any appreciable amount of the body stores of vitamin A.[5]

A similar observation has been recorded in the case of a cat fed with carotene for a short period, though the concentration of vitamin A in the spleen did not approach the high figure recorded in the case of a dog and was much less than that of the liver. It may incidentally be pointed out that the previous observations of Ahmad[6], Rea and Drummond,[7] and Ahmad and Malik[8] on the inability of the cat to form vitamin A from carotene, may be due to the reason that higher animals like cats and dogs in which the spleen is more highly developed and contains in its meshes a large proportion of the reticulo-endothelial cells (as compared to the liver), vitamin A may appear first in the spleen which those authors omitted to examine. But the question must needs be further investigated.

In the short term experiments[4] in which the increase in the vitamin A content of the liver was taken as the criterion of the formation of vitamin A from carotene administered intravenously, it appeared that it was only in the rabbit that any significant amount of vitamin A formation took place, while it failed in other species of animals. That this should be so, may be due to the probability that the reticulo-endothelial system of the rabbit is functionally more powerful, which is supported by the common observation that of all the experimental animals the rabbit responds more quickly in immunisation experiments.

At the same time one might take into consideration the analogous rôle of the reticulo-endothelial cells in the phagocytosis and ingestion of red-blood cells and the formation of bilirubin.[9] Further analogy is furnished by the rôle of monocytes in anti-body formation from foreign proteins.[10]

There is a striking parallelism between the concentration of reticulo-endothelial cells and the concentration of vitamin A in tissues of the animal body. Liver is a rich store of both. Spleen which might have been an exception is now known to contain relatively large amounts of vitamin A in higher animals particularly after a high carotene intake. Other animal tissues containing appreciable quantities of vitamin A are the adrenals, blood, lungs, bonemarrow, and the kidneys, all of which abound in the reticulo-endothelial cells with the exception of the last named. Of course, it should be taken into consideration that different types of reticulo-endothelial cells may have differentiated functions.

An attempt has been made to study this question further by examining the effects of splenectomy and the blockade of the reticulo-endothelial system in the rat during carotene administration. The results are on the whole inconclusive. The method is fraught with the obvious danger that the blockade or the removal of the reticulo-endothelial cells at one centre would lead to the active proliferation of these cells in other tissues.

This fragmentary evidence presented here is strongly suggestive. It is reported in the hope of stimulating investigations into this question at other centres of research.

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Notes on the Occurrence of *Grammothele cineracea* Bres. *Kneiffia grisea* Berk. and Curtis.

Grammothele cineracea Bresadola, a member of the family Hydnaceæ, is very common in Bengal; but curiously enough no report as to its occurrence in India has yet been made.[1] This unique and conspicuous species is not rare to a careful observer. It grows on trunks of *Phœnix sylvestris* and other palms, particularly on the persistent leaf-bases near the soil. I have also seen it growing on logs and posts. The fructification is entirely resupinate and crustaceous, characterised by

[5] Sherman and Boyhton, *J. Amer. Chem. Soc.*, **47**, 1646, 1925; Kerppola, *Skand. Arch. Physiol.*, **56**, 181, 1930; Moore, *Biochem. J.*, **25**, 275, 1931; Simmonet and Busson, *Comp. Rend. Soc. Biol.*, **109**, 182, 1932; Davies and Moore, *Biochem. J.*, **28**, 288, 1934.

[6] Ahmad, *Biochem. J.*, **25**, 1195, 1931.

[7] Rea and Drummond, *Z. Vitaminforsch.*, **1**, 177, 1932.

[8] Ahmad and Malik, *Ind. J. Med. Res.*, **20**, 1033, 1933.

[9] McNee, *Quart. J. Med.*, **26**, 390, 1923.

[10] Hekteon and Carlson, *J. Inf. Dis.*, **7**, 319, 1910; Luckhardt and Becht, *Amer. J. Physiol.*, **28**, 257 & 274, 1911; Topley, *J. Path. Bact.*, **33**, 339, 1930.

[1] Butler and Bisby, *The Fungi of India*, 1931.

the hymenium which is distinctly polyporoid. It is closely adpressed to the substratum and extends up to a foot in length. When fresh, the fungus is of dark ash-grey colour with a shining lustre which no one can afford to overlook.

Prof. Burt to whom the specimen was sent has also identified it as *Grammothele cineracea* Bres. He further writes to me to say that this species was first described from specimens collected in Cuba, under the name of *Kneiffia grisea* Berk. and Curtis.[2] Its inclusion in *Kneiffia* was, however, unfortunate. It was next collected by Rev. Rick at Sao Leopoldo, Rio Grande du Sol, Brazil, South America. These specimens were distributed in the exsiccati of Theissen Decades *fungorum brasiliensium*, No. 5. The same species was again reported from the Philippines and described by Bresadola as *Grammothele cineracea*.[3]

The name *Grammothele grisea* Berk. and Curtis should have been the proper nomenclature for this species. But as it is already pre-occupied by another species of the same authors, the type specimen of which was also collected at Cuba and a description published along with that of *Kneiffia grisea* Berk. and Curtis,[2] the comparatively recent nomenclature adopted by Bresadola has been retained for this species. It is very near to *Poria hydnopora* Berk. which, according to some, is a species of *Grammothele* but differs from it in having smaller sub-angular pores and other characteristics.

