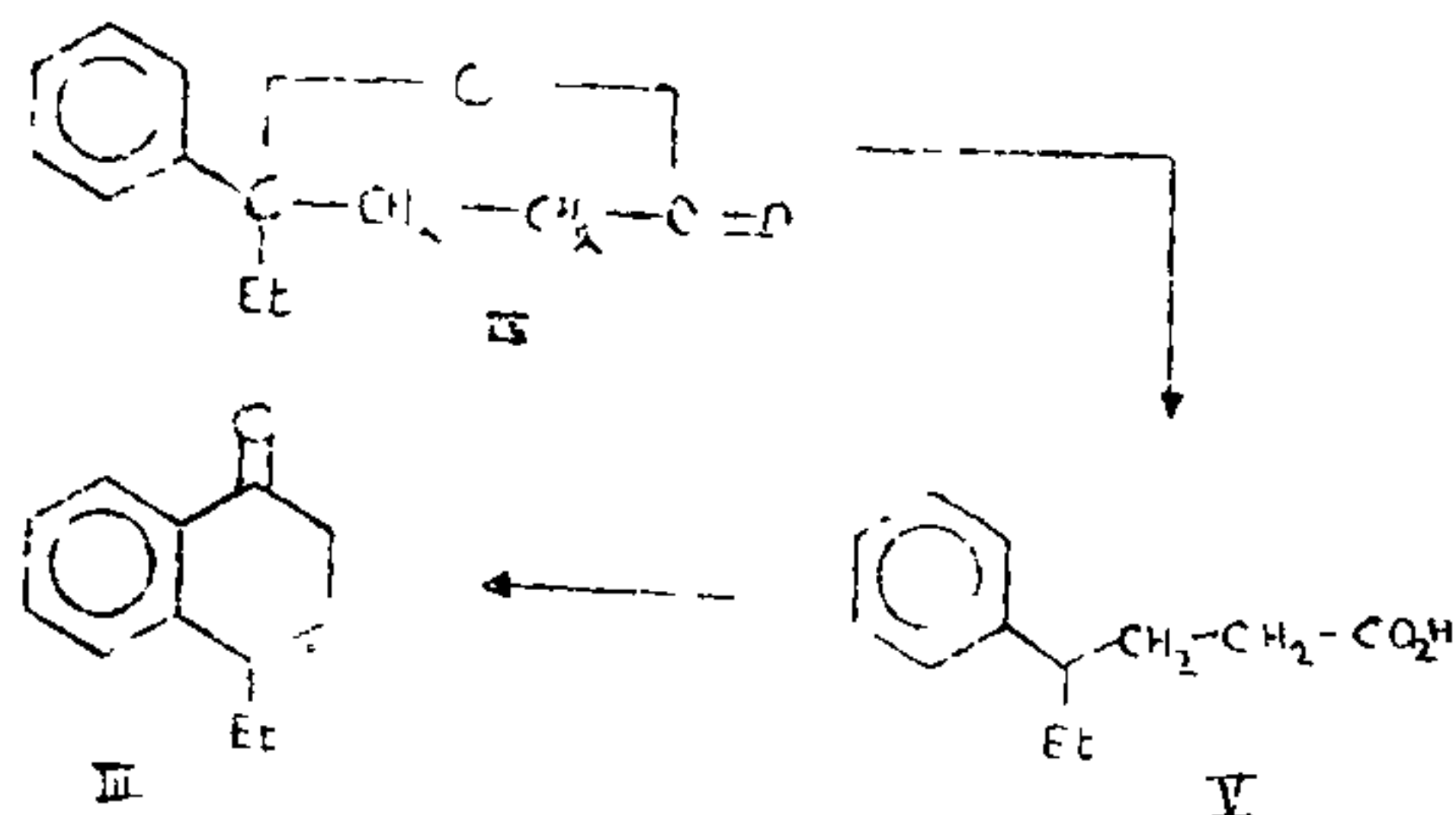


and Desai⁴ have reported the formation of 4-ethyl-ac-tetrahydro-1-naphthol during the Clam-mensen reduction of the above ketone, whereas the Russian authors³ have reported the isolation of 1-ethyl-1, 2, 3, 4-tetrahydronaphthalene during their reduction.



When the reactions of 4-ethyl-1-naphthol and 4-propyl-1-naphthol were attempted with carbon tetrachloride in the presence of anhydrous aluminium chloride under different experimental conditions, only a dark tarry mass was isolated in all cases, from which no pure product could be isolated.

All the compounds gave satisfactory elemental analysis.

