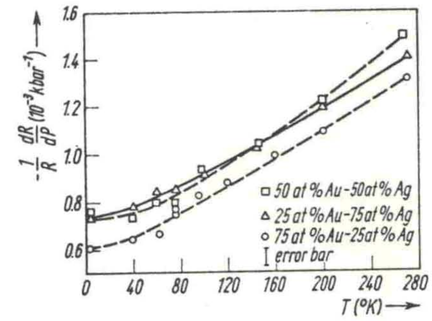

Fig. 3. The temperature dependence of the measured pressure derivative of the resistance for three typical alloys

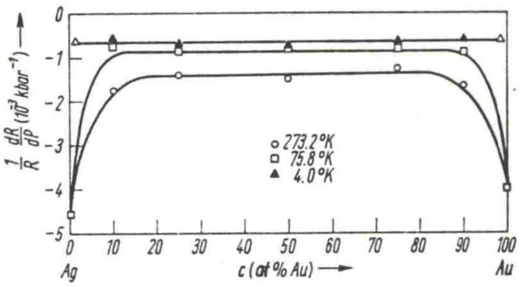

Fig. 4. The concentration dependence of the measured pressure derivative of the resistance. △ indicates Dugdales data for dilute alloys [3]

Ag and Au the pressure derivative of the lattice resistance decreases with decreasing temperature ($\approx -4.5 \times 10^{-3}$ kbar^{-1} at 273 °K to $\approx -20 \times 10^{-3}$ kbar^{-1} at 4 °K). The weak temperature dependence of $R^{-1}\,\mathrm{d}R/\mathrm{d}P$ for the alloys as compared to Ag and Au indicates that disorder scattering strongly influences the behavior of $R^{-1}\,\mathrm{d}R/\mathrm{d}P$ for the alloys.

In Fig. 4, $R^{-1}\,\mathrm{d}R/\mathrm{d}P$ is plotted as a function of concentration for the three bath temperatures. It is observed that $R^{-1}\,\mathrm{d}R/\mathrm{d}P$ is relatively insensitive to concentration from $c = 0.1$ to 0.9 as compared to the concentration dependence of the resistance. This is to be expected because the disorder resistance is proportional mainly to the number of deviations from periodicity of the lattice potential and is effectively divided out in the pressure derivative, $R^{-1}\,\mathrm{d}R/\mathrm{d}P$. It should be pointed out that the constant volume pressure derivative, $R'^{-1}\,\mathrm{d}R'/\mathrm{d}P$, has nearly the same temperature and concentration dependence as $R^{-1}\,\mathrm{d}R/\mathrm{d}P$ as shown in Fig. 3 and 4, except that the 273 °K points would be decreased in magnitude by $\approx 9\%$.

The pressure derivative of the residual resistance is taken to be the measured pressure derivative at 4 °K. This is justified in Section 4 following the discussion on Matthiessen's rule. The pressure derivative of the residual resistivity, $\varrho_0^{-1}\,\mathrm{d}\varrho_0/\mathrm{d}P$, was calculated from the raw data by using equation (1) and the volume derivative of the residual resistivity, $\mathrm{d}\ln\varrho_0/\mathrm{d}\ln V$, was obtained by multiplying $\varrho_0^{-1}\,\mathrm{d}\varrho_0/\mathrm{d}P$ by $-\chi^{-1}$. The results are shown in Table 1. It is observed

Table 1
Volume and pressure derivatives of the residual resistivity as a function of concentration

c (at % Au)	$\varrho_0^{-1}\,\mathrm{d}\varrho_0/\mathrm{d}P$ (10^{-3} kbar^{-1})	$\mathrm{d}\ln\varrho_0/\mathrm{d}\ln V$
≈ 1		1.00*)
10	−0.892	1.01
25	−1.016	1.22
50	−1.014	1.38
75	−0.832	1.29
90	−0.739	1.25
≈ 99		1.20*)

*) Dugdale [3].