



APPROACHES TOWARDS THE SYNTHESIS
OF ROSENONOLACTONE

A Thesis
Presented for the Degree of
Doctor of Philosophy

in
The University of Adelaide

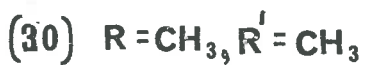
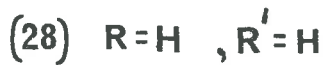
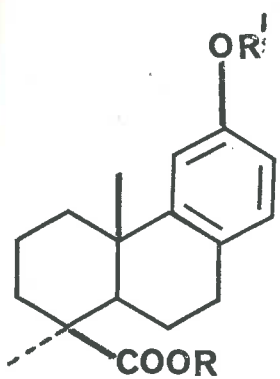
by

William S. Hancock, B.Sc.(Hons.)

Department of Organic Chemistry

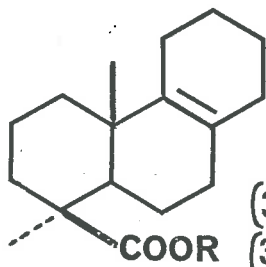
October, 1969.

Scheme 1. The Birch Reduction of *o*-Methyl Podocarpic Acid.

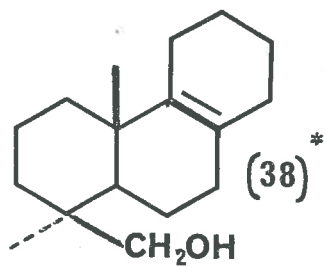


Li/NH₃

ROH



LiAlH₄

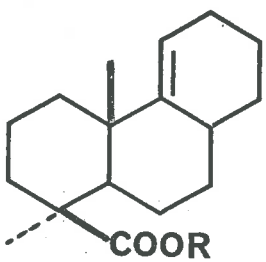


(31) R=H

(32) R=CH₃

(38)*

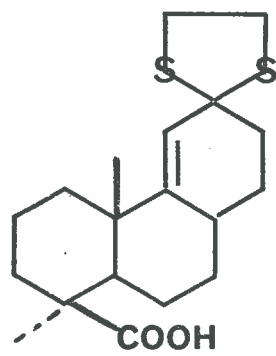
Scheme 1 cont'd



(33) R=H

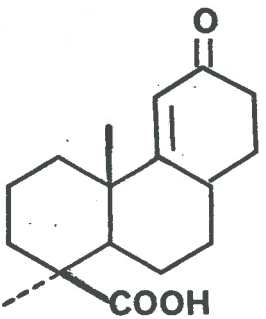
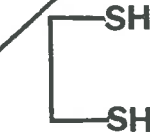
(34) R=CH₃

Li/NH₃



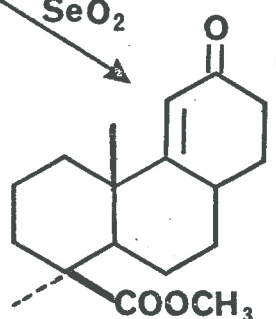
(39)

SeO₂



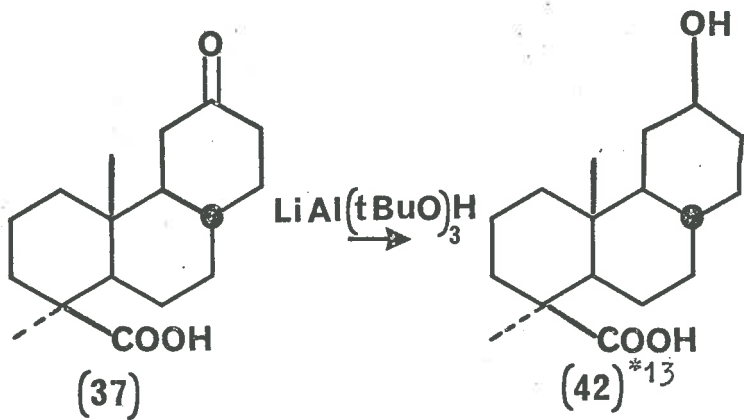
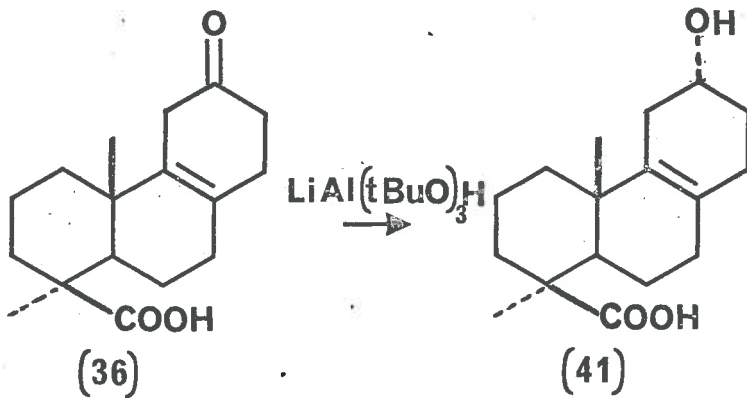
(35)

CH₂N₂



(40)*¹³

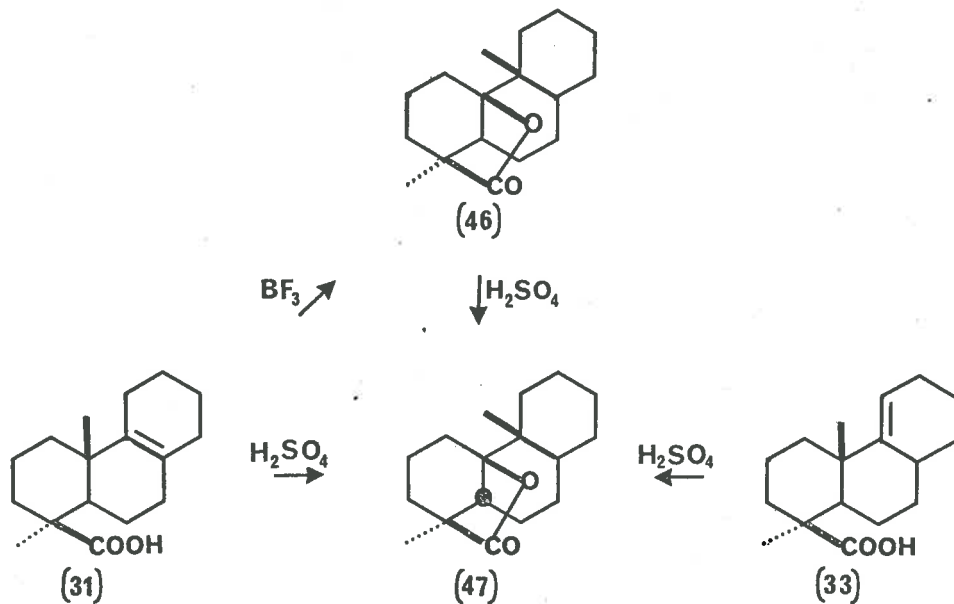
Scheme 1 cont'd



* = known compound.

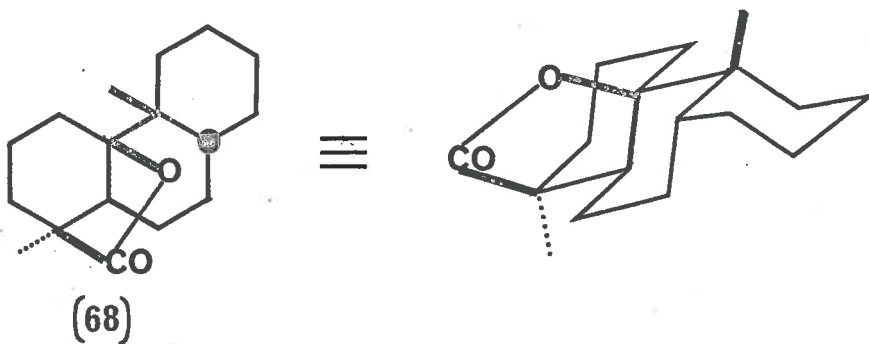
Scheme 2.

The lactonisation studies on podocarpic acid derivatives.

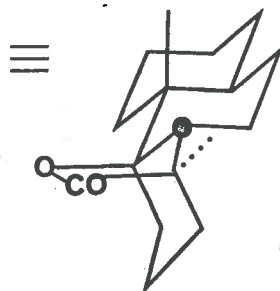
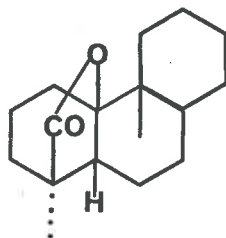
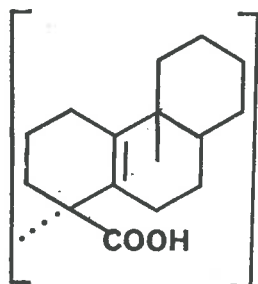
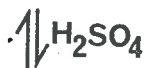
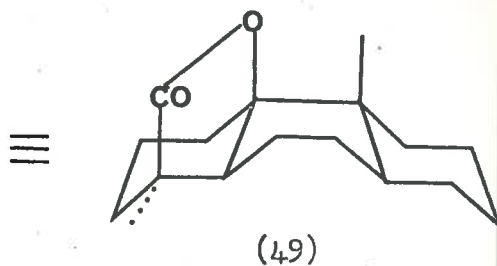
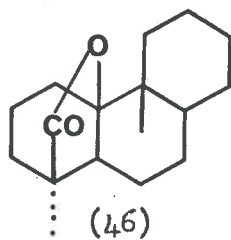
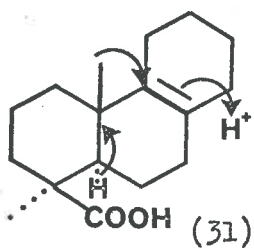


Scheme 3.

The saturated δ -lactones.



