A thin platinum wire is mounted on platinum springs along the axis of a glass tube into which the gas to be examined is introduced at the specified pressure. The electric current required to maintain the wire at a definite temperature (about 50° C.), when the tube is immersed in a well-stirred ice bath, is accurately measured. 'End effects' are corrected for by the use of a compensating tube[3].

Comparative determinations of the proportions of deuterium in the cathode gas during electrolysis of solutions of known heavy water content (c per cent) under various conditions are made by taking alternate measurements of the current (I) required to maintain the temperature of the wire in the thoroughly dried gas sample, and of the current (I_0) required in pure H_2 under identical conditions. After correcting for 'temperature drop'[4], $(I_0 - I)/I_0$ may be taken as proportional to the concentration of deuterium in the gas, if this concentration is not very large; and $(I_0 - I)/I_0 c = \alpha'$, as a relative measure of the separation coefficient (α). Although the factor required to convert these comparative values into absolute values has not yet been determined, the sensitiveness of the method can be judged from the following results for successive samples (taken at about 20 minute intervals) of the gas evolved from a gold cathode at 10 amp./sq.dm. in N NaOH solution containing 14·9 per cent of D_2O at 25° C.:

I_0	I	$\frac{(I_0 - I)}{I_0}$
0·57092		
	0·56832	0·00465
0·57103		
	0·56840	0·00466
0·57110		
	0·56836	0·00479
0·57110		
	0·56843	0·00470
0·57114		

With most cathode materials, values of $(I_0 - I)/I_0$ remain as constant as in the above example during 2–3 hours electrolysis at 10 amp./sq.dm.: in cases where large changes do occur, they are generally accompanied by parallel changes in the cathode potential (e) at which the gas is evolved, and can thus be attributed to an alteration of the cathode surface. Variations in the value of α' with different metal cathodes in solutions containing 15–25 per cent of D_2O appear to be much less in alkaline than in acid solution, and in the latter the values for a number of metals seem to be simply related to e.

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[1] *Proc. Roy. Soc.*, A, **144**, 467 (1934).
[2] Gregory and Archer, *Phil. Mag.* (7), **15**, 301 (1933).
[3] Gregory and Archer, *Proc. Roy. Soc.*, A, **110**, 91 (1926).
[4] Gregory, *ibid.*, **149**, 35 (1935).

Preparation of Partly Deuterated Benzenes

IN a preliminary report[1] of researches on the long-wave spectroscopy of the deuterobenzenes it was mentioned that 1 : 3 : 5-trideuterobenzene, an important compound spectroscopically on account of its trigonal symmetry and the absence of a centre of symmetry, had not been obtained, although various other partly deuterated benzenes, together with hexadeuterobenzene, had been examined. The *s*-tri-derivative has now been made (m.p. 6·1°).

In a paper which has just appeared, Erlenmeyer and Lobeck[2] describe the preparation of hexadeuterobenzene by decarboxylation of mellitic acid, through its salt, with calcium deuteroxide. This is of interest inasmuch as there has been disagreement with regard to the physical constants of hexadeuterobenzene, and the constants obtained by these authors exactly confirm ours[3].

Our hexadeuterobenzene was prepared by the sulphuric acid exchange reaction, but the method of decarboxylation with calcium deuteroxide is one of those which we have used with success for the preparation of a number of partly deuterated benzenes. In particular, it is the only method by which 1 : 3 : 5-trideuterobenzene has hitherto been prepared, since it appears difficult to introduce more than two deuterium atoms by the Grignard reaction.

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[1] NATURE, **135**, 1033 (1935).
[2] *Helv. Chim. Acta.*, **18**, 1464 (1935).
[3] cf. NATURE, **136**, 301 (1935).

A New Polarisation Phenomenon

IT is a well-known fact that a beam of light reflected obliquely by a dark glass mirror is elliptically polarised, the maximum electric vector being perpendicular to the plane of the incident and reflected rays. A metallic mirror, perfectly or imperfectly polished, gives a very weak polarisation.

If such a mirror is placed in a vacuum, its face parallel to a beam of metallic vapour (Ag, Al, etc.) in such a way that no molecules of the main beam can strike it directly, but only those diffused by collisions in the beam, an extremely thin deposit of metal can be obtained on the mirror. It is difficult to ascertain the thickness of the deposit; but it is probably much less than 10^{-7} gm. per square centimetre.

A metallic mirror which has been treated in this way produces a very strong polarisation of oblique light, reflected or diffused. According to the thickness of the deposit, the maximum electric vector is perpendicular or *parallel* to the plane of the incident and reflected rays. Under similar experimental conditions, the light diffused by an imperfectly polished mirror is completely polarised.

The intensity of polarisation depends on the wavelength, but is not modified by a rotation of the mirror around an axis perpendicular to its surface.

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Ontogeny of the Angiospermic Carpel

SOME recent morphological interpretations of the angiospermic gynœcium deny or greatly modify the classical interpretation that the carpel is a modified fertile leaf. In the ontogeny of the legume of two species of *Acacia*, I have found evidence that is contrary to these new interpretations, and is favourable to the classical interpretation. A preliminary