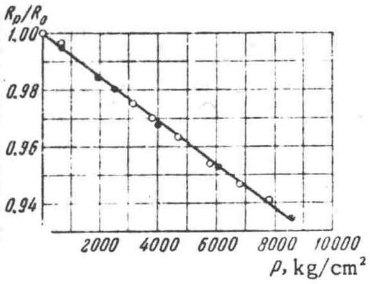

FIG. 1. Effect of pressure on the electric resistance of $MnAu_2$ at room temature: ○ – at rising pressure, ● – at decreasing pressure.

$MnAu_2$ at room temperature are shown in Fig. 1. It is seen from the figure that the measurements carried out both while increasing the pressure and while decreasing it give practically the same results: hydrostatic compression leads to a reduction in the electric resistance of $MnAu_2$. The value of the baric coefficient $R_T^{-1}dR/dP$ at room temperature is -7.6×10^{-6} kg/cm². The temperature of the antiferromagnetic transformation at atmospheric pressure according to our measurements is 364.6°K. At a pressure of 4600 kg/cm² we have $T_N = 368°K$, while at $P = 8850$ kg/cm² it amounts to $T_N = 370.7°K$. Figure 2 shows the R(T) curves measured at atmospheric pressure (curve 1) and at $P = 8850$ kg/cm² (curve 2). It follows from the data obtained that the hydrostatic compression causes a rise in the temperature of antiferromagnetic transformations; the magnitude of this effect amounts to

$$dT_N / dP = (0.68 \pm 0.05) \cdot 10^{-3} \text{ deg-cm}^2/\text{kg}.$$

2. Changes in the threshold field of $MnAu_2$ under the influence of pressure were determined by us by measuring the transverse galvanomagnetic effect $\Delta R_\perp/R$. Figure 3 shows the dependence of the specific magnetization (curve 1) and of the galvanomagnetic effect (curve 2) on the intensity of the external magnetic field, measured at atmospheric pressure and room temperature. As can be seen from the plots presented, the $\sigma(H)$ and $\Delta R/R = f(H)$ curves are outwardly similar; in either case they can be broken up into three regions: a) for fields less than 8000 Oe (antiferromagnetic region) the magnetization is small and proportional to the field; in this field region $\Delta R/R = 0$, that is, the magnetic field does not change noticeably the electric resistance of the specimen, and at any rate these changes are smaller than the sensitivity of our measuring setup; b) in fields from 8000 to 16,000 Oe the magnetization increases sharply, and the electric resistance of the specimen decreases rapidly, this decrease being observed starting with fields above the threshold value $H_{th} = 8000$ Oe; c) for fields exceeding 17,000 Oe, both the magnetization and $\Delta R/R$ begin to approach saturation.

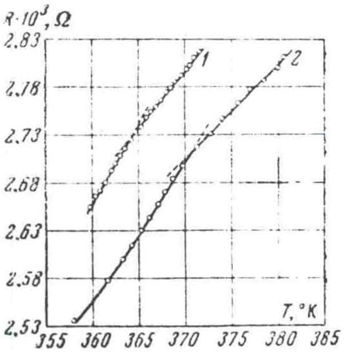

FIG. 2. Temperature dependence of electric resistance: 1 – at atmospheric pressure ($T_N = 364.6°$), 2 – at T = 8850 kg/cm² ($T_N = 370.7°$).

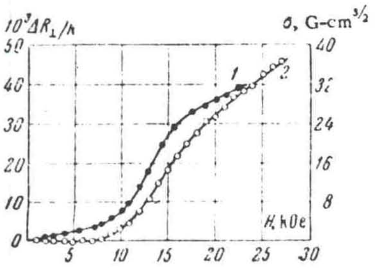

FIG. 3. Dependence of the specific magnetization of $MnAu_2$ on the magnetic field intensity (1) and dependence of $\Delta R/R$ on H (2). Room temperature.

From an examination of these curves we can conclude that the galvanomagnetic effect in $MnAu_2$ is determined principally by the magnetization, the variation of which in the transition region (8000–17,000 Oe) is connected with the destruction of the helicoidal antiferromagnetism and the establishment of ferromagnetic spin ordering, while in the region of strong magnetic fields the change $\Delta R/R$ is determined by the true magnetization. In this connection, the threshold field was determined by us from the $\Delta R/R = f(H)$ curves, as the field starting with which a variation of the electric resistance in the magnetic field is observed.

Figure 4 shows the results of the measurement of $\Delta R/R$ as a function of the magnetic field intensity, plotted at room temperature at six different values of the pressure: atmospheric, 2600, 5400, 7025, 8850, and 10,800 kg/cm². It is seen from these plots that the threshold field of $MnAu_2$ decreases rapidly with increasing pressure, but the character of the $\Delta R/R = f(H)$ curves remains unchanged.

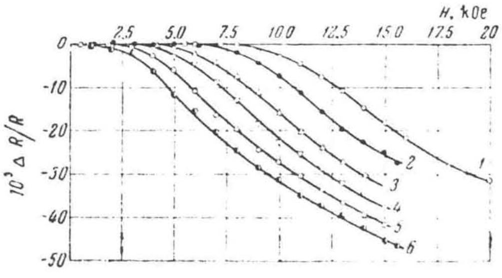

FIG. 4. Dependence of $\Delta R/R$ on H. Curve 1 – atmospheric pressure; curves 2-6 at pressures (P) 2600, 5400, 7025, 8850, and 10800 kg/cm², respectively.