The basement on which it rests — the earth's uneven surface — varies widely in temperature, and this variation passes to extremes in the higher mountains, whatever the zone. The atmosphere's own temperature, even in the tropics, is at the freezing-point at a height of less than four miles. Through these and other conditions the atmosphere has its varying belts of greater and less depth, — that is, of higher and lower barometric pressure, — its areas of high and low pressure moving in great circuits, and, as a consequence, winds, storms, cyclones, tornadoes, in its fruitless effort toward a state of equilibrium. These winds are its chief means of mechanical work.

The Mechanical Work of the Atmosphere. — The atmosphere works mechanically (1) by denudation, or, as it has been termed, *deflation*, with or without abrasion; (2) by transportation; (3) by deposition; and (4) through its pressure. The work and the results are called Eolian, from Αἴολος, *the god of the winds.*

The force of the wind, measured by the pressure on a square foot, increases with the square of the velocity. At 5 miles an hour, the pressure is about 2 ounces to the square foot; at 10 miles, which is that of a light breeze, 8 ounces; at 20 miles, a good steady breeze, 2 pounds; at 40 miles, a strong gale, 8 pounds; at 60 miles, 18 pounds; at 100 miles, 50 pounds. The work done is dependent largely on the form of the surface struck. This is well shown in the anemometer made of hemispherical cups: the difference between the pressure on the concave and convex sides being such that the cups move one third as fast as the wind, whereas with flat disks there would be no motion. A velocity of 186 miles an hour (or 170 pounds to the square foot) has been registered by the anemometer.

While the lighter winds, and especially the great currents, like the trades, have a degree of regularity in movement, the storm winds, on which geological work mainly depends, are hurrying bodies of air of inconstant force, breadth, and direction. A single storm includes all the courses of the compass, and all degrees of force, from lulls to extremest violence; and when most constant, these winds are still made up of fitful blasts. Under such conditions, abrasion, transportation, and deposition should be greatly mixed; and this is a striking feature of the results.

Eolian Denudation or Deflation.

Denudation, or wear by wind-force, is carried on (1) by simple wind-impact and (2) by impact when the air is loaded with sand or other material.

1. *By simple impact.* — The lighter work of the winds is the taking up of dust from roads, sand-fields, sand-hills, and sea-beaches, to drift away to some other place. The streets of most cities and the roads of the country often afford examples of the work on dry, windy days. It is to be noted, however, that a rather strong wind is required for this light deflation unless moving wheels first stir up the dust. The result is due to the direct impulse