V. PRELIMINARY OBSERVATIONS ON THE MOVEMENT OF SOLUTIONS IN THE SOIL

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The object of this paper is to review preliminary observations made in view of gaining a definite knowledge of the movement of substances in solution in the soil water. Information on this subject is important in connection with studies in soil fertility and plant growth. Roots of crop plants penetrate the soil to a depth of four to six feet and they absorb a great deal from the lower levels during their middle age and maturity.

Observations were begun by placing large quantities of acid, alkali, and salt on the surface soil, and a large number of soil samples were taken at each six inch level to a depth of four feet, and at different distances to the side of the area where the applications were made. Tests were made by moistening the soil with an equal volume of distilled water and by testing the filtrates. There was little movement except where the rain caused a movement of the water film downward or laterally or when evaporation caused a movement of the film upward. The acids and alkali were soon neutralized or became so diffuse that indicators failed to show their presence. Salt was present in much smaller quantities near the surface after rain or after an artificial application of water. But it became more abundant and even formed crusts in dry weather.

It was found that materials in solution in the soil water move with the water film. It was not possible to determine whether or not there was any movement by diffusion also.

Results on the movement of mineral elements in the soil are anticipated in the near future. This experiment was performed as a preliminary step to the investigations of mineral elements. This work proceeds slowly because of the tedious chemical analysis necessary in determining mineral elements.