elements comparable with those of RbNO$_3$ (orthorhombic, C-centered). They are $a = 16.07_8$ Å, $b = 9.94_1$ Å, $c = 7.67_8$ Å, $a : b : c : = 1.617 : 1 : 0.687$ ($Z = 18$). JAMIESON (1956) gives for this cell the constants $a = 16.12 \pm 0.04$ Å, $b = 10.12 \pm 0.04$ Å, $c = 7.75 \pm 0.01$ Å.

The standard deviation of the spacings for the small cell ($Z = 10$) is 0.00623, and that for the large cell ($Z = 18$), 0.01307, indicating a somewhat better fit of the indexing for the former. A check of the $\sin^2\theta$ values for $h00$, $0k0$, and $00l$ of JAMIESON's pattern against dense accumulations $\Delta \sin^2\theta$ on our bar graph (Hesse-Lipson procedure) showed a nearly complete lack of correspondence. Moreover, indexing of all lines of the pattern based on the large cell is not possible with $h + k = 2n$, a requirement for centering on C. In view of the above considerations it would seem preferable to adopt the smaller unit of structure.

From the indices listed in Table 1 it is possible to set up the following maximum restriction conditions:

$h00 : h = 2n$ $hk0 : h + k = 2n$
$0k0 : k = 2n$ $h0l : h + l = 2n$
$00l : l = 2n$ $0kl : k + l = 2n$

hkl : no restriction.

If these conditions are not fortuitous the space group is $P\frac{2_1}{n}\frac{2}{n}\frac{2_1}{n}$. With 10 molecules of KNO$_3$ per cell, however, space-group symmetry requires that triangular NO$_3^-$ groups be placed on edges or corners of repeat units, which is not allowable. If one were to consider restrictions based on the best fit of data then h odd and $h + k$ odd must be allowed and the space groups should be either $P\frac{2}{m}\frac{2}{n}\frac{2}{m}$ or $Pmn2_1$. Again the former is rejected because of the triangular NO$_3^-$-group, but in $Pmn2_1$ several compact arrangements of 10 KNO$_3$ can be devised.

Although no one of four such arrangements based on $Pmn2_1$ gave agreement in intensity good enough to warrant its description here, certain features of one show promise for future study. If one were to place K$^+$ ions at 0 0 0 (two ions); $\frac{1}{4}\frac{1}{4}\frac{1}{4}$ (four ions); and $\frac{1}{4}\frac{1}{4}\frac{3}{4}$ (four ions), then the calculated intensities of 002, 202, 400, 230 + 222, and 402 would be medium to strong and would compare roughly with the observed values. The 020 (observed weak) line would also be strong, but by placing several O atoms in equipoints in the glide-plane between the sets of 4 K$^+$ ions this line would be weakened. Further work will

be required before a complete description of the structure can be given.

The cell constants determined yield a Δv of transition of 0.060_4 cm^3/g at 3 kbar which may be compared with 0.04474 cm^3/g by BRIDGMAN (1916).

B. Transition rate

Our experimental arrangement is especially suitable for studying transition rates. This is accomplished by fixing the goniometer at the 2θ value corresponding to a high-pressure line, and applying the pressure to the sample as suddenly as possible with the chart running.
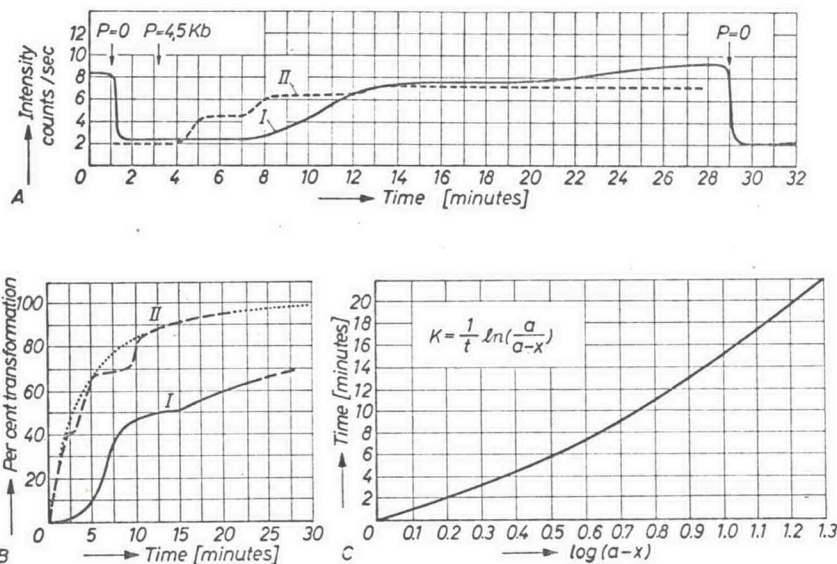

Fig. 4. *A*. Transformation rate of KNO$_3$ II $\rightleftharpoons$ KNO$_3$ IV as traced out by recording pen from growth of 230 peak. See text for explanation. Supported beryllium cylinder. Attenuation 2—1—4. Pellet 2.55 × 0.4 mm.; *B*. Data of Fig. 4*A* plotted as per cent transformation vs time; *C*. Test of first-order kinetics for II—IV transition (see text). Plot is from data of Fig. 4*B* using dotted line

The final pattern is read in minutes horizontally and counts per second vertically. In this manner, as the high-pressure peak grows, the recording pen traces out directly the rate curve. Two such charts traced and reduced, are shown in Fig. 4*A*.

The rates have been investigated only in the supported beryllium pressure vessel since it is desirable to approach hydrostatic conditions in the sample as nearly as possible. In this instance a 2.55 mm sample was used. The attenuation used (scale factor = 2, multiplier = 1, time