As lignin contains beyond doubt, more than one methoxy group attached to the benzene ring, it is obvious that the fact that it is acted upon by ClO_2 does not in any way prove the existence of aromatic OH in the molecule.

It has also been observed that the only substituent that makes the benzene compounds stable towards ClO_2, is the carboxyl; all others are attacked more or less easily. Even toluene and xylenes are oxidised by this reagent. The di-oxymethylene group, however, has been found to be quite resistant towards ClO_2.

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Fumeless Digestion of Nitrogen.

ESTIMATION of nitrogen is perhaps the most important item of procedure in modern chemical analysis, over a million determinations being annually carried out by those engaged in scientific research alone. The estimations are usually carried out according to one or the other of the several modifications of the Kjeldahl method,[1] and involve prolonged digestion with concentrated sulphuric acid—an operation which is attended by emission of objectionable acid fumes. Some recent workers[2,3] have suggested that the residue after wet combustion of carbon can be distilled as such for nitrogen, but such a procedure, especially in the case of soils and other biological materials, leads invariably to retention of nitrogen in the digest, and consequently, low and inconsistent estimates being obtained.

A systematic enquiry into the various factors relating to the digestion has shown the following:—(*a*) the conversion of organic nitrogen into ammonia proceeds more rapidly in presence of small amounts of water combined with an oxidising agent (preferably chromic acid) than with concentrated sulphuric acid alone. In the case of soils, a mixture of sulphuric acid and water in the proportion of 2 to 1 yields the best results, the entire digestion being complete in 30 mins. During digestion, the proportion of acid to water has to be maintained constant, so it would be necessary to fit the digesting flask with an air- or water-cooled condenser. (*b*) The digesting mixture requires only a low flame and does not bump, so the long-necked (Kjeldahl) flask generally used for the purpose can be dispensed with. In fact, both the digestion and the distillation can be conducted in the same flask. (*c*) The minute quantities of nitrogen still retained in the digest can be easily released by addition of small amounts of zinc just prior to distillation with alkali. Metallic aluminium or Devarda's alloy can also be used for the purpose, but their action is a little too vigorous, and causes alkali spray to pass over into the distillate. (*d*) In the case of materials containing chlorides, it would be necessary to add a small quantity of mercuric or silver sulphate to the digesting mixture, for, otherwise, free chlorine will be formed and nitrogen will be lost in the elementary form. If the substance (*e.g.*, soil) contains nitrate, the latter should first be extracted with water preferably in presence of a suitable flocculant such as calcium sulphate. The residue is digested in the usual way and the digest, together with the extract containing nitrate, distilled with zinc and alkali, in the manner outlined above.

A simple method embodying the above principles has been developed and applied successfully to the estimation of nitrogen in soils. The procedure is also being extended to other biological materials and to nitrogenous substances in general. Attempts are also being made to combine the above method with that for the estimation of carbon[4] so that both the determinations can be carried out on the same sample.

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The Occurrence of *Choanephora cucurbitarum* (B. & Rav.) Thaxter on *Cassia Tora* Linn.

IN September 1934 our attention was drawn by Prof. B. Sahni to a dead shoot of *Cassia Tora* infected by the white mycelial hyphæ

[1] Kjeldahl, *Z. anal. Chem.*, 1883, **22**, 366.
[2] Anderson and Schutte, *J. Biol. Chem.*, 1924, **61**, 57.
[3] Brown, *Ind. Eng. Chem.*, 1927, **19**, 629.
[4] Subrahmanyan, Narayanayya and Bhagvat, *J. Indian Inst. Sci.*, 1934, **17A**, 197.

of *Choanephora cucurbitarum*. Both sporangia and conidial heads of the usual type were noticed. A large number of atypical triangular sporangiospores were found which bore clusters of very fine radiating appendages at the ends. No zygospore stage was found.

This species has been mentioned to occur on the fading flowers of quite unrelated plants such as *Hibiscus*, *Cucumis*, *Gossypium*, *Capsicum* and a number of Cucurbitaceous plants.*‡

The fungus has been said to be a parasite. But our preliminary observations tend to show that it can also lead a vigorous saprophytic life. An examination of a number of healthy plants of *Cassia Tora* infected with *C. cucurbitarum* did not reveal the existence of the parasite in a number of plants examined out of a great forest of them. But the fallen twigs and leaves where there was plenty of moisture were mostly found infected with the fungus. This fact has raised doubts in our minds whether it is an obligate parasite at all. A single inoculation on the stem and leaves of the vigorous plants did not give any satisfactory results. Inoculation experiments will be repeated in the next rainy season when the weather conditions are favourable.

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Observations on the Systematic Position of *Ficus Krishnæ* growing at the Royal Botanic Garden, Calcutta.

ONE of the trees of *Ficus Krishnæ* C. de C., growing for more than thirty-two years in the nursery of the Royal Botanic Garden, Calcutta, developed what may be called a bud mutation[1] on one of its branches—about five years ago—as shown in Fig. 1.

The broad flat leaves like the leaves of *Ficus bengalensis* are the mutated leaves. The rest are all cup-shaped normal leaves of *Ficus Krishnæ*.

Fig. 1.

Mutated branch of *Ficus Krishnæ*.

Germination experiment from the seeds of *Ficus Krishnæ* shows only about 10 per cent. breeding true, the rest, about 90 per cent., are of the type of *Ficus bengalensis* L. But when *Ficus Krishnæ* is propagated from *goobies* or cuttings of *Ficus Krishnæ* the daughter plant nearly always bears hypoascidi-form leaves of the mother plant. This *Ficus Krishnæ* which has exhibited bud mutation was introduced during the last decade of the nineteenth century in the Royal Botanic Garden from cuttings secured from another plant of *Ficus Krishnæ* growing in a private garden in the neighbourhood of the Calcutta Botanic Gardens. The plant was named by C. de Candolle in 1901 as a separate species. The Indian view is that it is a modified garden variety of *Ficus bengalensis*. It is from this garden that cuttings were sent to C. de Candolle at Geneva and to Kew—sometime in 1900-1901. The plant was successfully grown in the tropical house at the Kew Garden which produced receptacle for the first time in 1905.[2] Prof. Hans Molisch who happened to pay a visit to the Calcutta Botanic Garden

* H. M. Fitzpatrick, *The Lower Phycomycetes*, 1930, pp. 259, 262.

‡ Dastur, J. F., *Choanephora cucurbitarum* (B. & Rav.) Thaxter on chillies (*Capsicum* spp.). *Ann. Bot.*, 1920, **34**, 399.

[1] Biswas, K., "Bud Mutation," *Nature*, 1932, **130**, 780.

[2] Prain, D., *Curtis' Botanical Magazine*, 1906, **2**, Tab. 8092.