

No. 532

A Science Service Feature

Jan. 23

? WHY THE WEATHER ?

By Dr. Charles F. Brooks
of Clark University

WATER VAPOR- INTO, IN, AND OUT OF THE AIR

Water vapor gets into the air by the discharge of individual molecules from a wet surface. The warmer the surface and the lower the atmospheric pressure the more rapidly will molecules be discharged. Some conditions of the wet surface are also factors in evaporation; curved surfaces, as those of raindrops, evaporate more rapidly than do flat ones; liquid water surfaces discharge molecules appreciably faster than do ice surfaces at the same temperature, and saline surfaces such as those of the sea release water less rapidly than fresh-water ones. Wind is a factor in evaporation only in so far as it keeps bringing fresh bodies of air into contact with the surface, or increases the area and curvatures of the wet surface by raising waves or making spray. The return of molecules from the air is proportioned to the amount of water vapor in the air, and when the dewpoint of the air is the same as the temperature of the wet surface there is no evaporation.

Moisture in the air is largely confined to the warmer lower layers of the atmosphere, practically half of all present being found below a height of 7000 feet. Likewise, most of the atmospheric moisture is to be found in the warmer low latitudes; percentages of water vapor in the total volume of the air range from an average of 2.6 at the equator to 0.9 at latitude 50, and 0.2 at latitude 70. The total amount over a place in mid-latitudes even in summer is so small that if it were all precipitated it would amount to only about one inch of rain.

Vapor is precipitated from the air mainly by some form of cooling which reduces the limit for the amount that can continue in the vapor state. And then we have rain, snow, sleet, or hail. Some moisture is also condensed out on cold objects, forming dew and frost.

(Tomorrow: Indoor Deserts and Humidifying)
All rights reserved by Science Service
SCIENCE SERVICE,
B and 21 st Sts.,
Washington, D.C.