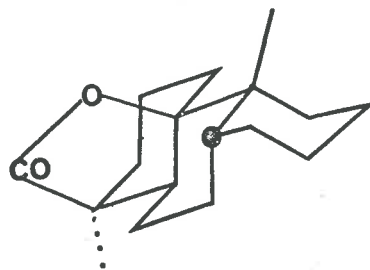
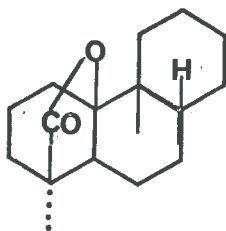
Scheme 3 cont'd



(48)

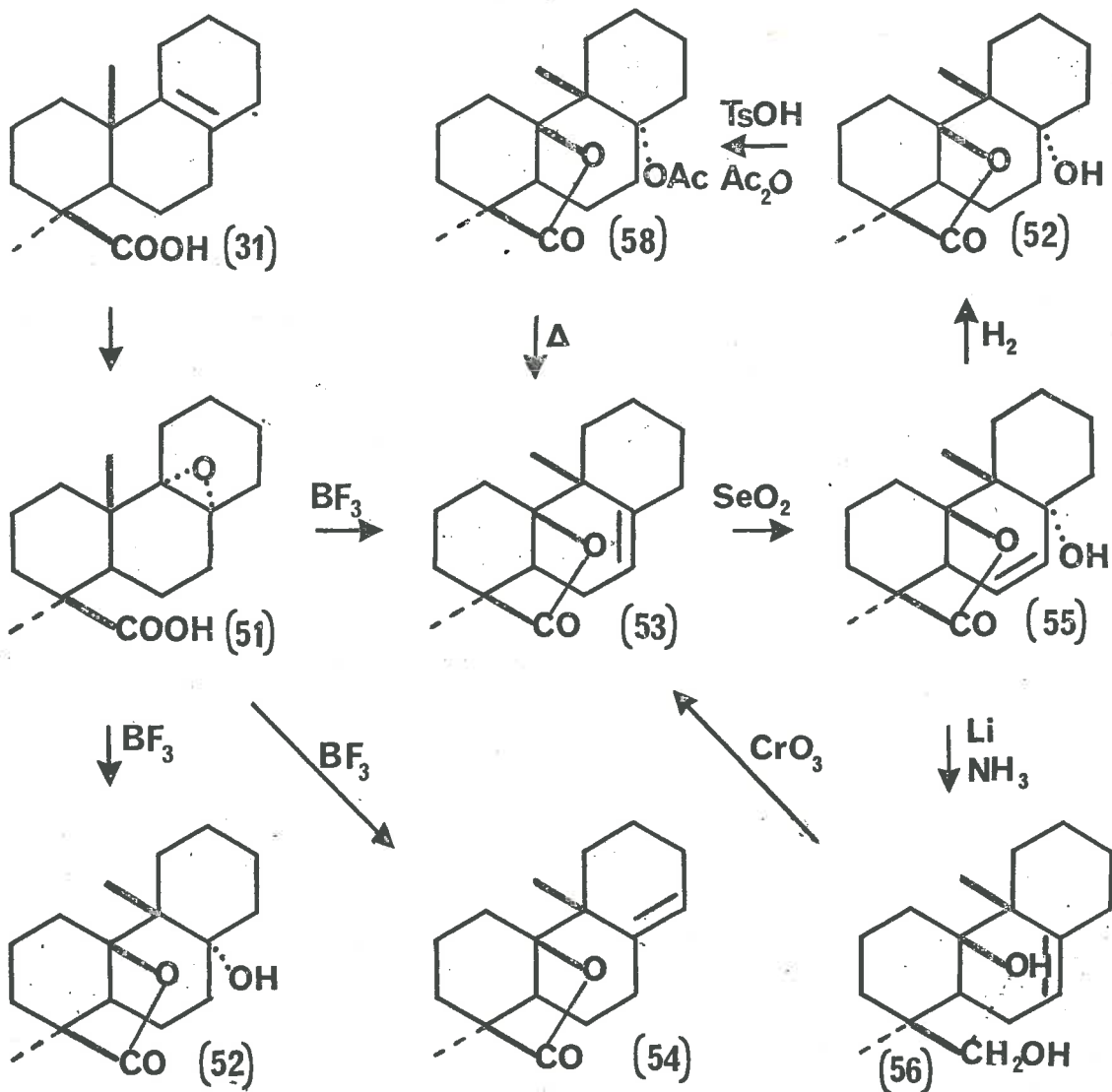
(47)

(50)



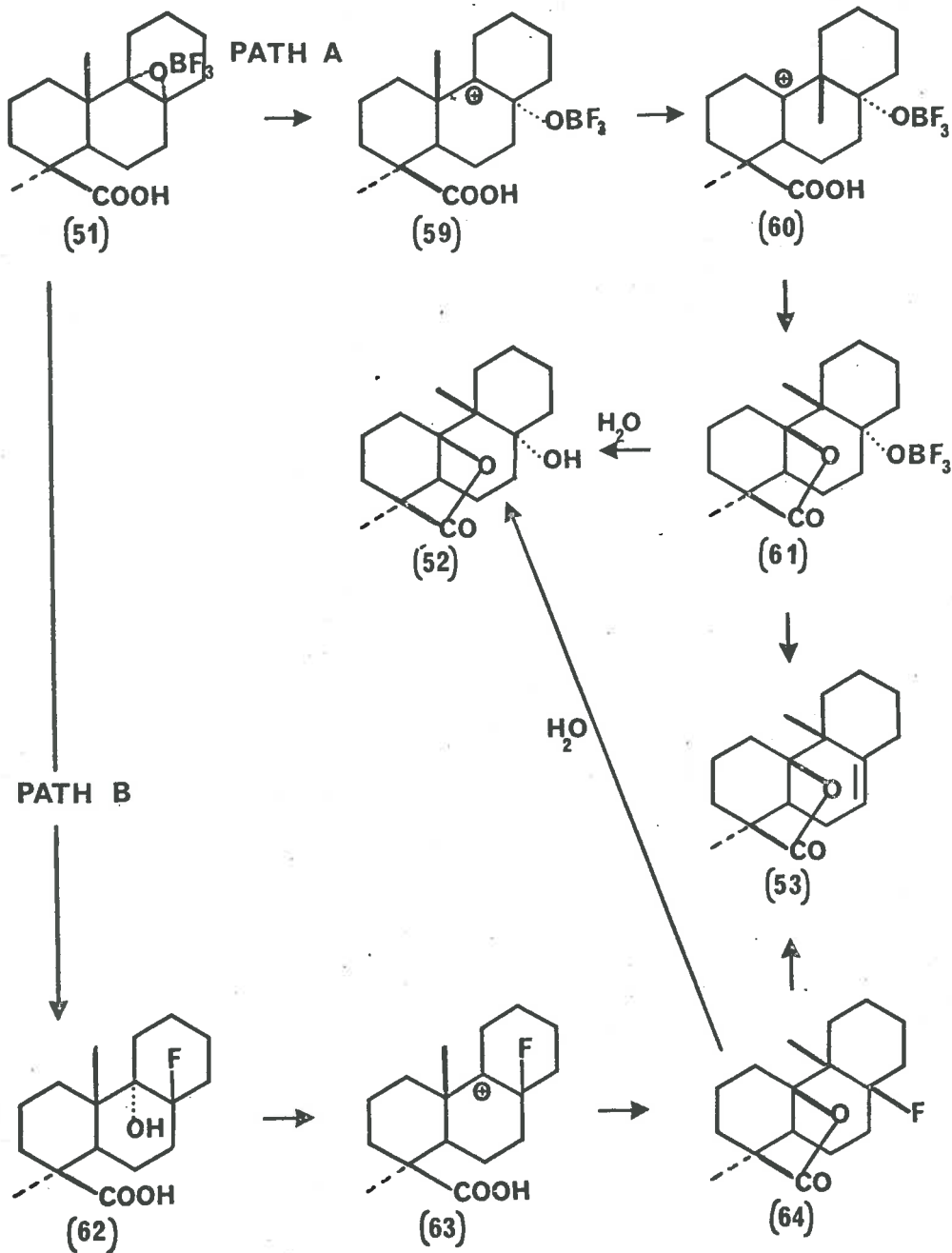
Schemes 4 and 5

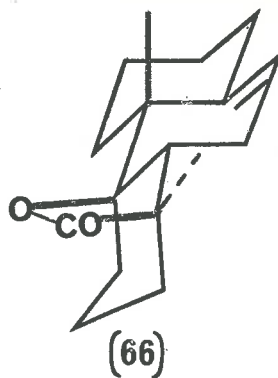
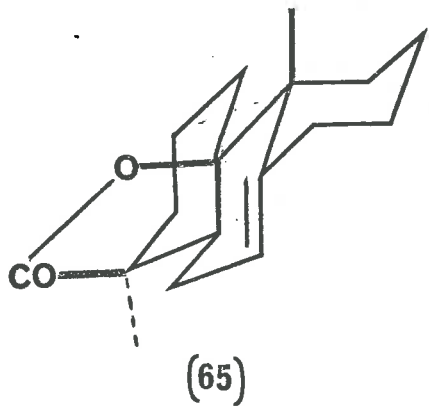
These interconversions do not establish the configuration at C₅ of any of the products, this will be established later in the discussion.



Scheme 6.

