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? WHY THE WEATHER ?

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TEMPERATURE AND PRESSURE EXPERIMENT

An interesting experiment may be performed with a tin cup over which is stretched a piece of thin rubber held tight with a rubber band. If the rubber is wet on the cup side it can be readily made air tight. Now place a few large drops of water on top of the dry rubber surface stretched over the opening of the cup, and with the top horizontal wrap a hot wet cloth around the sides of the cup. Soon the water will roll off as the rubber bulges upward with the expansion of the air inside. Try the same experiment with a cold wet cloth instead of a hot one, and watch the drops of water roll into the depressed rubber surface as the air inside contracts. You have observed the first stages of convectional circulation. Over a warm area the air expands and some overflows above, reducing the pressure at the surface of the warm place but raising it over the cooler neighborhood. Over a cold area the air contracts and allows air to flow in above, thereby increasing the weight of the air column over the cold spot and reducing it in the warmer vicinity. The differences in pressure so produced in the lower levels of the air cause a flow of air in a direction opposite to that above: in toward the warm, like the sea breeze, and out from the cold, like the land breeze. If the flow occupies a considerable time, such as the monsoons, into or out from a warm or cold continent, the turning of the earth under the moving air makes an appreciable "deflection" of the wind, which is to the right in the northern hemisphere. And if the circulation is world wide, as on both sides of the heated equator or about the cooled poles, secondary belts of pressure develop, high on either side of the equator, and low about the poles, which together are further intensified by the dynamic action of the great wind systems involved.

(Tomorrow: Complexities of Western Winters)
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