important role in the deposition process (e.g., Sehmel, 1980). In view of the above considerations, seasonal variations in meteorology and surface characteristics will obviously change the aerodynamic resistance to transport of both particles and gases.

The stagnant film resistance, r_b, should not be interpreted as a physical feature of all circumstances. While it may be relatively well-defined over smooth surfaces, these are rare in the "real world." Over plant canopies and even water surfaces, it is probably not a continuous phenomenon, but rather serves as a simplified, average representation of a situation where turbulent eddies approach and interact with surface elements, during which interactions molecular and Brownian diffusion plays a significant role in the mass transport. With this interpretation of the "stagnant film" in mind, it may be noted that r_b also depends to a certain extent on the same factors as r_a, since drag forces and the intensity of atmospheric turbulence will determine the "effective" thickness of the stagnant film. However, because of the importance within the film of molecular diffusion for gases, and Brownian diffusion and impaction for aerosols, r_b is also strongly dependent on the characteristics of the material under consideration--in particular, the diffusivity of gases and the particle size distribution of aerosols (see, for example, Wesely and Hicks, 1977; Sehmel, 1980). As with r_a, it can be seen that seasonal variations in meteorological and surface factors can lead to corresponding variations in r_b. In addition, if for particles there are appreciable seasonal changes in the size distribution, potentially large changes in r_b could result (e.g., Sehmel, 1980; Ibrahim et al., 1980).

As implied by its definition, for a given substance r_c depends only on the characteristics of the surface. For particles, probably for lack of reliable information to the contrary, it has sometimes been assumed that r_c is equal to zero (e.g., Ibrahim et al., 1980; Sievering, 1979a). For gases, r_c depends on the properties of the gas [mainly the solubility in water (Hill, 1971) and molecular diffusivity (Wesely and Hicks, 1977)] and the absorbing surface. For surfaces covered by vegetation, r_c depends on the nature, and state of growth and condition, of the plant in question, the latter being influenced by the water availability, solar radiation level, and air