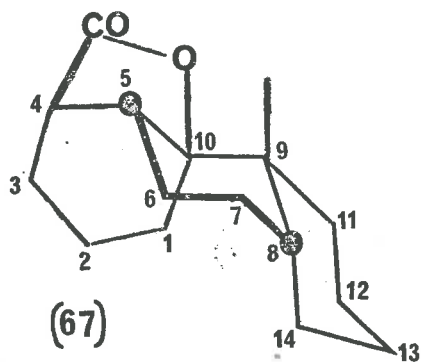
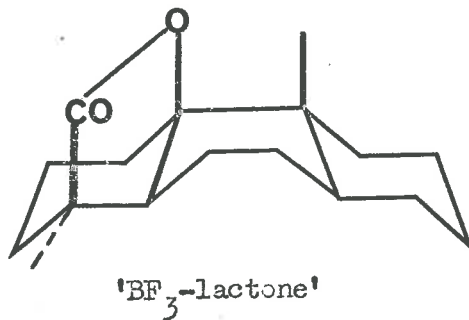
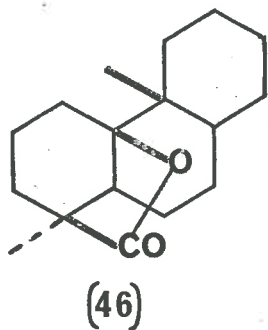
Two possible mechanisms for the rearrangement of the epoxyacid (51).

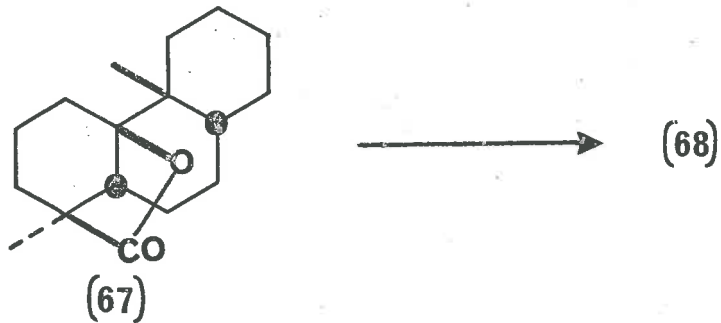




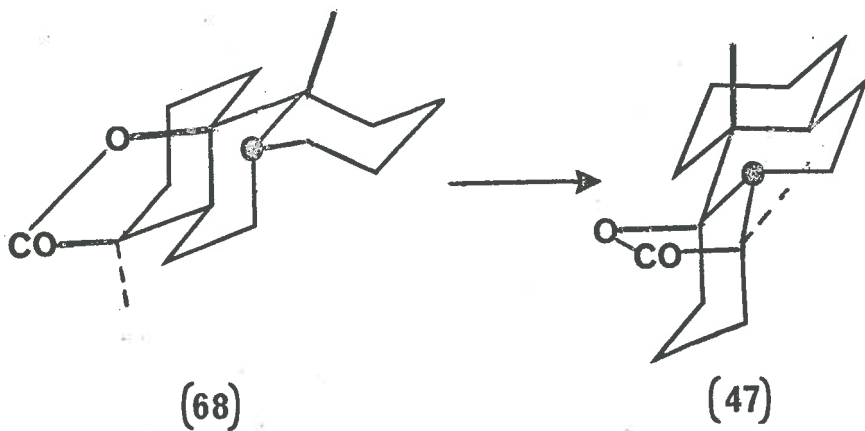
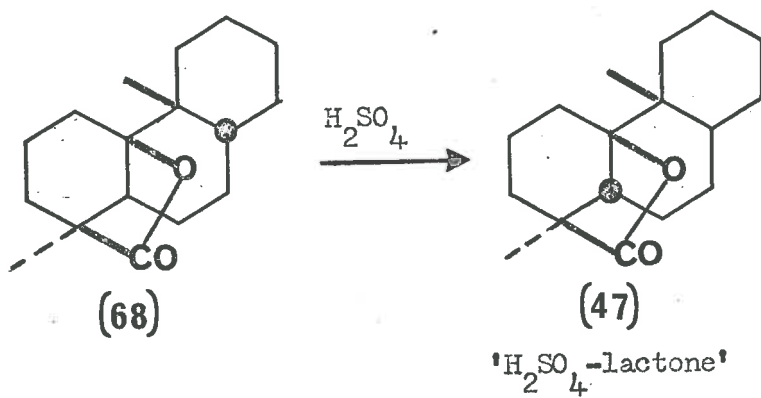
Scheme 7

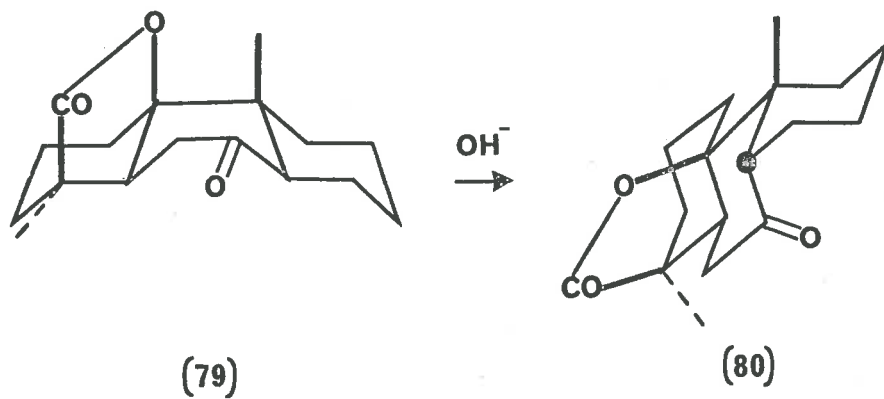
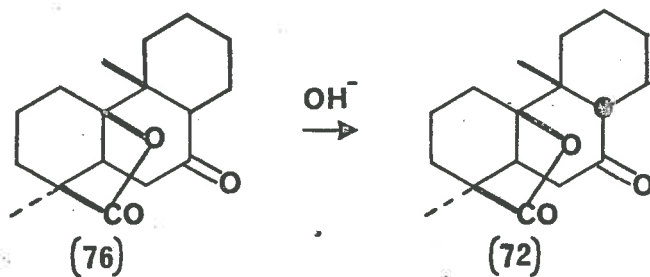
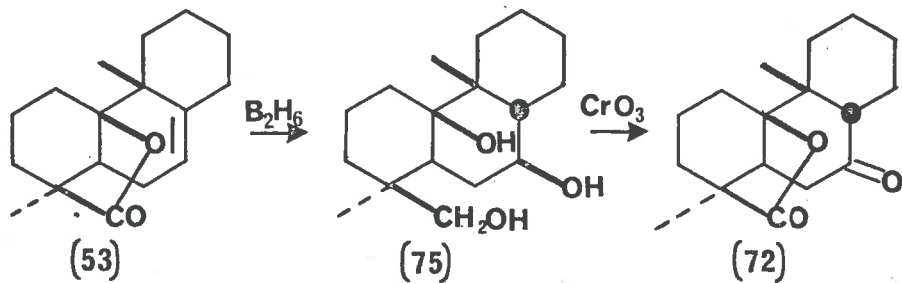
Possible structures for the 'H₂-lactone'.



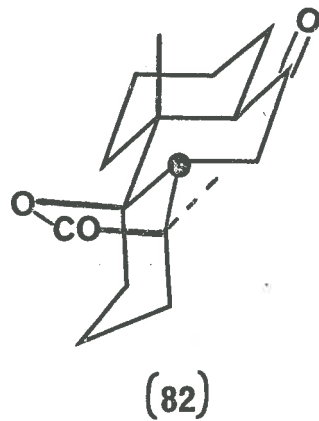
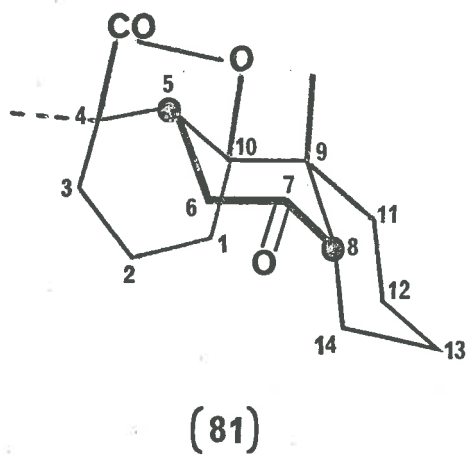
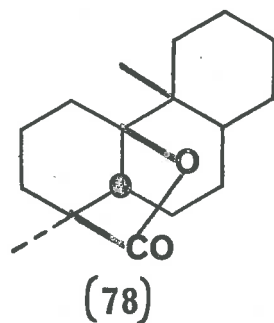
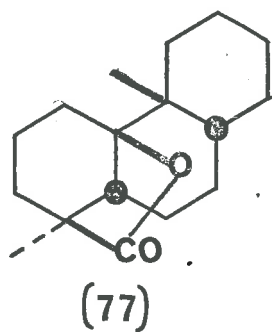


