in the cylindrical cavity of a tubular graphite resistance furnace. The remaining space was filled with powder of the same muscovite so that the tablet height was 3 mm; on the end faces the furnace was sealed by graphite plugs. Before the experiment was begun, about 0.02 g of a saturated solution of $KHCO_3$ was introduced into the pressure chamber.

The experiments were performed by the quenching method; the procedure consisted of the following cycle: pressure rise - temperature rise - residence at this temperature - quenching - pressure reduction. The residence time at the maximum temperature was 5 min.

The temperature and pressure in the chamber were determined on the basis of independent calibrations (Markov et al., 1965; Ryabinin et al., 1963). The pressure was determined to within ±8%, the temperature to within ±5-7%. As shown by Markov et al. (1966), with this type of heater design, a considerable temperature gradient is created in the specimen, so that the latter displays a cold zone (at the ends) and a hot zone (near the heater). Calibrations enable the temperature to be determined in both zones.

Processing of the specimens after the experiment was as follows: microscopic investigation of faces and thin sections, measurement by the immersion method (Petrov, 1965) of the optical constants and densities of accessory minerals, and recording and processing of the powder patterns. The accessory minerals were identified from all these data.

RESULTS

Like trioctahedral micas, in the investigated temperature range (the parameters of the principal experiments are given in Table 3) muscovite undergoes a number of conversions. The character of the development of the accessory minerals in the specimens is illustrated by sketches (fig. 1) of thin sections from axial cross sections. The numbers of the sketches correspond to the numbers of the experiments in Table 3.

Below 1050°C the initial muscovite displays no changes during the experiment. In those

TABLE 3. Parameters of experiments on muscovite (pressure 66 kbar).

Expt. no.	Temperature		Time, mm	Medium
	Cold zone	Hot zone		
1	940	1120	5	$KHCO_3$
2	1290	1540	5	$KHCO_3$
3	1660	1980	5	$KHCO_3$

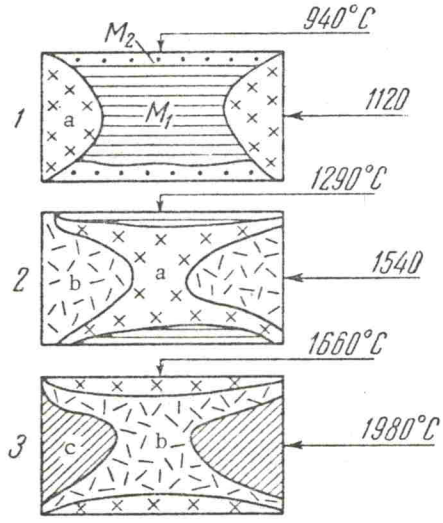

FIGURE 1. Scheme of location of neogenic phases in axial cross sections of specimens from experiments 1, 2, and 3 (table 3).

M_1 - crystal of initial muscovite
M_2 - powder of initial muscovite

a - accessory mineral of "a" type
b - accessory mineral of "b" type
c - accessory mineral of "c" type (explanation in text)

The figures near each sketch are the temperatures in the cold and hot zones of the specimens.

parts of the specimen where the temperature is above 1050°C, muscovite is replaced by a neogenic formation of the "a" type. Figure 1, 1 shows a sketch of a thin section, whose cold zone had a temperature of 940°C (relict muscovite was retained in this zone). In the hot zone of the specimen the temperature reached 1120°C, and an association of the "a" type was observed. The boundary between the relict muscovite and the "a" material corresponds approximately to an isothermal surface of 1050°C.

In thin sections under the microscope, "a"-type neogenic material is brown. In the sector of immediate contact with muscovite we see that this material is an association of several minerals. This sector displays pointed (up to 0.01 mm) inclusions and round (0.016 x 0.008 mm) and elongated platy (0.04 x 0.008 mm) grains. If the boundary of the "a"-type neogenic association runs perpendicular to the cleavage of the initial muscovite, we observe development of accessory minerals at the cleavage planes of the mica ahead of the main front of muscovite replacement. Table 4 shows the densities and refractive indices of the minerals of this association. Table 5 (col. a) gives the interplanar spacings calculated from the powder pattern of "a" material.