In retrospect, it is obvious that the early measurements of Bridgman[3]), in which he investigated the pressure dependence of an anomaly of unknown origin in the resistivity of chromium, point to the pressure sensitivity of its antiferromagnetism (which was unknown at the time of the measurements). The first systematic studies of the effect of pressure on the antiferromagnetic structure of chromium (as detected by neutron diffraction) were done by Litvin and Ponyatovskii[4]), and by Mitsui[5,6]). In a wider pressure range (up to 85 kbar), McWhan and Rice[7]) found that the Néel temperature is an exponential function of the pressure:

$$T_N^p = T_N^{p=0} \exp[\beta p], \qquad (2)$$

where β is a constant. The value of β for chromium can be calculated from the formula given in terms of the relative volume change by McWhan and Rice[7]) and the bulk modulus $B_0 = 1620$ kbar quoted by them:

$$\beta = -16.5 \times 10^{-3}/1000 \text{ atm}.$$

In the experiments described in the present paper we measured the Néel temperature of alloys of different electron/atom ratio under pressure in order to decide whether it changes under the simultaneous variation of concentration and pressure in the way predictable from previous experiments. $(dT_N/dp)_{p\to 0}$ was measured as a function of the concentration for a number of Cr–V alloys containing less than 3 at % vanadium.

In the following section the preparation and chemical analysis of the samples and the experimental technique are described. The results of the measurements are summarized in section 3, and finally in section 4 the results are discussed in view of recent theoretical developments.

2. *Experimental procedure.* 2.1. Preparation and chemical analysis of the samples. Starting from Johnson and Matthey spectrographically standardized chromium and vanadium, Cr–V alloys containing less than 3 at % vanadium were prepared by arc-melting in an argon atmosphere. The obtained buttons were annealed at 1300°C for about one week, in vacuum-sealed silica tubes. After quenching and etching the buttons, specimens of approximate dimensions $10 \times 1 \times 1$ mm³ were prepared by using a spark-cutting technique. The copper current and potential leads were spot welded to the samples.

With a wet chemical analysis the vanadium concentration was verified An atomic absorption spectrophotometer was used to detect some impurities. The following impurities were examined quantitatively:

Mg < 1 ppm	Mn: 20 ppm
Cu: 30 ppm	Co: 80 ppm
Fe: 40 ppm	Ni: 20 ppm
Al < 30 ppm	

2.2. Measuring technique and apparatus. The high pressure equipment used for these measurements is similar to the one described by Franse[8]). In a copper-beryllium vessel helium gas was used as the pressure-transmitting medium; the pressures up to 3000 atm were detected by means of a Hottinger transducer. The uncertainty in the determination of the pressure was about 5 atm for all pressures, while the variation of the pressure during the measurements due to varying temperature was less than 10 atm.

For each sample a series of isobars was measured at temperatures in the range from 77 to 300 K. A copper-constantan thermocouple, which was mounted in a hole at the outside wall of the vessel, was used to determine the temperature. All points of an isobar were taken in thermal equilibrium, the uncertainty in the temperature was estimated to be less than 0.2 K.

The resistance has been measured by a four-probe dc technique; the current through the specimen was kept constant within 0.0001 %, while the voltage over the specimen was amplified by a Keithley millimicrovolt-meter, and determined with a Hewlett-Packard digital voltmeter. To eliminate thermopower effects the current was commutated.
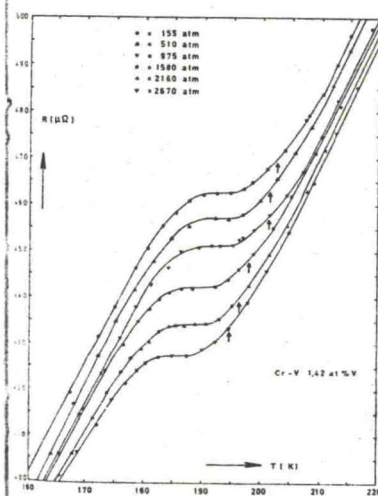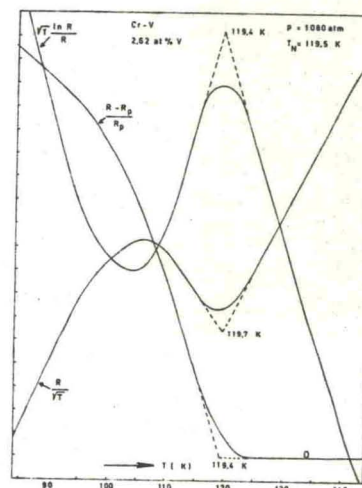

Fig. 1   Fig. 2

Fig. 1. Electrical resistance *vs.* temperature for a Cr–1.42 at % V sample at different pressures. The arrows denote the determined Néel temperatures.

Fig. 2. Three graphical analyses in the region of the anomaly in the R *vs.* T curve for determination of T_N. The three extrapolations (dotted lines) give the same value for T_N (within the experimental error). $R_p =$ extrapolated paramagnetic value for the resistance.