Scheme 7 cont'd



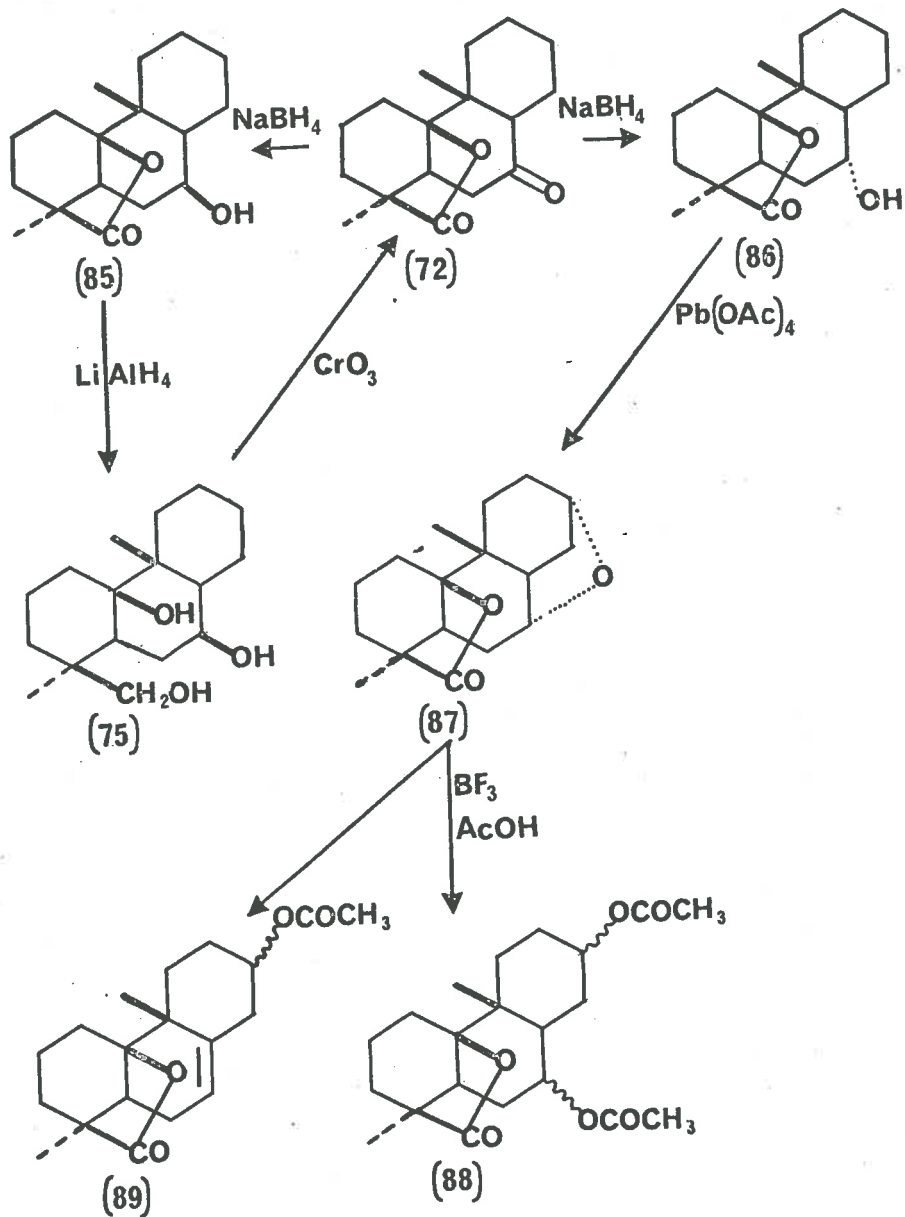
The possible structures for the ketolactone (72).

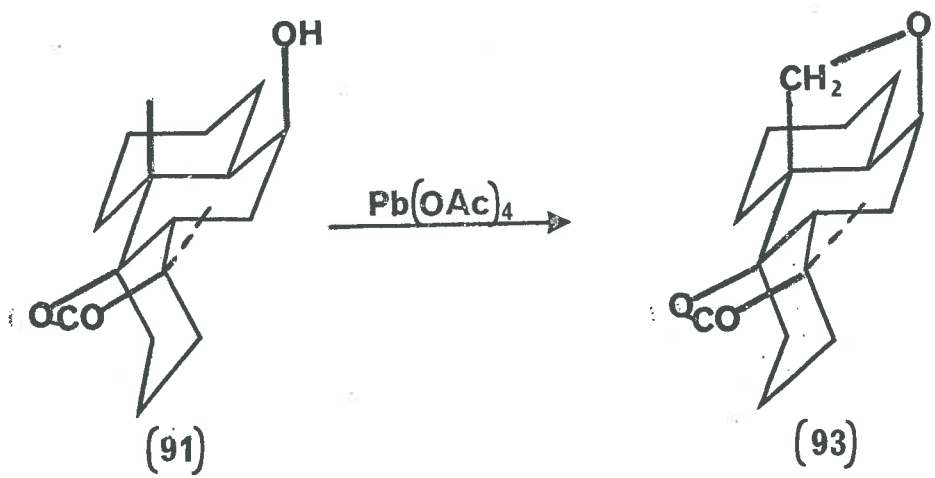
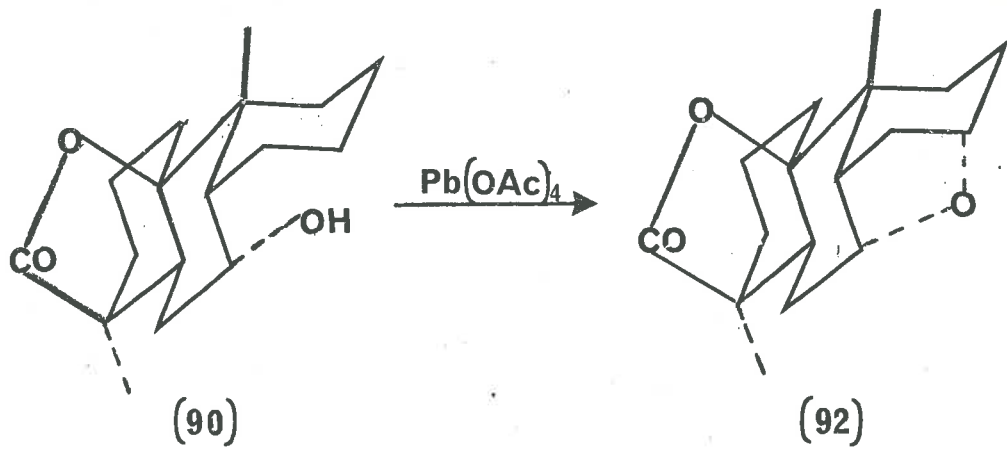
Scheme 9 cont'd



Scheme 10.

The reduction of the ketolactone (72) with sodium borohydride.

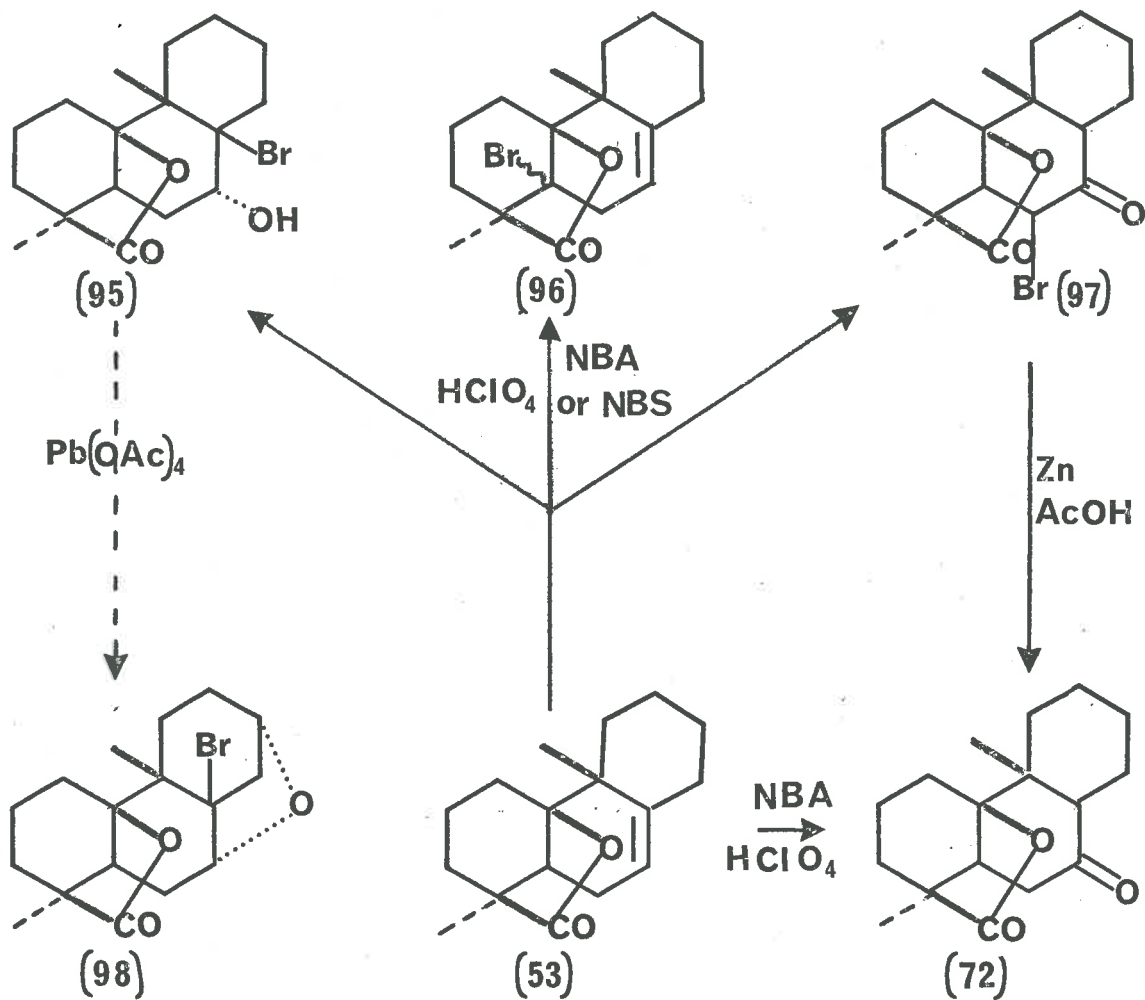




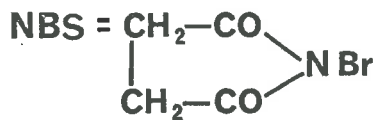
Scheme 11.

