Recent studies on soil profiles in our laboratories have seemed somewhat inadequate, because of the need for information regarding the finer materials of the soil, especially the colloidal fraction. With the introduction of the super-centrifuge as a natural and rapid means for obtaining appreciable quantities of colloidal material an investigation of certain phases of colloidal activity as applied to soil profiles was undertaken. Results of preliminary studies of the heats of wetting, pH values and the amount of lime necessary to bring about neutralization on three typical soil profiles in Michigan are reported here.

The soils used were complete profiles except the layer of forest mold. One sample of Ontonagon silt loam was obtained from the Upper Peninsula, one sample of Brookston clay loam from Huron County and one sample of Napanee silt loam from Berrien County in the Lower Peninsula. The first soil is a Podsol type, developed from a red calcareous clay. The two Lower Peninsula soils are Brown soils. The Brookston being somewhat more poorly drained than the Napanee. The soils were kept moist until used.

Methods of Procedure

The soil from which the colloids and clay was removed was air dried and screened. 500 grams of this air-dry soil were extracted with successive portions of 500 cc. of neutral distilled water; allowing sedimentation to take place for one hour, after which period the supernatant liquid containing clay and colloidal particles was poured off. The first two additions of water were discarded in each case because of the presence of soluble salts in quantities large enough to cause a settling of all of the material, making it impossible to obtain suspensions. At the third addition of water a thick suspension resulted, and this was saved by placing in an 8-litre bottle. Each horizon thus was extracted by equal amounts of water, but the quantities of fine material yielded by each was quite variable. By means of a Sharples supercentrifuge, the suspensions were separated into two portions. The clay portion was thrown out at the lower end of the bowl when the liquid was run through at the rate of 1-litre per minute. The upper portion of the bowl was coated with material of colloidal nature. The liquid which came through the centrifuge was again run through at a much slower rate, about 1-litre in 10 minutes. This removed nearly all of the suspended material which was also colloidal in nature. For this work the upper portions of the first