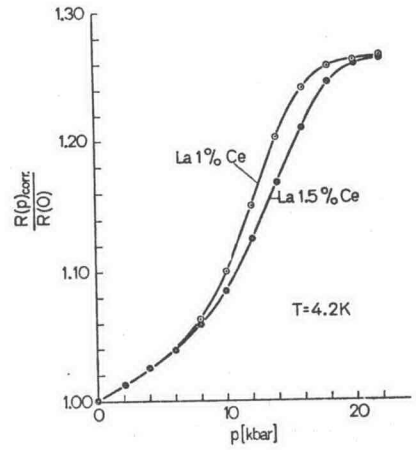

Fig. 3. Pressure dependence of the resistance of La 1% Ce and La 1.5% Ce at 4.2 K

the transition temperature decreases. For pure La Schwidtal[10] has found a decrease of 0.3 K. The LaCe alloys measured in this work showed a considerably greater depression of T_c (approximately 1 K).

Similar discrepancies are known for the effect of pressure on T_c in La[7]. In Fig. 1 we show as an example, the behaviour of $T_c(p)$ of our dhcp La 1% Ce alloy which is pressurized at liquid helium temperature. After an initial increase of T_c, which is due to the increase of T_{c0} for pure La, the growing pair-breaking effect dominates and leads to a drop in T_c which could be recorded up to 18 kbar. Because of the transformation into the fcc phase at ca. 20 kbar, the pressure was increased immediately to 40 kbar; and the sample was then warmed up to room temperature to have the phase transformation as complete as possible. Then T_c was measured with decreasing pressure. In accordance with the measurements of Maple *et al.* the depression of T_c has its maximum at 14 kbar.

To test whether a pressure dependence of the Kondo temperature $T_k(p)$ appears, two procedures have been used. At first the normal resistance $R(T)$ was measured at different pressures. It is found that $R(T)$ always exhibits a minimum near 8 K and then shows a linear increase with $\ln T$ down to 1.5 K, or the lowest temperature to which superconductivity can be suppressed by 9 kG, the maximum field

10 Schwidtal, K.: Z. Physik 169, 564 (1962).

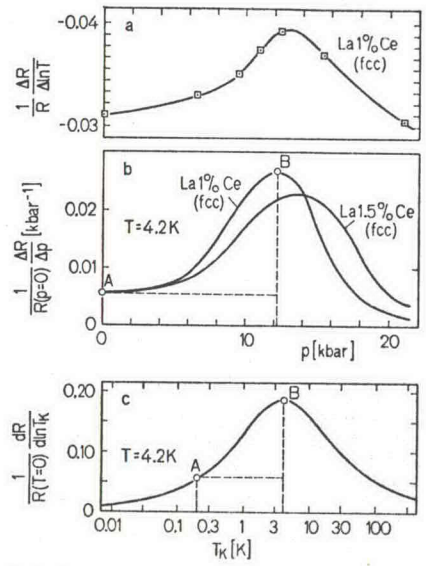

Fig. 4. a) Slope of the low temperature resistivity versus pressure of La 1.5% Ce. b) Differential resistivity increase at a fixed temperature (4.2 K) versus pressure. c) Plot of Eq. (4) differentiated with respect to $\ln T_k$, with $T = 4.2$ K

applicable in our pressure device. In Fig. 2 we show data on the 1.5% Ce alloy which has also been transformed to the fcc phase at 40 kbar and 300 K. A characteristic change in slope $\Delta R/\Delta \ln T$ is observed, which is plotted in Fig. 4a*. Its consequences for $T_k(p)$ will be discussed below. Note the maximum at 13 kbar.

The second procedure determining $T_k(p)$ makes use of the drastic increase of the resistance with pressure already seen in Fig. 2. We have investigated this effect for both samples in more detail at a fixed temperature of 4.2 K. The measured resistance curves $R(p)$ contain the pressure dependence of the resistance of the pure La lattice, which consists of a reversible and an irreversible part. These two parts were determined separately by an equivalent experiment on pure La and accounted for in plotting $R(p)/R(0)_{corr}$ in Fig. 3. Graphic differentiation yields the bell-shaped curves of Fig. 4b with maxima near 12 and 14 kbars, respectively.

* It was verified experimentally that a field of 9 kG has no measurable influence on the slope (Fig. 2, 6.6 and 12.5 kbar).