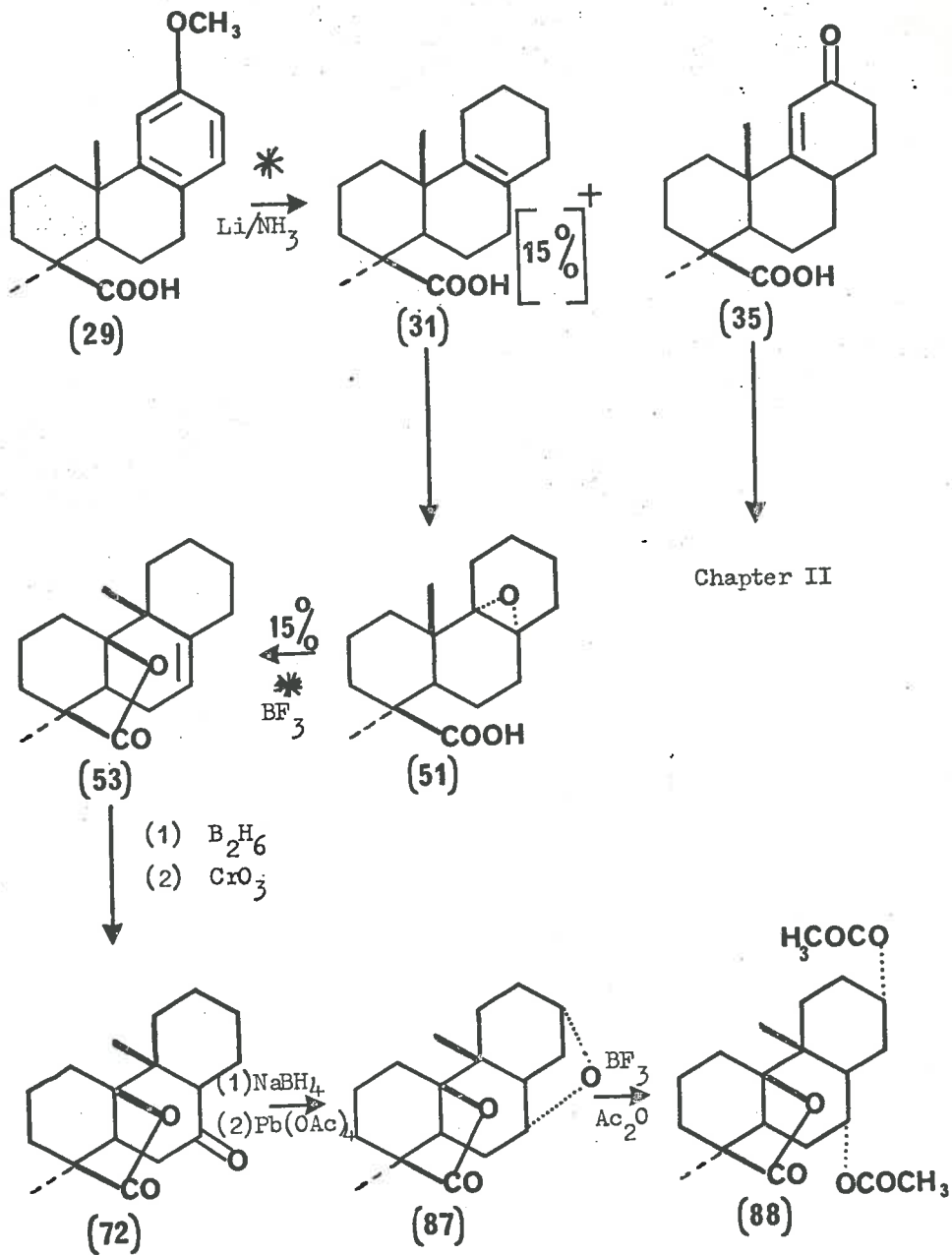
The lead tetra-acetate oxidation of the hydroxylactone (86).

Scheme 12. The synthesis of the bromohydrin (95).

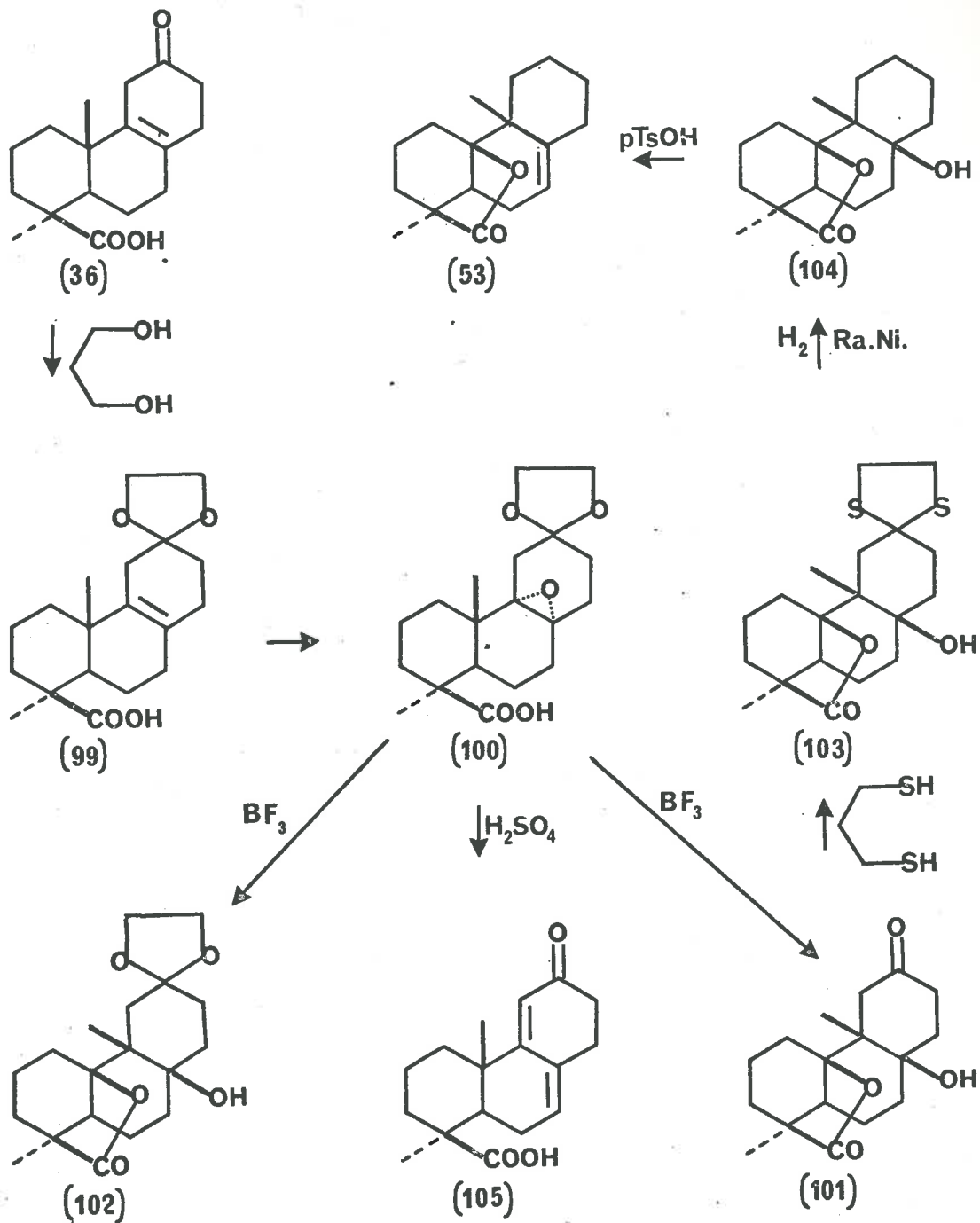


NBA = CH_3CONHBr

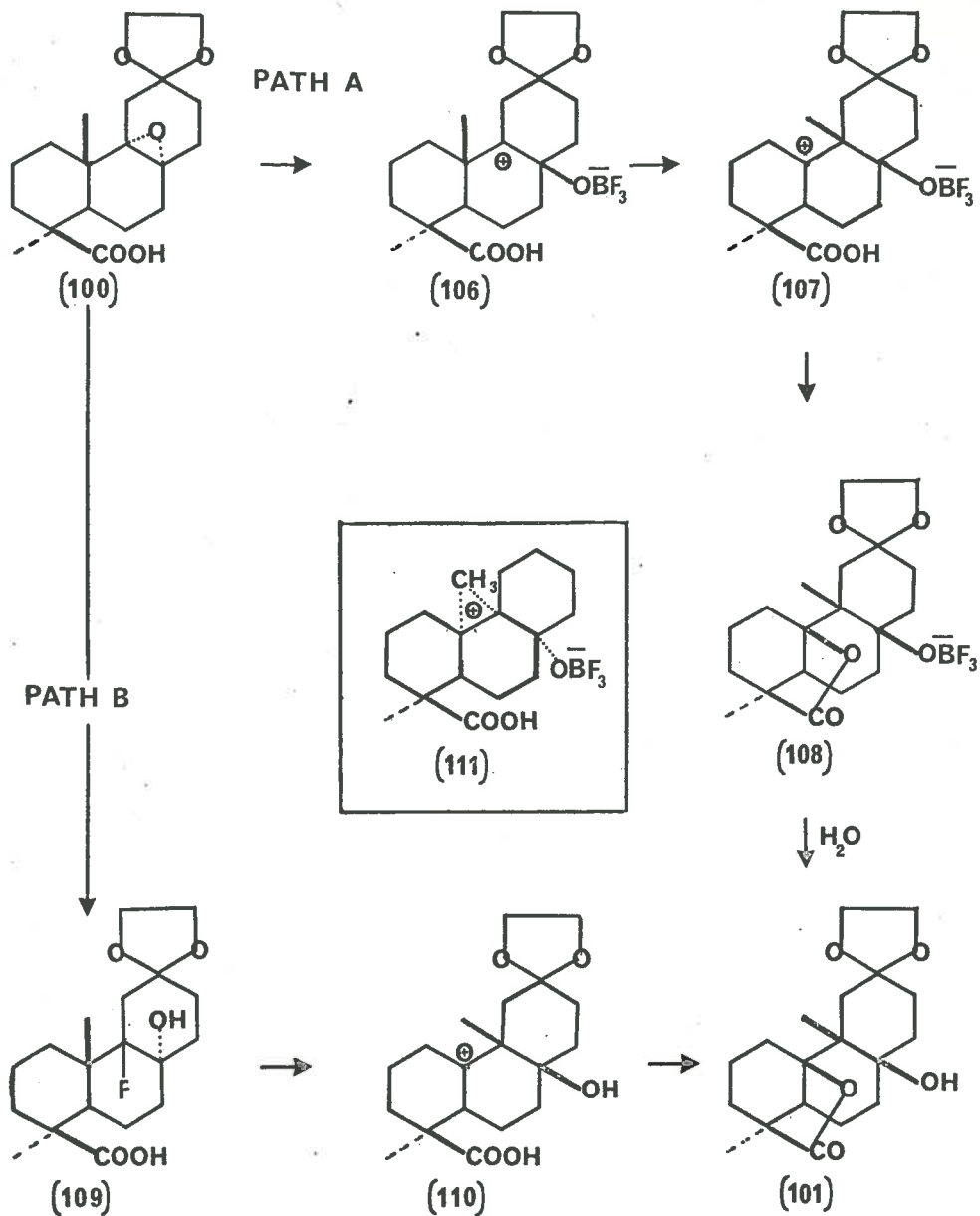




Scheme 15. Preparation and rearrangement of the epoxyketal (100).

