materials, because it is a measure of the external magnetic energy available in static operation, but for dynamic operation other criteria apply, and there may then be merit in the value of $(4\pi JH)_{\max}$.

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CHEMISTRY

Exothermic Reactions behind a Reflected Shock

The use of reflected shock waves to initiate exothermic reactions in a shock tube is commonly concerned with the ignition of oxygen and simple fuel molecules. The speed of the incident shock, U_s, determines the speed of the reflected shock, U_r, and the temperature, T_5, at which the reaction takes place. If T_5 is sufficiently high, an explosion