circumstances, the data were replotted in a form dictated by an equation derived from Newton's Law of Cooling. In effect, the temperature function used is linear with time for that part of the warming process prior to the start of melting. With this region of the warming curve straightened, and with the added sensitivity of a difference plot included, the sensitivity of detection of the thermal changes occurring at the solidus point was greatly increased. The derivation of the following equation is found in the Appendix.

$$\ln (T_s - T) = Kt + C \qquad (1)$$

In the formula, T_s is the constant temperature of the surroundings and T is the temperature of the system. C and K are constants and t is time. A difference plot, $\Delta = \ln (T_s - T) - (Kt + C)$ versus t, is then made from the time-temperature data. According to equation (1), the point at which deviation from the base line begins with no melting locates the solidus point. Figure 3 shows examples of plots made in this way.

The composition of maximum solid solubility for each side of the phase diagram was obtained by varying the composition of the solutions until eutectic (or meritectic) first started to appear. The values of $.008 \pm .001$ mole fraction K in Na and $.046 \pm .003$ mole fraction Na in K agree well with the values obtained from extrapolation of the solidus lines. The solubility of Na in K is in excellent agreement with the value of 0.045 mole fraction Na determined by