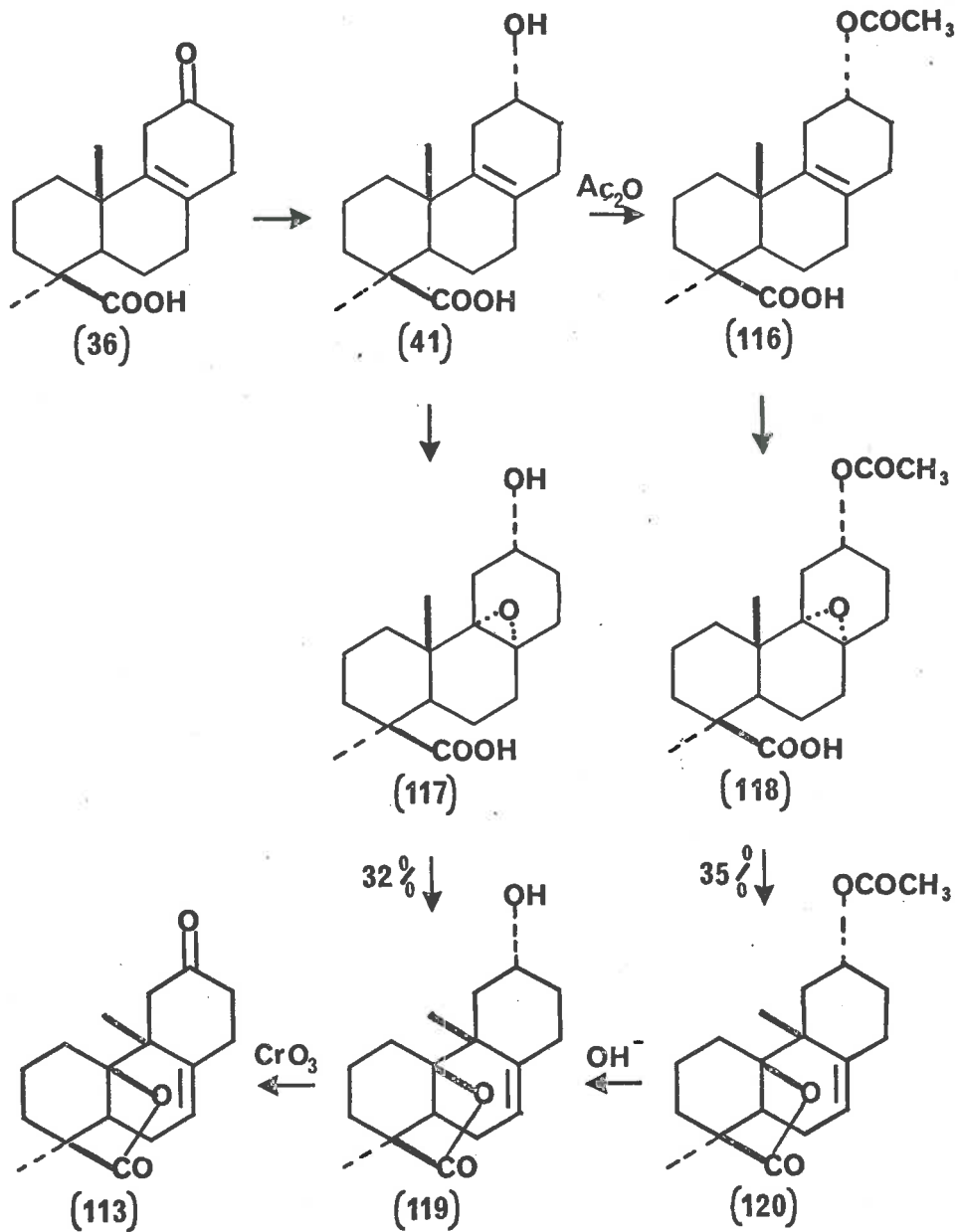


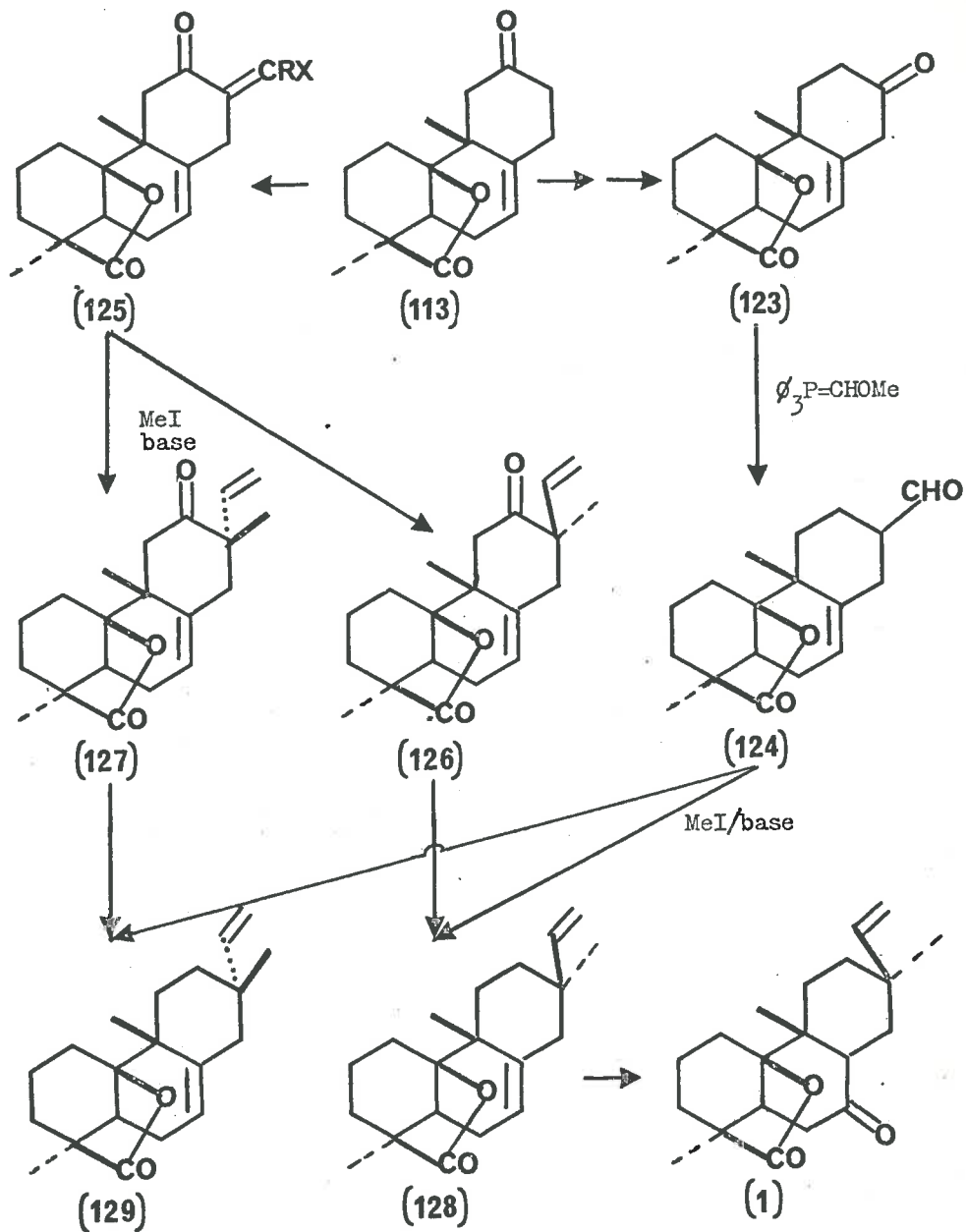
Possible mechanisms for the rearrangement of the epoxyketal (100).



see Scheme 6 for the corresponding rearrangement of the epoxyacid (51).

The preparation and rearrangement of the alcohol (41) and its corresponding acetate (116).

