Water Retention by Clays

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The purpose of this investigation was to determine the characteristics of the dehydration pF curves of finely divided clays as a means of assessing the possible mechanisms by which water may be retained in soils. The effects of surface tension forces on the retention of water in coarse textured materials is well known. The effects of adsorptive forces and of surface tension forces in colloidal materials are not so well known.

PROCEDURE

The procedure included the separation of the finer fractions of Wyoming bentonite (montmorillonite) and Putnam clay (beidellite) by centrifuging and of kaolinite by sedimentation. The suspended materials were then let stand until to form slightly viscous gels from which the excess water was decanted. The concentrated clay suspensions were dehydrated at a series of moisture tensions ranging from pF0 to pF7. The range from pF6 to pF2 was obtained by pouring the clay suspensions onto alundum plates cemented in which were attached to leveling bulbs filled with water. The desired tension was attained by setting the level of the water in the bulb at the appropriate distance below the level of the clay on the alundum plate. The moisture tension range from pF3 to pF4.2 was attained by adding the clay suspension to an ultrafilter using a viscose membrane. Pressures of from one to 20 atmospheres were developed using a tire pump. The moisture tension range from pF5 to pF6.5 was attained.

1 Contribution from the Department of Soils, Missouri Agricultural Experiment Station, Columbia, Mo. Journal series.
2 Instructor in Soils.