3. Under conditions where homogeneous photochemical reactions are not expected to be significant (e.g., during the night or early morning, or during the winter at far northern locations), conversion rates have been observed to be small--generally, well below 1% $h^{-1}$.

4. Temperature or relative humidity may or may not have an effect on the conversion rate (compare Lusis et al., Forrest et al., Chan et al., Garber et al., with Eatough et al., Dittenhoefer and De Pena in Table 5). However, the degree of plume dilution due to atmospheric mixing is certainly important (Wilson and Gillani, 1980).

It must be emphasized that the above summary represents a considerable simplification of what happens during atmospheric $SO_2$ oxidation in chimney plumes, and a more rigorous treatment would require separate consideration of each point source, including the composition of the emissions as well as that of the background air into which the plume is mixing.

Consider now the corresponding data obtained from studies of urban plumes. Although urban plume data are more relevant to long-range transport modelling than chimney plume data, which generally have represented conditions within the first hour or two of emission, they are also more difficult to interpret. To extract the oxidation rate from the data, assumptions have to be made about other atmospheric processes such as air parcel dilution and dry deposition (see, for example, Alkezweeny and Powell, 1977). This should be kept in mind when evaluating the urban plume results.

Alkezweeny (1980) has summarized the available data on $SO_2$ oxidation in urban plumes, and the results in Table 6 are largely taken from his paper. An inspection of this table suggests that:

1. "Dry" oxidation rates in urban plumes are somewhat higher than those in chimney plumes (at least, before the latter have been mixed into the background air), possibly by a factor of two or more.