

A 1,2-DIAZETIDINE INTERMEDIATE  
FROM PHOTOCYCLIZATION OF A SCHIFF BASE

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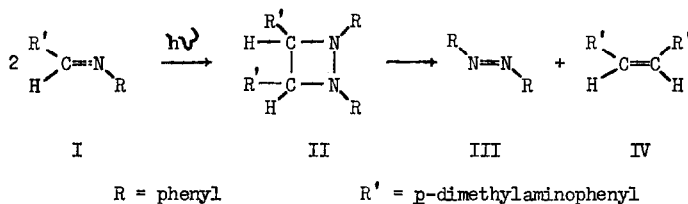
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There have been two recent reports of the photocyclization of Schiff bases to phenanthridines,<sup>1,2</sup> as well as 5,6-benzoquinolines.<sup>3</sup> We also had independently observed phenanthridine formation on irradiation of several other Schiff bases, and have now isolated products from the irradiation of N-p-dimethylaminobenzylideneaniline (I) which indicate the intermediacy of the substituted 1,2-diazetidene (II).

Irradiation of a dilute, ethereal solution of (I) for sixty hours with a Hanovia "S" quartz mercury lamp gave trans-azobenzene (III) and cis-4,4'-bis(dimethylamino)stilbene (IV), isolated in 35 and 25% yields, respectively. Also obtained was a 15% yield of a material, m.p. ca. 180° (subl.), tentatively identified as 9-dimethylaminophenanthridine on the basis of its elemental analysis, infrared and n.m.r. spectra; and 10% of (I) was recovered. The irradiation was carried out without exclusion of air.

Azobenzene was identified by its melting point (m.p. 66-7°, m.m.p. 66-7°, reported 66°<sup>4</sup>) and the identity of its infrared spectrum with that of an authentic sample. The 4,4'-bis(dimethylamino)stilbene was identified by its melting point of 257-8° (reported 253-4°<sup>5</sup>) and by its infrared and n.m.r. spectra. This was confirmed by its identity with a sample of (IV) prepared by another, previously reported method.<sup>5</sup>

While details concerning the mechanism of this process are still lacking, it seems reasonable to postulate cycloaddition of a photochemically excited molecule of (I) to another molecule of (I), in either an excited or ground state, in a head to head fashion to give (II) in an excited state. Such a molecule of (II) could then collapse to the observed products by a simple electron redistribution process.<sup>6</sup> Further work on this and other photochemical reactions of Schiff bases is in progress.



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#### REFERENCES

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