Irradiation of \( \gamma \)-N,N-dialkylaminovinyl phenyl ketones (1) in benzene with high pressure mercury lamp through a Pyrex filter under nitrogen gave the corresponding pyrroles (2) in 11-46% yield. Irradiation of the \( \gamma \)-benzoylvinyl)trialkylammonium chlorides (3) in ethanol under the same conditions afforded the 1,4-diketones (4). Irradiation of \( \gamma \)-ethoxyvinyl phenyl ketone (5) gave an intractable mixture, while the corresponding thioketone (6) was photochemically inactive. Photolysis of the 2-dialkylaminobenzophenones (7) gave the corresponding indoles (8), accompanied by dealkylation products. The formation of the pyrrole (2) was presumed to occur from the \( n \rightarrow \pi^* \) triplet state. The formation of pyrrole (2), 1,4-diketone (4), and indole (8) is considered to arise via \( \beta \)-hydrogen abstraction by an excited carbonyl through a seven-membered ring transition state initially. Irradiation of 3-phenylpropyn-3-one (9) in various alcohols yielded the corresponding furans (10) in 12-27% yield. The formation of the furan is considered to arise intermolecular \( \alpha \)-hydrogen abstraction of alcohol by an excited carbonyl of 2. These photochemical reactions might be useful for the synthesis of pyrrole, indole, and furan derivatives.