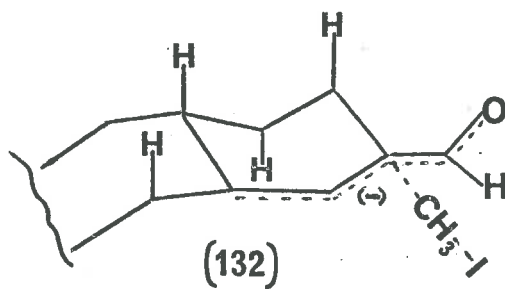
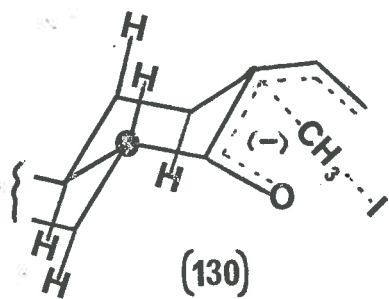
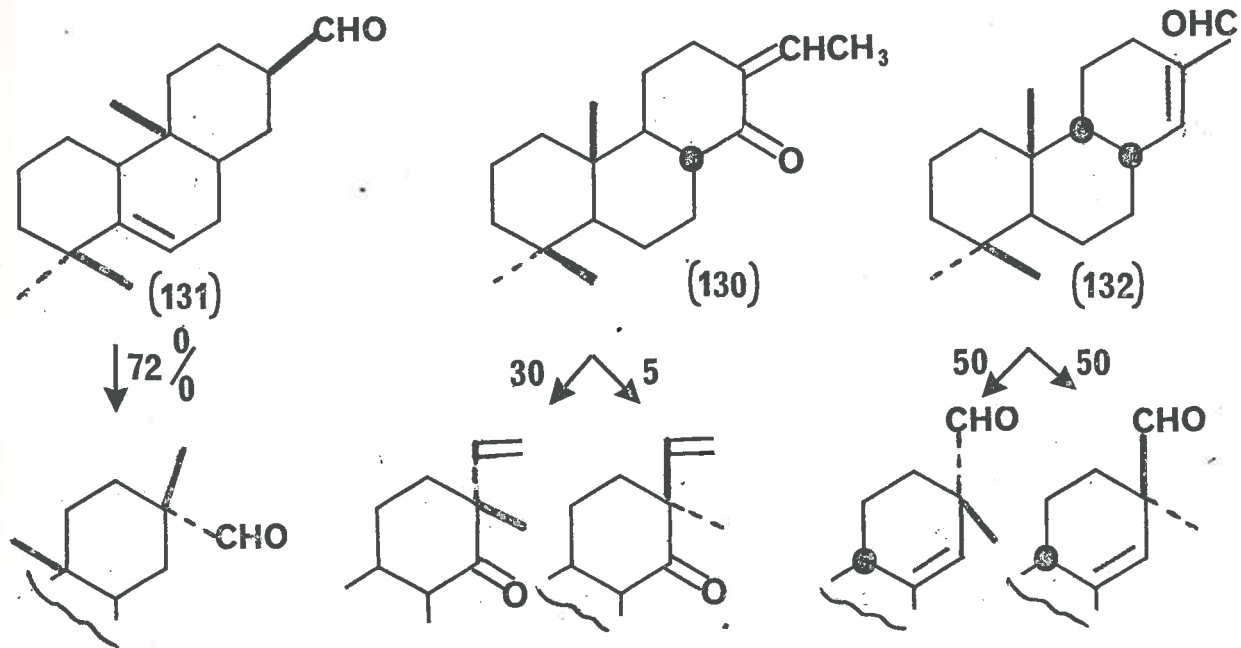




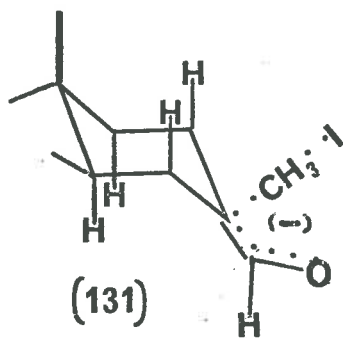
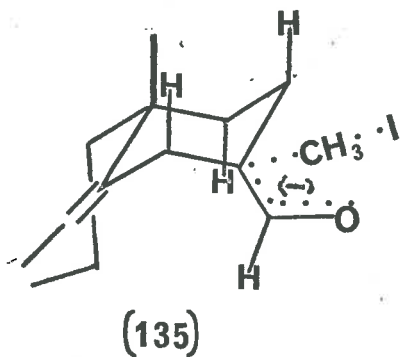
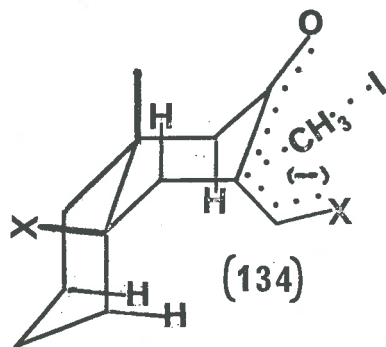
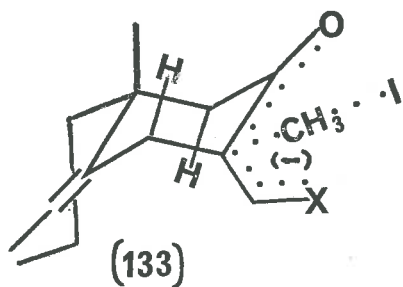
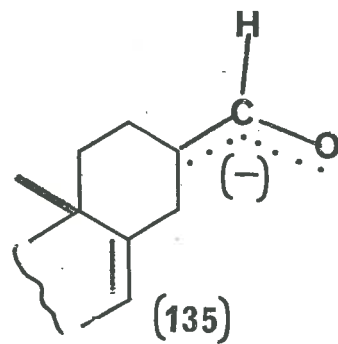
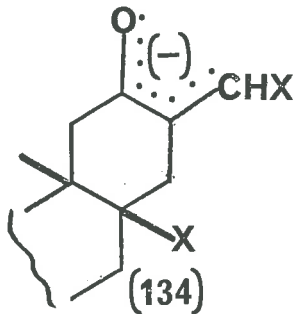
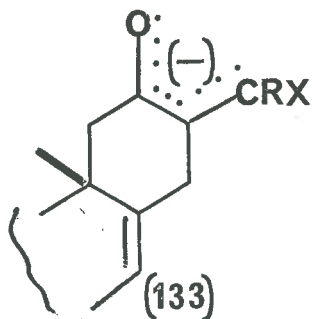
R = H or -OH

X = O, C, or N derivative.

