sand. The acidity of certain soils has been attributed by modern workers to absorption phenomena rather than to the presence of free organic acids and there is a tendency in recent soil work to associate all soil absorptions with the general phenomena of adsorption. The part played by different soil-constituents in the various kinds of absorption observed is still unknown but it is stated by the author of this paper that "probably we are working towards a more precise definition of available plant foods based on our knowledge of how the soil absorbs them in the first instance."

Lipman, C. B., Burgess, P. S. and **Klein, M. A.** "Comparison of the nitrifying powers of some humid and some arid soils." *Journ. of Agric. Research*, Vol. VII. No. 2, 1917, p. 47.

It has been stated on the authority of Hilgard (1906) that nitrification is especially active in arid soils. As the result of an extended experimental study of arid soils in California the authors of the present paper reach a different conclusion, holding that there is no evidence that the nitrifying powers of soils are more intense in arid regions than they are in humid regions.

Sharp, L. T. and **Hoagland, D. R.** "Acidity and adsorption in soils as measured by the hydrogen electrode." *Journ. Agric. Research*, Vol. VII. No. 2, 1917, p. 123.

The authors of this paper hold that "soil acidity should not be set apart and considered as a phenomenon unrelated to the ordinary concepts of acidity." They have investigated the acidity, i.e. the H-ion concentrations, in various soil suspensions and soil extracts, using the hydrogen electrode method and an apparatus modified from that of Hildebrand (1913). Experimental data were also secured with respect to the lime requirements of soils and the so-called "adsorption of bases." They conclude that soil acidity is due to the presence of an excess of hydrogen ions in the soil solution and that direct evidence of this can be given by hydrogen-electrode measurements. Several phases of "adsorption" phenomena were studied and some general theoretical considerations bearing on the relation of adsorption to chemical reactions in soils are presented in the paper. An electrometric method for the determination of the lime requirements in soils is suggested and a convenient method described for utilizing the hydrogen electrode in soil studies.

Wyatt, F. A. "Influence of calcium and magnesium compounds on plant growth." *Journ. of Agric. Research*, Vol. VI. 1916, p. 589.

There is conflicting evidence as to the effect of compounds of these metals on plant growth under crop conditions and as to the necessity for a definite CaO/MgO ratio for optimum growth (Loew, 1892). Among other results the authors found experimentally that the crop yields and the ratio of calcium to magnesium in the plants have no direct relation to the ratio in the natural carbonates applied. They found also that different ratios of calcium to magnesium within rather wide limits produced no marked differences in yields and that all the plants grown (wheat, soy beans, alfalfa and cow peas) showed tolerance of calcium and magnesium salts.

Headley, F. B., Curtis, E. W. and **Scofield, C. S.** "Effect on plant growth of sodium salts in the soil." *Journ. Agric. Research*, Vol. VI. 1916, p. 857.

During the reclamation of a tract of salt land in Nevada, laboratory experiments were made to determine the degrees of tolerance of certain plants to the common salts of sodium.

The values obtained showed that the limit of tolerance is not a fixed point but is extremely variable, and that the same plant may show marked differences in tolerance at different periods of growth. The facts make the problem of reclamation of such land a very complex one. M. C. R.

THE WATER RELATION.

Briggs, L. J. and **Shantz, H. L.** "Daily transpiration during the normal growth period and its correlation with the weather." *Journ. Agric. Research*, Vol. VII. No. 2, 1917, p. 155.

This paper deals with the daily transpiration of certain crop plants. Measurements were made with a view to determining: (1) the march of transpiration during the growth period, and (2) the extent to which the daily transpiration is correlated with various weather factors. The results of the research are presented in a series of graphs, but are too complex to summarise with any adequacy in a short notice.

Alway, F. A. and **Clarke, V. L.** "Use of two indirect methods for the determination of the hygroscopic coefficients of soils." *Journ. Agric. Research*, Vol. VII. No. 2, 1917, p. 345.

The Briggs and Shantz (1912) method for estimating the hygroscopic coefficient of soils is criticised in this paper and held to give such unreliable values in the case of certain soils that it is unsuitable for use either for studies of available soil moisture or for soil-surveys. A method is described for calculating the hygroscopic coefficient from the hygroscopic moisture found in a soil which has been allowed to come into equilibrium in a partially saturated atmosphere.

Alway, F. A. and **Joubetts, C. Russell.** "Use of the moisture equivalent for the indirect determination of the hygroscopic coefficient." *Journ. Agric. Research*, Vol. VI. 1916, p. 833.

A critical review of the use of the Briggs and Shantz formulae for calculating the amount of available water in soil indirectly from (*a*) the wilting coefficient; (*b*) the maximum water-capacity as defined by Hilgard; (*c*) mechanical soil analyses. On the basis of their own experimental work the authors judge that no general formula is universally applicable to estimations based on mechanical analyses, and also that in general the effect of considerable amounts of organic matter is to raise the value of the ratio of moisture equivalent to hygroscopic coefficient. They advise also that before employing the indirect method of calculating the hygroscopic coefficient from the moisture equivalent the ratio should be experimentally determined for each of the *types* of soil under consideration. (See Briggs and Shantz, U.S. Dept. of Agric., Bur. Plant Industry, Bull. 230, 1912.) M. C. R.