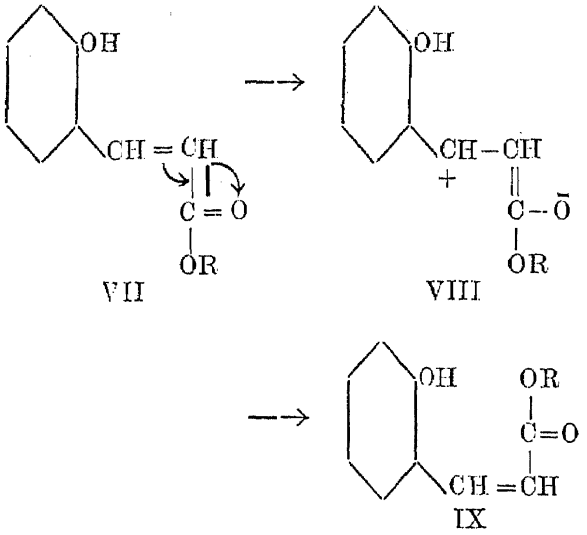
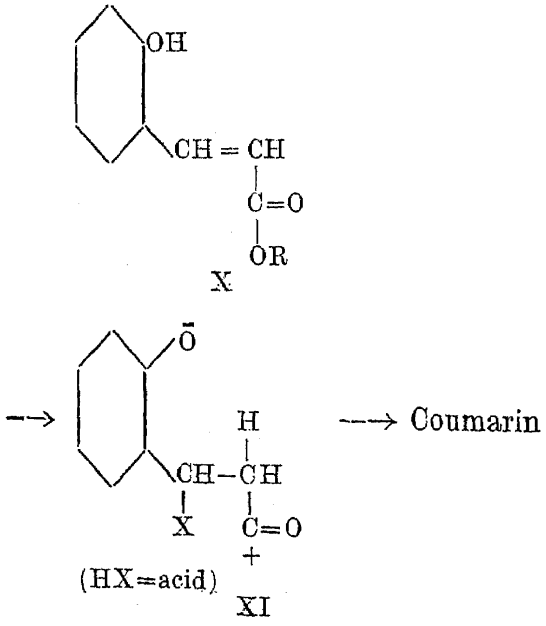
is suggested, the polarisation of the system being facilitated by light:—



VII VIII IX

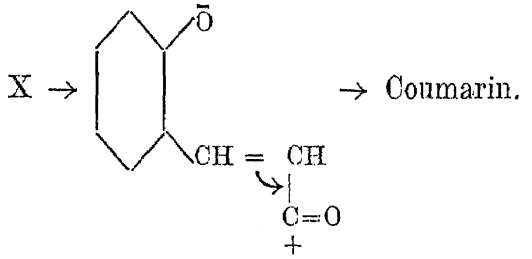
The stage VIII may be formed only momentarily and once the *cis*-phase is produced it is stabilised as coumarin by the ready elimination of alcohol or water. A nitro group in the benzene ring further weakens the double bond by the positive field it creates and hence greatly facilitates the transformation whereas a methoxyl group does the opposite.

In the presence of fuming hydrochloric, hydrobromic and concentrated sulphuric acids, particularly at 100°C. the *trans* acids and their esters undergo easy conversion into the coumarins. The removal of alcohol or water seems to be the first stage in the reaction. The dipole that is formed supplies the necessary energy for the inversion and the rotation of the groups is facilitated by the temporary addition of the acids at the double bond.



X XI

The course of the transformation under the influence of heat at the melting points of the substances, seems to belong to a slightly different type. In the case of the esters alcohol is first eliminated and the subsequent inversion may be represented as below:—



Here the combined effect of the carbonyl group and the positive charge on the carbon atom brought about by the removal of OR eliminates the effect of the double bond. Such a process does not obviously take place in the case of the acids partly due to the greater difficulty of the removal of water and partly due to the facility with which the elimination of carbon dioxide takes place producing styrenes. Experimental details will be published elsewhere.

T. R. SESHADRI.

Chemical Department,
Andhra University, Waltair,
May 28, 1934.

On a New Method of Synthesis of Bicyclic Terpenes: Synthesis of Ethyl *cyclo*hexanone 2 : 6-dicarboxylate.

THE synthesis of this ester has been attempted in this laboratory by several methods, one of which, *viz.*, the action of sodium ethoxide upon trimethylene dimalonic ester has now yielded the desired product b.p. 140-42°/1-1·5 mm. The formation of the desired *cyclo*hexane ring by this method has been definitely established by hydrolysis and decarboxylation of the ester into *cyclo*-hexanone.

