In an attempt to elucidate the mechanism of K fixation in soils, prompted by the differential behavior of the K ion in the zonal soils, a series of investigations have been conducted (5,6). In discussing the fixation of K in relation to the phosphate compounds of Fe, Al, Ca, and Mg it was pointed out (6, p. 239-240) "that the phosphate ion is not the only causative agent of potassium fixation.... We have found that montmorillonite and like materials are capable of fixing large quantities of K even though the P content of these materials is very low."

Continuing the studies on the fixation of K (in non-exchangeable form) Kolodny (8) reported that the phenomenon of K fixation in bentonite is accompanied by a decrease in exchange capacity which is equivalent to the K fixed. This equivalence was also noted and reported by Truog and Jones (14) who worked with bentonite and soils. In both cases (14) the K fixed was equivalent to the decrease in exchange capacity.

**Experimental**

Following up the work on K fixation by bentonite, studies were undertaken to trace the phenomenon of K fixation in soils and montmorillonite in relation to heat effects. These materials were heated to the respective temperatures, subjected to alternate wetting and drying with either a solution of KCl or H₂O and then leached with neutral (pH 7.0) normal ammonium acetate to remove all traces of exchangeable K. The K fixed was determined by difference. The procedure and the results of the experiments are recorded in Tables 1 and 2.

The data bring out some interesting facts about the relation of temperature to K fixation. In the case of the montmorillonite, Table 1, the decrease in fixation becomes apparent only after raising the temperature above the 200°C mark. At temperatures above 500°C no K fixation takes place. In the case of the soil, Table 2, the fixation attains a maximum at 200°C and thereafter decreases with increase in temperature. However, this difference: in the montmorillonite a rise in temperature is accompanied by a decrease in fixation without the release of K, whereas in the soil a rise in temperature not only caused a decrease in fixation but also caused a release of K. Both soil and montmorillonite show a complete loss of fixation capacity at temperatures above 550°C.

In this connection it is interesting to note that Hofmann et al (3,4) and Nagelschmidt (13) show that beyond 550°C the c axis of montmorillonite can no longer increase when water is introduced. The interplanar distance between lattice layers becomes fixed. Simultaneously, with the loss of the property of swelling, the exchange capacity (8) drops from approximately 100 m.e. to 6 m.e. per hundred grams.

Heating to these high temperatures not only causes a destruction of the lattice structure of these minerals. Milligan and Weiser (12) show by X-ray studies that heating a number of silicates to around 400°C breaks down the lattice structure completely in some cases and at least in part in others. Kelley, Jenny, and Brown (7) point out the fact that minerals such as montmorillonite and the clay minerals in general have, according to modern concepts of crystal structure, water molecules existing as OH ions, and that these constitute an essential part of the lattice structures. High temperatures increase the thermal agitation to such a degree that the water molecules virtually jump out of the crystal lattice with consequent destruction of the crystal. Milligan shows that montmorillonite loses nearly and at least partially irreversibly at least partially irreversibly part of its water up to 200°C and then slowly up to 400°C; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer; this water is derived from the brucite-like layer.