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AZINE DYES AS NEW REDOX INDICATORS IN CERATE OXIDIMETRY*

RECENTLY, Rao and coworkers¹ have reported the use of some azine dyes as redox indicators in cerimetry and in a continuation of this work, we have observed that six azine dyes, Phenosafranine (PS), Methylene Violet (MV), Amethyst Violet (AV), Safranin T (ST), Wool Fast Blue BL (WFBBL), (Colour Index Nos. 50200, 50210, 50225, 50240, and 50315 respectively) and Aposafarine (AS), can be used as redox indicators in titrations involving ammonium hexanitratocerate(IV) in nitric acid medium. The reductant systems studied are: iron(II), arsenic(III), vanadium(IV), hydroquinone and ascorbic acid.

Procedure.—Treat an aliquot of the reductant solution (0.1 N or 0.01 N) with enough water and 1:1 nitric acid such that the required overall acidity (mentioned below) is obtained when diluted to 50 ml. Add 0.1 ml of 0.1% PS, MV, AV, ST or AS or 0.2 ml of 0.1% WFBBL, and titrate the mixture with ammonium hexanitratocerate (IV) solution (0.1 N or 0.01 N).

Of the six indicators, MV, AV and AS are the best. Using these indicators, the titrations can be carried out in 0.5–1.0 N nitric acid medium and the colour changes at the end points are: pinkish violet to pink with iron(II), pinkish violet to yellow with arsenic(III) (1 ml of 0.002 N iodine is used as catalyst) and light pink to bright yellow with hydroquinone. Vanadium(IV) can satisfactorily be titrated only in a medium of 0.2–0.4 N nitric acid + 6–7 M acetic acid and ST as indicator (end point is orange to bright yellow). Other indicators are unsuitable. The titration of ascorbic acid is satisfactory only in a medium of 1.5–2.5 N nitric acid + 0.8–1.0 ml of phosphoric acid and the end point is bluish violet to yellow. (ST is not suitable in these titrations).

The results obtained are in very good agreement with those obtained using standard indicators.

Titrations involving 0.1 N solutions do not require any indicator correction, but in titrations of 0.01 N solutions an indicator correction of 0.02–0.04 ml (0.08–0.10 ml in the case of WFBBL) has to be applied.

The transition potentials (mV vs. N.H.E.), for the iron(II)-cerate(IV) titration are: PS: 850 ± 10 , MV: 900 ± 40 , AV: 825 ± 20 , ST: 785 ± 20 , AS: 975 ± 10 . While using MV, the potentials are not stable after two or three reversals of the

colour at the end point. WFBBL does not function satisfactorily in this titration.

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SOIL MOISTURE MOVEMENT AND GROUND-WATER RECHARGE BY TRITIUM TAGGING TECHNIQUE—DISCUSSION

THE computed recharge values in the paper by Bahadur *et al.*¹ cannot be considered as indicative of the net groundwater recharge for the area studied.

the average of a couple of years is taken. The rates of tracer movement computed from the data given in Figs. 2, 3 and 4 (Ref. 1) are as follows (Table I):

It is seen that rate of upward movement varies widely depending on the season and the location. Therefore, the use of an average value of 1.2 mm/day is not justified. This apart, we do not believe that incomplete profiles (Ref. 1) such as given in Fig. 4 can be used to calculate the position of the centre of gravity (c.g.) and hence, tracer displacement to even a limited accuracy.

Further, let us use the value of 1.2 mm/day for the rate of upward movement during dry season and calculate the position of the c.g. of the tracer profile to a date one year after the date of initial injection. It is noticed that in most cases computed position of c.g. is either above or just below the injection depth. This would then indicate practically no net recharge. We, however, do not wish to convey the impression that in the area studied, net groundwater recharge is negligible. The argument made above is only to illustrate inappropriateness of the analytical procedures adopted by the authors of the paper. We submit that the data given in the paper (Ref. 1) are too inadequate to compute the net annual vertical recharge of

TABLE I

Fig. No.	Plot No.	Downward Movement			Upward Movement		
		From	To	mm/day	From	To	mm/day
2	2	6-6-1973	11-10-1973	9.21	11-10-1973	24-11-1973	7.19
2	3	6-6-1973	20-10-1973	7.21	20-10-1973	24-11-1973	8.17
3	Todapur under natural vegetation			Nil	20-5-1974	13-12-1974	0.55
4	MB-8C (Plot-R ₁)	19-7-1975	29-8-1975	8.5			
		29-8-1975	19-11-1975	2.6			Nil
4	MB-8C (Plot-R ₂)	18-7-1975	29-8-1975	11.63	29-8-1975	19-11-1975	1.0

The authors have considered the downward movement of tracer during the monsoon period alone for estimating groundwater recharge. It is seen from Fig. 2 (Ref. 1) that there is a significant upward movement of the tracer even at the beginning of the dry season (in October–November 1973). The upward movement of tracer is undoubtedly in response to evapotranspiration. The net recharge on an annual basis can, therefore, be obtained from the net displacement of tracer over a period of about a year, or better still if

groundwater in the area under investigation. The recharge, certainly, is much less than the estimates given in the paper.

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