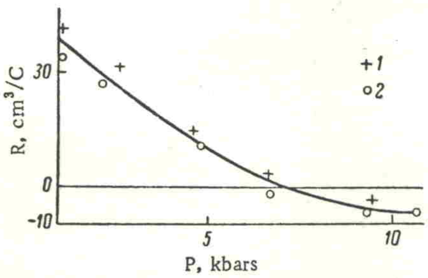

Fig. 3. Pressure dependence, at 77.3°K, of the Hall coefficient R of a bismuth single crystal subjected to programmed loading up to 500 g/mm². 1) Pressure increasing; 2) pressure decreasing.

reaching a maximum value at 7-8 kbars, and then it tended to decrease. When the load was removed the resistivity of this single crystal decreased by about 14% compared with the initial value. We measured the magnetoresistance and the Hall coefficient of this sample when pressure was increased and decreased. It was found that the pressure dependence of these properties for a program-hardened crystal differed from the dependence obtained for untreated bismuth single crystals at low temperatures and from those obtained in a hydrostatic medium at room temperature in the same range of pressures [6]. Figure 3 shows that the Hall coefficient of a program-hardened crystal even changes its sign at 7 kbars. The change of the sign of the Hall coefficient in bismuth single crystals has been observed earlier by one of the present authors, but this observation was made at a higher pressure (about 16 kbars), applied through the medium of silver chloride [6]. The unusual nature of the pressure dependence of the Hall coefficient was probably governed not by the properties of carriers in bismuth but by a redistribution of defects during programmed loading.

The reversible changes in the electrical resistivity during low-temperature uniform compression and the increase in the resistance to plastic deformation confirmed the possibility of improvement of the structural uniformity of crystals by programmed loading to very low degrees of deformation.

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