The actual existence of moving current vortices, similar to those assumed in the above explanation, was deduced by Schmidt[2] from an examination of the disturbing force at ten European stations during a period of disturbance at about 18h. on February 28, 1896. The figure given by him (and reproduced in "Geomagnetism", p. 313) shows a current vortex moving southwards along a line to the west of the stations, *followed by another of opposite polarity*. It now appears that these "wandering vortices", as Schmidt called them, may be due merely to self-induction in a *non-uniform* ionosphere. It is perhaps worth emphasizing that, in order to explain the motion of these vortices, it is unnecessary to assume either (1) that there is any mass-motion of the conducting material, or (2) that the currents are produced by some moving primary source of electromotive force. Once the currents are produced (by electromagnetic induction or otherwise) the non-uniform distribution of conductivity in the ionosphere will necessarily cause the current vortices to move in the manner described above.

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[1] *Proc. Roy. Soc.*, A,, **84**, 85 (1910).
[1] *Met. Z.*, **16**, 385 (1899); see also Chapman and Bartels, "Geomagnetism", 311.

A New Ketone Synthesis

THE reaction between substituted malonic esters and acid chlorides has been investigated on a number of occasions in the past[1], and has been found to give the corresponding acylmalonic esters in high yield according to the following reaction :

Previous workers[2] have realized the potentialities of such a reaction for the synthesis of ketones of the general formula $R.CO.CH_2R'$, but have failed, except in the case where $R' = H$ [3,4], to effect the ketonic hydrolysis of this type of keto-ester without simultaneous rupture of the bond (a).

It has now been found that the benzyl esters of acylmalonic acids readily undergo hydrogenolysis at room temperature in the presence of palladized charcoal with the formation of the parent keto-acids. These acids on gentle warming (50–70° C.) lose two molecules of carbon dioxide and furnish the corresponding ketones in excellent yield.

The method is applicable, for example, by suitably modifying the functional groups, to the synthesis of a wide variety of ketones, diketones, keto-acids and other carbonyl compounds. Typical cases in which it has so far been applied are the preparation of heptadecan-8-one (91 per cent yield from n-octoyl chloride and dibenzyl n-octyl-malonate), 2-methylpentadecan-5-one (80 per cent yield from undecoyl chloride and dibenzyl *iso*butyl-malonate), octacosane-10 : 19-dione (78 per cent yield from sebacyl chloride (1 mol.) and dibenzyl n-octyl-malonate (2 mol.)), tridecan-3-one-1-carboxylic acid (more than 66 per cent yield from undecoyl chloride and tribenzyl ethane-1 : 1 : 2-tricarboxylate) and heptadecan-9-one-1-carboxylic acid (81 per cent yield from 8-carbethoxy-n-octane-1-carbonyl chloride and dibenzyl n-heptyl-malonate, prepared by Mr. R. G. Mason).

The many possibilities opened up by this reaction will be the subject of further investigations, the results of which will be published elsewhere in due course.
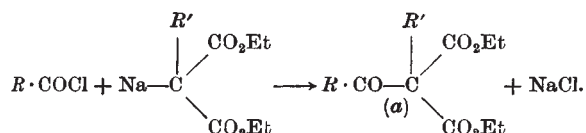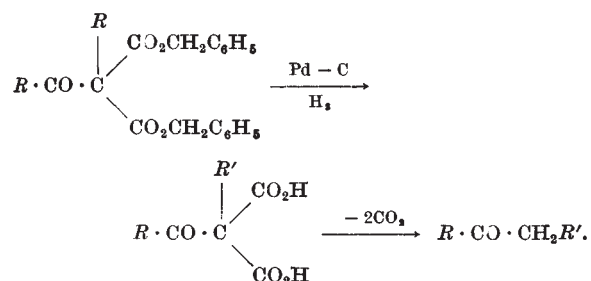
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[1] Lang, *Ber.*, **20**, 1326. Michael, *Amer. Chem. J.*, **14**, 510.
[2] Robinson and Robinson, *J. Chem. Soc.*, **127**, 175 (1925).
[3] Walker and Hauser, *J. Amer. Chem. Soc.*, **68**, 1386 (1946).
[4] Bowman, unpublished results.

Extinction of Petrol Fires by Methyl Iodide

IN a recent communication on this subject[1], O. C. de C. Ellis makes a number of statements which should not go unchallenged. First, it is stated that carbon tetrachloride will not extinguish petrol fires. For many years carbon tetrachloride has had world-wide use for the extinction of petrol fires, particularly those associated with internal combustion engines, and its reputation rests to a large extent on its success for this very purpose. Secondly, it does not decompose stoichiometrically to yield twice its vapour volume of chlorine ; the amount of chlorine evolved in a fire is, in most cases, negligible[2].

More serious, however, is that several important factors should have been overlooked in the tests and interpretation of results. Carbon tetrachloride and similar materials can extinguish flame only by achieving a sufficiently high concentration in the atmosphere ; clearly, then, volatility is of considerable importance. Methyl iodide (b.pt. 42·3°) will vaporize more readily than carbon tetrachloride (b.pt. 76·7°) ; consequently, there can be apparent differences in the properties of these two substances when they are applied to fires, although modification of technique will achieve the desired result in each case, namely, extinction of the fire. In using carbon tetrachloride it is necessary to provide sufficient heat transfer and, among other ways, this can be simply done by directing the liquid on to a warm surface, when sufficient vaporization takes place to put the fire out. To apply carbon tetrachloride directly into the middle of an inflammable liquid burning in an open tank may, quite likely, not extinguish the fire due to the fact that the carbon tetrachloride penetrates to the cold region underlying the burning surface and so does not vaporize. In any event, large fires of this type should be dealt with by carbon dioxide when the vapours are reason-