bands, which are more stable than Fe-S:S-Feσ^* bands, makes it possible to rationalize the maxima with x in the Curie temperature T_c and magnetization M_s in the system $Fe_{1-x}Co_xS_2$ and the antiparallel coupling of substitutional Ni^{2+} ions. Similarly, recognition that Co-S:Se-Co and Co-S:As-Coσ^* bands have higher energy than Co-S:S-Coσ^* bands permits a consistent interpretation of the variations with composition in the Weiss constant Θ_p and M_s in the systems $CoS_{2-x}Se_x$ and $CoS_{2-x}As_x$.

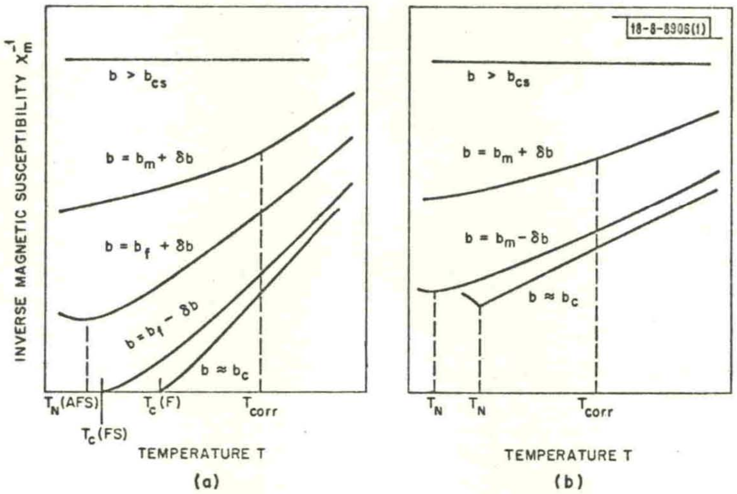

Fig. II-10. Inverse magnetic susceptibility vs temperature for various values of $b = b_m \pm \Delta b$: (a) $n_\ell = 1/2$; (b) $n_\ell = 1$.

Figure II-10(a-b) shows how the χ_m^{-1} vs T curves may be expected to vary with b. Since there is greater covalent mixing with a Ni^{2+} than a Co^{2+} ion, the fact that $NiSe_2$ is without spontaneous magnetism and NiS_2 apparently has a $b \approx b_m$ is consistent with a FS in CoS_2 and an AFS in $CoSe_2$. Furthermore, the extremely large $|\Theta_p| \approx 40\ T_N$ found in NiS_2 as well as its $\mu_{Ni} \approx 1.17\mu_B < 2\mu_B$ in this magnetically ordered phase vs a $\mu_{eff} > 3.1\ \mu_B$ in the paramagnetic state are consistent with $b \approx b_m$ and Fig. II-10. They illustrate well the dangers associated with any attempts to interpret the paramagnetic-susceptibility data of itinerant-electron magnetism in terms of localized-electron concepts.

J. B. Goodenough

E. VOLUME COMPRESSION MEASUREMENTS BY X-RAY DIFFRACTION STUDIES AT HIGH PRESSURES

The volume compression of materials with structures of high symmetry can be determined to pressures as high as 500 kbars by using x-ray diffraction techniques[14] to measure their lattice parameters as a function of pressure. The internal pressure on the sample is best found by simultaneously measuring the lattice parameter of a marker material intimately mixed with the sample. The pressure is then obtained from tabulated values of V/V_o vs P calculated from the equation of state for the marker. Reliable equations of state for several cubic materials, with coefficients calculated from the elastic constants measured at atmospheric pressure, have been derived from various theoretical models. Decker, et al.[15] have recently reviewed the calculations for NaCl, the most common marker material. Accurate lattice parameters can be obtained for

Banus, M.D.