Recourse has also been taken to another method for the preparation of the desired di-ester from *cyclo*hexanone-2 : 2 : 6 : 6-tetracarboxylic ester, b.p. 175°/2-3 mm. (pure product 30% yield) obtained by the action of carbonyl bromide upon the di-sodium derivative of trimethylene dimalonic ester. The tetra ester on being hydrolysed with alcoholic potash gives the corresponding tetra acid m.p. 246°, and is converted into *cyclo*hexanone on being boiled with 50 per cent. sulphuric acid during 16 hours. The

conversion of this tetra ester into the required diacid is being tried under regulated conditions of hydrolysis and decarboxylation. This reaction being of very general applicability has been extended for the preparation of *cyclo*pentanone and *cyclo*butanone tetracarboxylic esters by condensing ethylene and methylene dimalonic esters, respectively, with carbonyl bromide. The *cyclo*pentanone tetra ester on drastic hydrolysis accompanied by decarboxylation has given *cyclo*pentanone. It has been possible to raise the yield of ethyl butane tetracarboxylate from 15 to 65 per cent. by using magnesium amalgam instead of sodium.[1]

The *cyclo*hexanone-2 : 6-dicarboxylic ester and the corresponding *cyclo*pentanone and *cyclo*butanone diesters with two active hydrogen atoms in 1 : 3-positions should, it is expected, form convenient starting materials for the synthesis of some interesting bicyclic terpenes.

P. C. GUHA.
N. K. SESHADRIENGAR.
Department of Organic Chemistry,
Indian Institute of Science,
Bangalore,
May 31, 1934.

Catalogue of Scientific Periodicals.

ABOUT a year ago in an Editorial article[2] it was suggested that one of the duties or functions of an Indian Academy of Science would be the establishment of a central library in order to facilitate scientific research in this country. The wisdom of spending in this manner so large a sum as would be required is, I think, debatable and in my opinion it would serve the purpose better if the money were used to increase the facilities available in existing libraries throughout the country. However that may be, I wish to suggest that an excellent and useful piece of work in connection with Indian libraries could be done by any central scientific body, such as an All-India Academy of Science, in preparing a catalogue of all the periodical scientific literature available in the principal public and quasi-public libraries in India.

At present it is often very difficult to ascertain in what library (even in a given city) a wanted reference may be found or whether it is available in India at all. The only catalogue of which I am aware dealing with periodicals in more than one Indian library is Kemp's "Catalogue of the Scientific Periodicals in Calcutta Libraries" published in 1918. This is already out of date and incomplete though still useful. There may be others of which I am unaware. Other countries possess catalogues of the scope suggested. For instance, the "World List of Scientific Periodicals" published in England in two large volumes contains in the first volume the titles of all the known published scientific periodicals in the world and in the second volume a reference to where copies may be found in the libraries of selected cities in Great Britain and Ireland. Similar catalogues exist for South Africa, Canada and the United States; also, no doubt for other countries.

The cost of preparing such a catalogue for the chief Indian libraries would be but a fraction of the cost of a new central library and the result would, I suggest, be of at least equal value to Indian science though it would not, of course, fulfil the same functions. Indeed, even if a central library were eventually instituted the need for such a catalogue would still exist. It would be interesting to know how many librarians of existing libraries would be willing to co-operate in this scheme.

A catalogue of this nature to be of greatest use would need to be brought up-to-date periodically—say, once in every five years.

FORBES W. SHARPLEY.
Department of Engineering,
Indian School of Mines,
Dhanbad,
June 12, 1934.

'Barren-Sterile'—A New Mutant in Rice and its Inheritance.

As far as the writers are aware the mutant described in this note does not seem to have been recorded in rice, previously. However, an almost similar case was described by C. M. Woodworth in maize.[3]

In the 1932-33 paddy season, the junior writer in going through the selections from Muthusamba, a variety got from Cuddalore in 1931, noticed that out of 92 single plants grown separately, one lot No. 1900 was found to throw out a fairly large number of plants with leafy shoots, in the place of earheads (Fig. 1). The actual counts showed 148 normal and 38 barren-sterile plants in

[1] Perkin, *J.C.S.*, 1894, **65**, 578.
[2] *Current Science*, 1933, **1**, 335.
[3] *J. Heredity*, 1926.