support the theoretical expectation that particles smaller than about 0.1 μm in diameter will be deposited at a rate that is largely determined by the Brownian motion of the particles concerned. In this instance, the limiting factor is the transfer by Brownian motion across the quasi-laminar layer referred to earlier. On the other hand, particles larger than around about 5 μm in diameter are effectively transferred via gravitational settling, at rates determined by the familiar Stokes-Cunningham formulation. Particles in the intermediate size ranges are transferred very slowly. In terms of the deposition velocity, v_d, defined as the ratio of the flux to the concentration at some convenient height, the minimum value of the "well" of the deposition velocity versus particle size curve is approximately 0.0001 cm/s.

However, natural surfaces are rarely aerodynamically smooth. Wind tunnel studies have shown that the well in the deposition velocity curve is filled in as the surface becomes rougher (see Sehmel, 1980). Although studies have been conducted, in wind tunnels, of deposition fluxes to surfaces such as gravel, grass, and pieces of foliage from trees and shrubs, the situation involving natural vegetation such as corn, or even pasture, remains uncertain. It is well known that many plant species have foliage with exceedingly complicated microscale surface roughness features. In particular, leaf hairs have been shown to increase the rate of particle deposition in wind tunnel studies (Chamberlain, 1967), and it has been postulated that their influence in natural circumstances might be considerable. Other factors, such as electrical charges associated with foliage and stickiness of the surface, have also been investigated. In every case, there is evidence that at least in some circumstances, a natural canopy might be considerably different from the simplified surface that is suitable for investigation in laboratory and wind tunnel investigations.

It is frequently emphasized that caution should be taken in extending laboratory studies using artificially produced aerosol particles to the situation of the deposition of acidic quantities. Special concern is associated with the hygroscopic nature of many acidic species. At humidities that are frequently attained near vegetated surfaces, these hygroscopic particles will become liquid. Their growth as they enter into a region of high humidity, and their liquid nature when they impact upon the surface, are