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? WHY THE WEATHER ?

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MEASURING CLOUD HEIGHTS

There are several ways of determining the heights of clouds. The most exact methods involve simultaneous measurements of the angular elevation of some part of a cloud as viewed from the ends of a measured base-line; the angles being measured with theodolites or, in some cases, determined by a comparison of photographs taken simultaneously at the two stations. From the data thus obtained the actual height of the cloud is worked out trigonometrically. Less precise measurements can be made from a single station with the aid of a range-finder, such as is used by artillerists. A method that has been used for many years at one observatory consists in viewing the image of a cloud reflected in a pool of water some yards below the observer, and at the same time setting a small pivoted sheet of glass in such a position that the image of the cloud reflected by it and the image in the pool seen through it coincide. The angular position of the glass plate is then read from a graduated circle attached to it, and the rest is a simple problem in trigonometry.

In mountainous country the mountains, if their heights are known, serve as measuring-sticks for determining the heights of clouds enveloping their summits or extending down their flanks. The height of a cloud directly overhead can be measured by releasing a pilot-balloon, which ascends at a known and constant speed, and noting the time elapsed before it enters the cloud. The height of a cumulus cloud, which is formed by the cooling and condensation of moisture in an ascending air current, can be computed roughly from the humidity and temperature of the air near the ground. The "ceiling light", used by the airway weather services to show the height of low clouds, is a search-light, which throws a beam at an angle of 45 degrees to the horizontal. The observer paces off the distance from the lamp to a point directly under the spot of light on the cloud, and this is (by geometry) equal to the height of the cloud.

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