studies of the fluxes of atmospheric heat and momentum show that the aerodynamic resistance to transfer (i.e., the resistance to transfer between some convenient level in the air and a level immediately above the quasi-laminar layer) ranges from between 0.1 s/cm in strongly unstable, daytime conditions, to more than 10 s/cm in many nocturnal cases (as shown for a pine canopy by Hicks and Wesely, 1980, for example). There are several resistance paths that permit gaseous pollutants to be transferred into the interior of leaves. An obvious pathway is directly through the epidermis of leaves, involving a <u>cuticular resistance</u>. An alternative route, known to be of significantly greater importance in many cases, is via the pores of leaves, involving a <u>stomatal resistance</u> that controls transfers to within stomatal cavities, and a subsequent <u>mesophyllic resistance</u> that parameterizes transfer from substomatal cavities to leaf tissue. Comparison between resistances to transfer for water vapor, ozone, sulfur dioxide, and gases that are similarly soluble and/or chemically reactive, shows that, in general, such quantities are transferred via the stomatal route, whenever stomates are open (Chamberlain, 1980). Otherwise, cuticular resistance appears to play a significant role. Cuticular uptake of ozone and of quantities like NO and NO_2 appears to be quite significant (Wesely <u>et al</u>., 1981), whereas for SO_2 this does not appear to be the case. When leaves are wet, such as after heavy dewfall, uptake of sulfur dioxide is exceedingly efficient until the pH of the surface water becomes sufficiently acidic to impose a chemical limit on the rate of absorption of gaseous SO_2 (Fowler, 1978). However the insolubility of ozone causes dewfall to inhibit ozone dry deposition (Wesely <u>et al</u>., 1978).

The same conceptual model can be applied to the case of particle transfer with considerable utility. While the roles of factors such as stomatal opening become less clear when particles are being considered, the concept of a residual surface resistance to particle uptake appears to be rather useful. Studies of the transfer of sulfate particles to a pine forest have shown that this residual surface resistance is of the order of 1 to 2 s/cm, with a standard error margin of approximately 25% (Hicks and Wesely, 1980). A similar value has been identified for the transfer of small particles (about 0.1 μm) to pasture (Wesely <u>et al</u>., 1977). Sheih <u>et al</u>. (1978) have assumed a constant value for this surface resistance in estimating