result for cobalt therefore is surprising and needs confirmation.

The writer has made a thorough study of the longitudinal effect in cobalt, using thin strips of the metal cut from a plate, certified by the makers to be of 95 per cent. purity. It has been found that the resistance does saturate, and also shows hysteresis. In the following table are given the values of the percentage change of resistance of cobalt in longitudinal magnetic fields. The magnetic field is increased gradually, and when there is no further change of resistance, the field is gradually decreased and brought back to zero. It is found that the resistance of the metal is now greater than the original resistance.

TABLE I.

Increasing fields	Percentage change of resistance	Decreasing fields	Percentage change of resistance
0·0 gauss	0·0	0·0 gauss	0·08
20 ,,	0·07	20 ,,	0·15
500 ,,	0·36	75 ,,	0·19
700 ,,	0·43	440 ,,	0·41
1020 ,,	0·55	890 ,,	0·54
1250 ,,	0·58	1300 ,,	0·58
1500 ,,	0·58	1500 ,,	0·58

The intensity of magnetisation in the specimens of cobalt was also measured and it was found that the maximum intensity was attained between 1200 and 1300 gauss. Thus it appears that the change of resistance saturates at the same time as the magnetisation. The change is always found to be an increase, as is evident from the above table. The writer has also been able to obtain the complete resistance-hysteresis cycle of cobalt in longitudinal magnetic fields. Full details will be published elsewhere.

This is for the first time that resistance-hysteresis has been observed in the case of cobalt. The fact that the increase of the resistance of cobalt saturates at the same time as the intensity of magnetisation, has also been observed for the first time.

The writer is indebted to the authorities of the Patna Science College for permission to carry on the investigation in the Physics Laboratory of the college, and the facilities afforded.

MD. SHARF ALAM.

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October 3, 1934.

Smoke Pollution in Bombay.

THIS investigation of smoke pollution was undertaken on behalf of the Smoke Nuisances Commission, Bombay.

The following brief report (a fuller account with a new method of estimating the number of smoke particles will appear elsewhere) indicates the nature of variation in the number of smoke particles at various mill localities in Bombay.

Some observations were taken in dry weather in April while a few were made in monsoon in July on suitable rainy days. The results at each centre were taken both in the morning and in the evening.

April Results.

	Fergusson Road	Byculla Bridge	Lalbaugh	Sewri
Morning	2830	1930	2060	2940
Evening	3950	2990	3570	2780

July Results.

	Fergusson Road	Byculla Bridge	Lalbaugh	Sewri
Morning	2260	2380	2210	1260
Evening	3025	3050*	2215	1740

*The number in each column represents the average number of smoke particles per c.c.

It is seen that on the whole the evening number of smoke particles is higher than the corresponding value in the morning.

There is a difference between the evening results of April and July, and excepting the result marked (*), it is clear that the average number reduces by about 1000 to 1200 per c.c. in monsoon. This number may be attributed to smoke other than that of mills. There is no uniform variation in the morning results of the two months indicating that in the morning there may not be smoke other than that of mills.

The results indicate that the number of smoke particles per c.c. varies between 1200 to 4000 per c.c.

I thank the Commission for the permission to publish these results.

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September 1934.

Dry Ether as Solvent for Anhydrous Aluminium Chloride in Organic Synthesis.

THE author has made the interesting observation that dry ether which has the remarkable property of readily dissolving anhydrous aluminium chloride can be advantageously used for some reactions of the Friedal-Crafts' type which take place under mild conditions, *i.e.*, at or below the boiling point of ether.

Anhydrous aluminium chloride when added to dry ether quickly dissolves with evolution of heat and a clear colourless solution results in which the aluminium chloride is present in the form of a double compound with ether, $AlCl_3$, $C_4H_{10}O$.[1] This solution can directly be used for synthesis.

The author observed that the condensation of benzanilide-imido-chloride with polyhydric phenols in the presence of aluminium chloride to give anils of polyhydroxybenzophenones, proceeds best with dry ether as solvent. Ichaporia, working in this laboratory, has also found the use of dry ether as solvent advantageous for Shah and Chaubal's synthesis of dialkylaminobenzophenones[2] in which a benzanilide-imido-chloride is condensed with an aromatic tertiary amine with aluminium chloride as condensing agent. It is also found that a solution of aluminium chloride in ether can be used in place of a suspension of zinc chloride in ether for the Hoesch synthesis, *e.g.*, for the preparation of 2: 4-dihydroxybenzophenone from benzonitrile and resorcinol. All of these reactions are carried out in cold ethereal solution.

Ether would appear to offer an obvious advantage over some of the usual diluents like carbon disulphide, benzene, petroleum ether, in which aluminium chloride is insoluble. With ether as solvent, the reaction can be carried out in homogeneous solution.

The principal drawback to the general use of ether for this purpose is its tendency to react in some cases in the presence of aluminium chloride, the carbon-oxygen bond in ether being broken. The mixture of benzoyl chloride and aluminium chloride reacts with ether to give ethyl benzoate[3]. Triphenyl chloromethane in the presence of aluminium chloride and ether gives triphenyl methyl ethyl ether, which further gives by decomposition triphenylmethane and acetaldehyde.[4] The action of ether and aluminium chloride on diphenyl-dichloromethane is stated by the same author[5] to give benzophenone. It may be pointed out, however, that it seems more likely that no reaction takes place in the last case, and that the formation of benzophenone might be due to simple hydrolysis of the easily hydrolysable diphenyldichloromethane on subsequent treatment with water. Ether has also been known to act as an ethylating agent in the presence of aluminium chloride, but this requires high temperatures. Thus Jannasch and Rathjen[6] obtained diethyl phenol by heating phenol, ethyl ether and aluminium chloride at 145°. They similarly prepared hexaethyl benzene from benzene, ethyl ether and aluminium chloride.[7]

A detailed account of the experiments above referred to will be published elsewhere.

Attention is directed to the author's observation in as much as it may find application in some of the numerous organic reactions requiring the use of aluminium chloride as a condensing agent, which take place at relatively low temperatures.

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September, 1934.

[1] *Cf.* Walker and Spencer, *J.C.S.*, 1904, **85**, 1106; Frankforter and Daniels, *J. Am. Chem. Soc.*, 1915, **37**, 2560.

[2] *J.*, 1932, 650.

[3] Norris, *J. Am. Chem. Soc.*, 1924, **46**, 2580.

[4] Norris, *loc. cit.*

[5] Norris, *loc. cit.*

[6] *Ber.*, 1899, **32**, 2391.

[7] *Ber.*, 1898, **31**, 1716.

The Biological Oxidation of Inositol.

INVESTIGATIONS have been carried out on the oxidation of inositol *in vitro* by animal tissues. The wide occurrence of inositol in plant and animal tissues would suggest