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A Science Service Feature

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MEASURING DUST IN THE AIR

Many different methods are in use for determining the total amount of solid matter present in a given volume of air, counting the number of particles, or gathering samples of the atmospheric impurities for microscopic examination or chemical analysis.

Thus a known volume of air may be drawn through a filter of cotton wool or bubbled through distilled water, and the dust detained by the cotton or deposited in the water may be weighed. In certain types of apparatus the air is drawn or forced against a plate or tube coated with glycerin, oil, varnish, gelatin or other adhesive substance, to which the dust remains attached. Several devices depend for their operation upon the fact that when a mass of confined air is cooled by expansion a point is eventually reached at which the water vapor present condenses to form a fog, each droplet of which is supposed to have a single particle of dust as its "nucleus". This is the principle embodied in the well-known Aitken dust-counter, which has been extensively used in different parts of the world and has furnished most of the statistics of air dustiness found in textbooks and reference books.

In the Owens dust-counter, now regarded as the standard instrument for outdoor use, the air is drawn into a chamber, where moisture is added to it; it is then cooled by expansion until the dust particles are coated with water. The moisture-coated particles are then driven violently against a microscope cover-glass, to which they stick. The cover-glass is subsequently removed and placed under a high-power microscope, by which the particles are counted. The number of particles per cubic centimeter of air is estimated on the basis of this count.

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