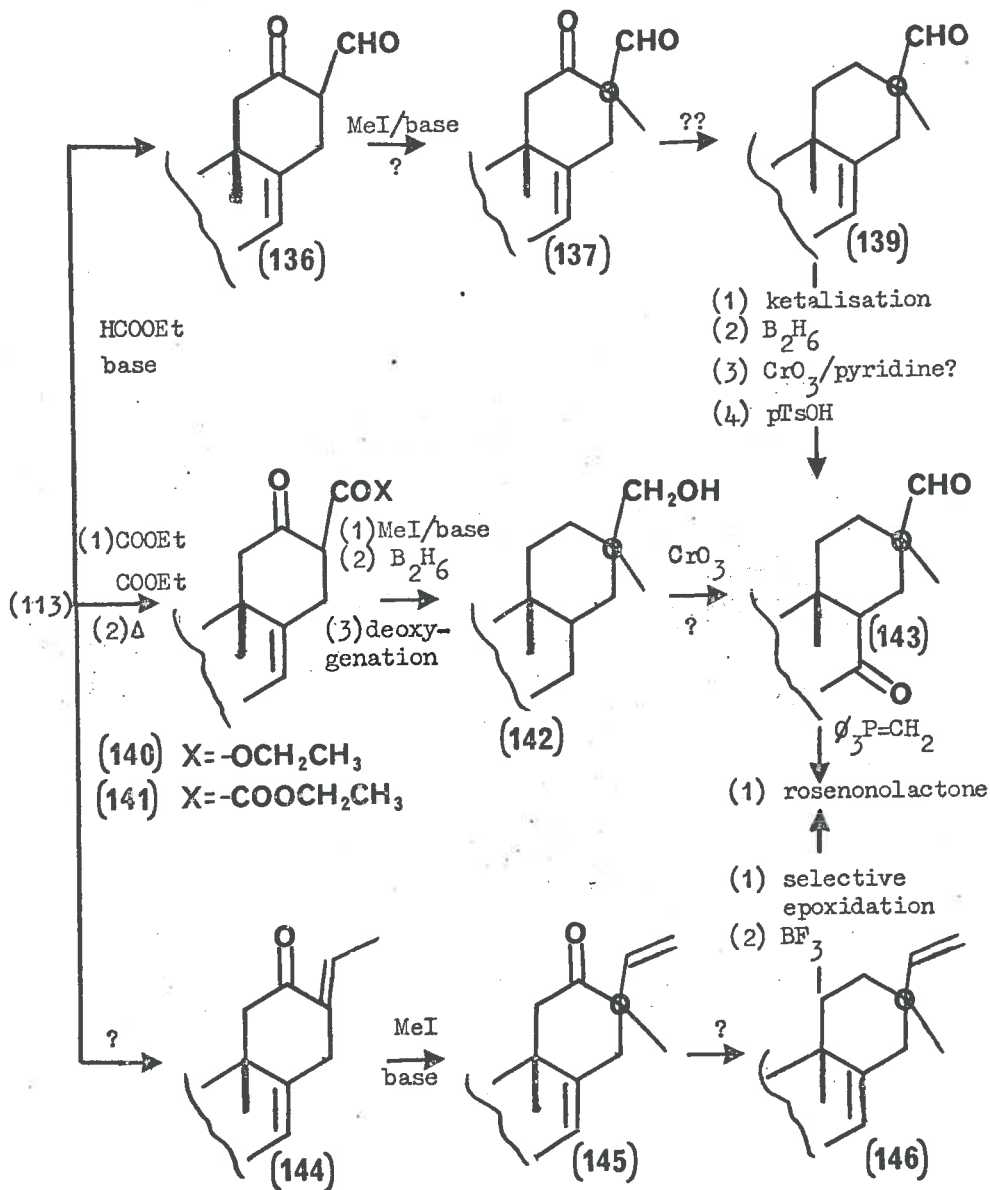
Scheme 22



Scheme 22 cont'd

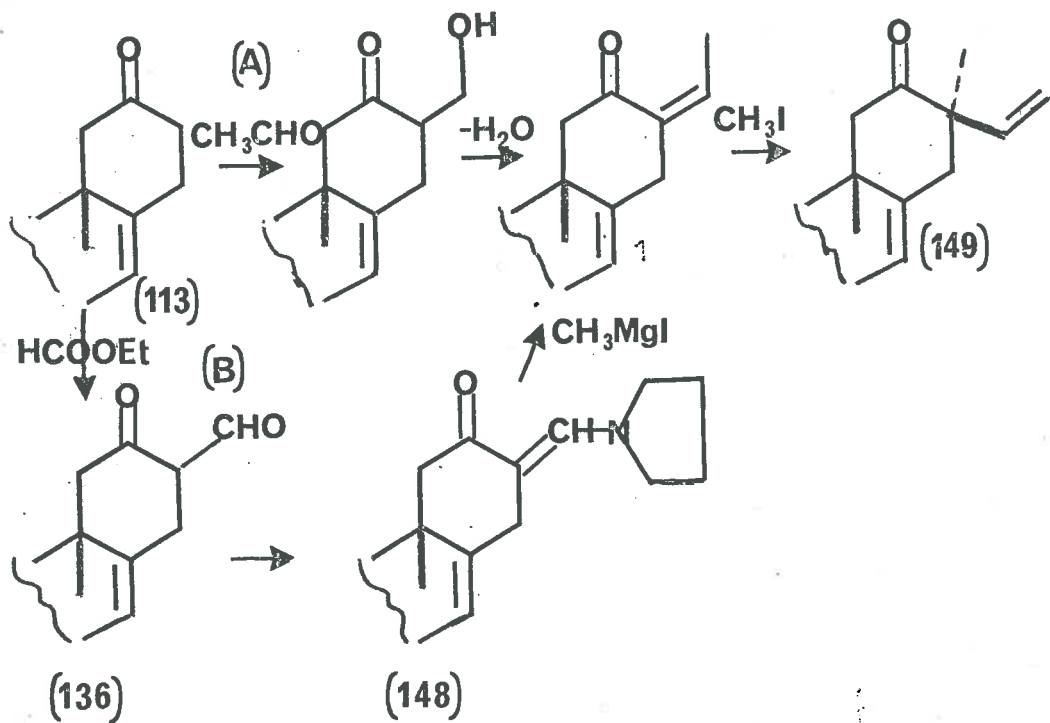


Scheme 22b Synthetic approaches based on various activating groups

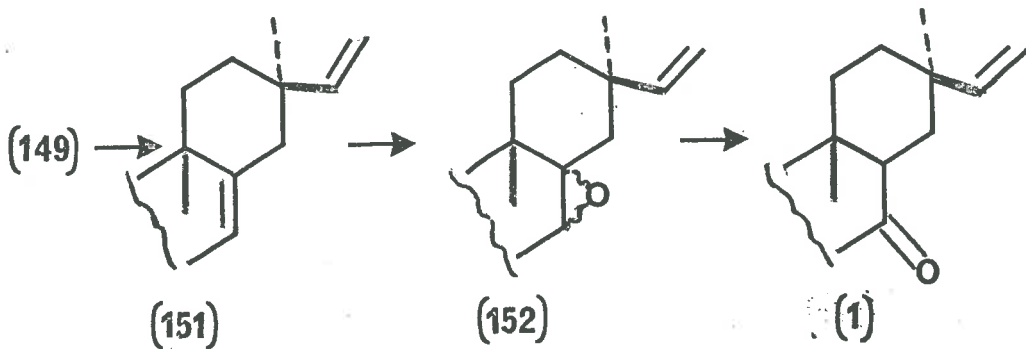


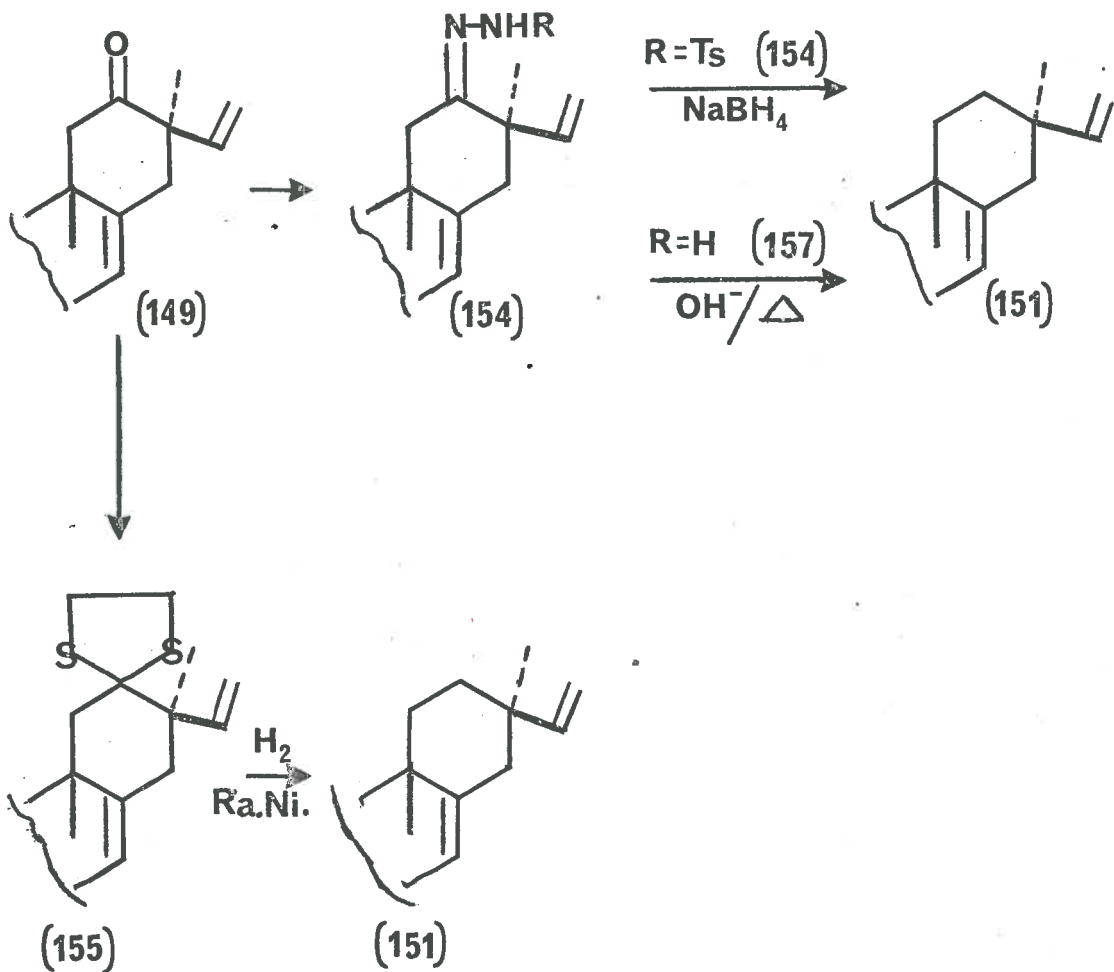
? = possible difficulties

Methods for the preparation of the diene (151).



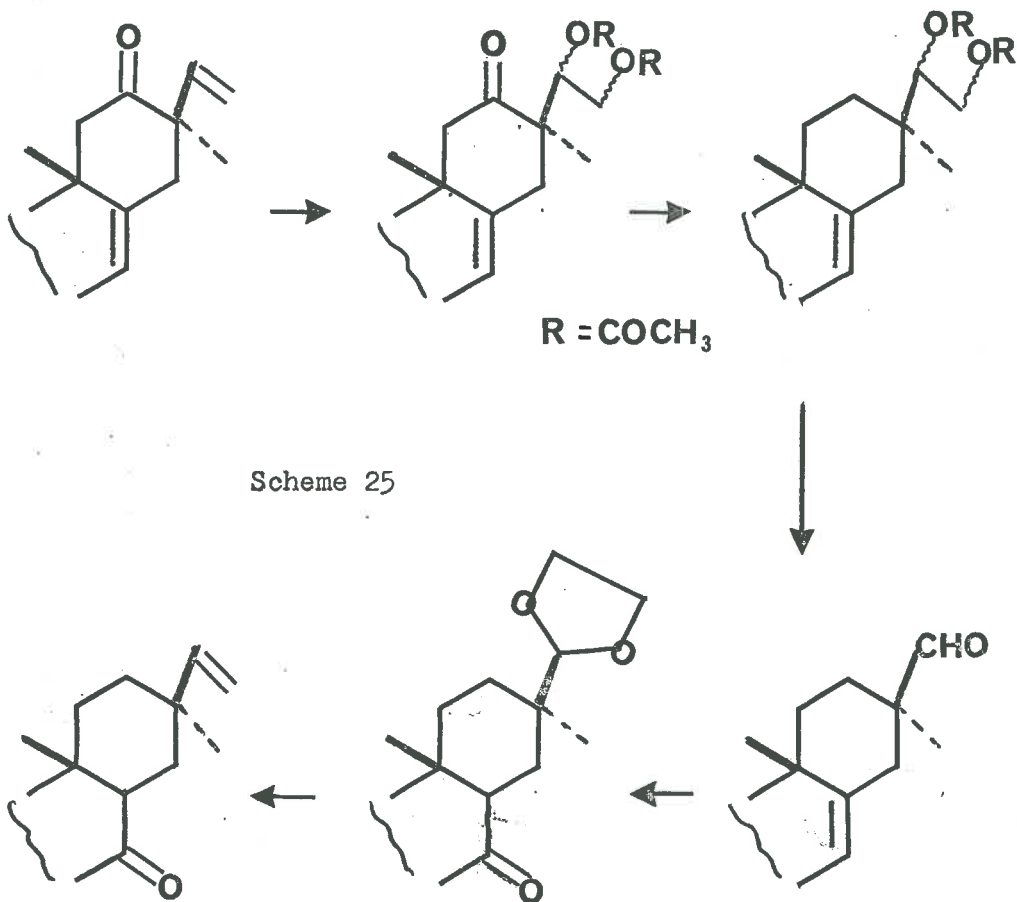
Elaboration of the diene.





Scheme 24.

Methods for the removal of the carbonyl group of the ketone (149).



Scheme 25

Scheme 26