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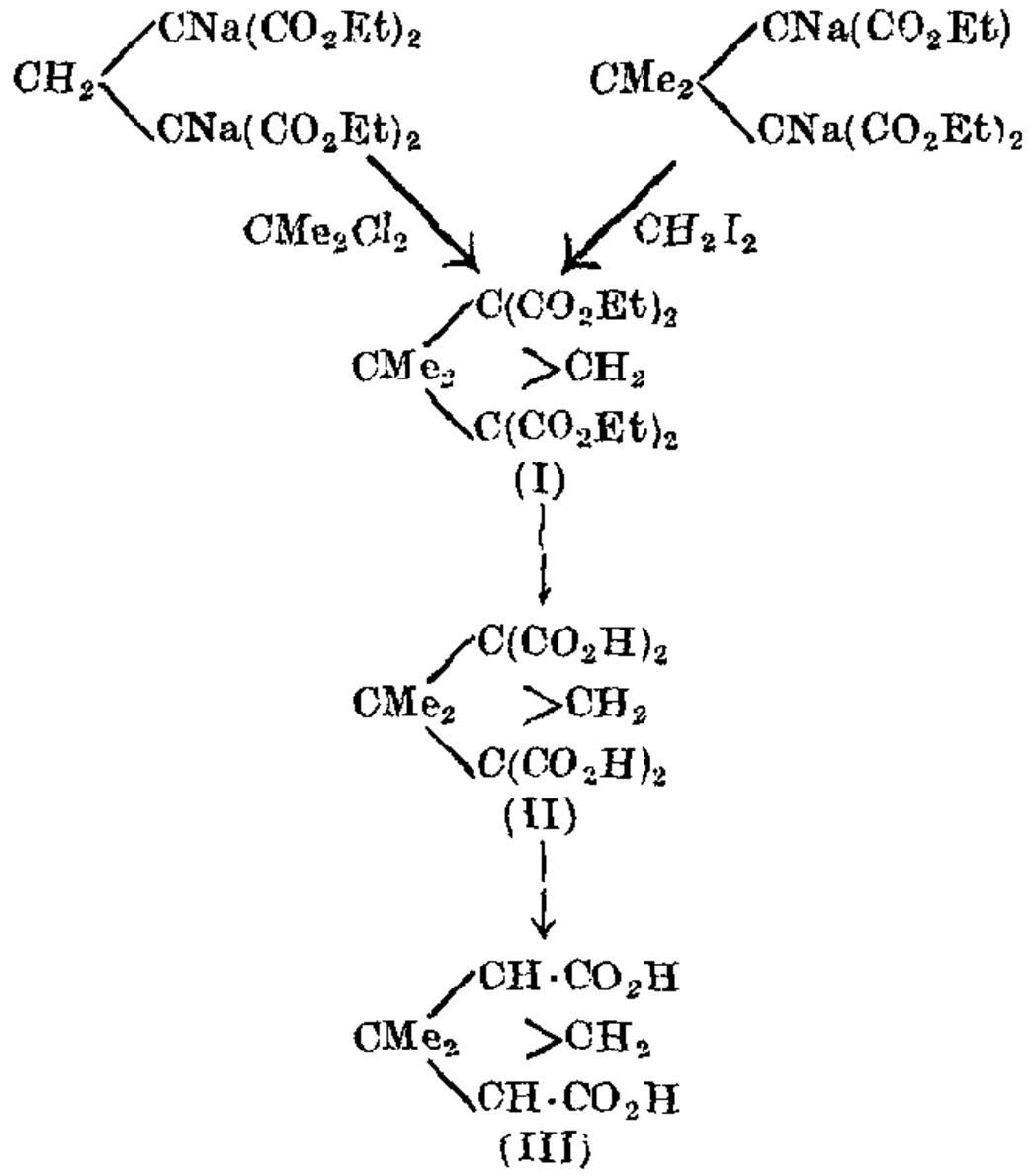
Two New Methods of Synthesis of Norpinic Acid.

THE synthesis of norpinic acid has been achieved by the following two new methods, namely, (1) by the condensation of sodium methylene dimalonic ester and $\beta\beta$-dichloropropane, and (2) sodium derivative of isopropylidene dimalonic ester with methylene iodide.



The tetracarboxylic ester (I) suffered hydrolysis and decarboxylation simultaneously on being boiled with 50 per cent. sulphuric acid yielding *trans*norpinic acid (III) m.p. 145-146° softening at 136°. The tetracarboxylic acid m.p. 200° (II) obtained from (I) by hydrolysis with alcoholic potash was decarboxylated by heating at 220-240° or by boiling with 50 per cent. sulphuric acid. The yields of II and III are poor.

As a result of a large number of experiments conducted under varying conditions, it has been possible to effect considerable improvement upon the methods of preparation of isopropylidene malonic (yield 1315 g. from 1170 g. of malonic ester) and dimalonic (yield 42 g. from 80 of isopropylidene malonic ester) esters described by Clemo and Welch (*J. C. S.*, 1928, 2621).

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Conversion of *Meso*tartaric Acid into an optically active form by Walden inversion under asymmetric conditions.

ORGANIC compounds, containing asymmetric centres in their molecule, but inactive due to internal compensation, are generally supposed to be non-convertible into the active

[2] *Journ. Linn. Soc.*, **X**, p. 327, 1868.
[3] *Hedwigia*, **56**, p. 299, 1915.