Although the term 3α should be introduced in eqs. (4a) and (4b) as in the similar form as in eq. (3), this term has been neglected due to its smallness. The second term on the right-hand side in eq. (4a) is larger than that in eq. (4b), but the difference between them is about 14% at $T/T_c=0.9$ and it decreases as T/T_c increases.

In the intermediate temperature range, M_s decreases with temperature parabolically rather than $T^{3/2}$ law.

Then it is found that $F(T)$ is a monotonically increasing function with concave upward or decreasing with concave downward according as $C_2>0$ or $C_2<0$. Moreover, $|F'(T)|$ becomes larger in the neighborhood of T_c. If $C_2=0$, then $F(T)$ is independent of temperature.

On the basis of these discussions, the form of $F(T)$ versus temperature curve may qualitatively be expected and six types of $F(T)$ curves thus expected are schematically shown in Fig. 1 against the reduced temperature T/T_c. The cueres A_1, A_2, ... in this figure correspond to the following cases:

$$
\begin{aligned}
C_1>0 \text{ and } C_2&>0 : A_1,\\
&=0 : A_2,\\
&<0 : A_3,\\
C_1<0 \text{ and } C_2&>0 : B_1,\\
&=0 : B_2,\\
&<0 : B_3.
\end{aligned}
$$

One may expect, therefore, that the temperature dependence of the pressure effect on σ_s observed in the form of the pressure coefficient $\sigma_s^{-1}(\partial\sigma_s/\partial p)$ is given by any one of such curves as shown in Fig. 1 and also that the sign of $\partial T_c/\partial p$ and $\partial\sigma_s/\partial p$ is determined from the observed curve of $\sigma_s^{-1}(\partial\sigma_s/\partial p)$.

In order to ascertain the relations among the pressure effects on σ_s, σ_{so} and T_c mentioned above, the data in previous measurements[1-4] are useful.

The pressure effect on σ_s has been experimentally derived from the measurement of the pressure effect on the saturation flux and that of the compressibility. Then the pressure coefficient of σ_s is given by[1)]

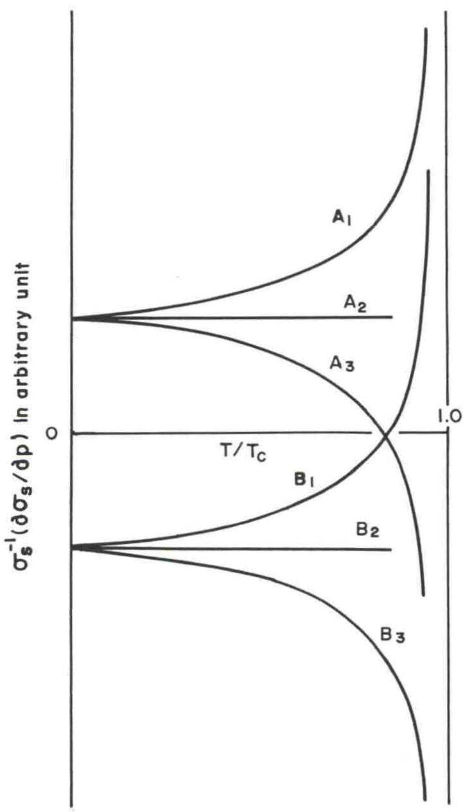

Fig. 1. A plot of the expected curves of $\sigma_s^{-1}(\partial\sigma_s/\partial p)$ as a function of reduced temperature T/T_c.

$$\frac{1}{\sigma_s}\frac{\partial\sigma_s}{\partial p}=\frac{1}{\Phi_s}\frac{\partial\Phi_s}{\partial p}-\frac{1}{3}\kappa, \tag{5}$$

where Φ_s represents the flux picked up by a search coil wound directly on the specimen magnetized to saturation.

The pressure effect on Φ_s, however, is hardly observed as already been pointed out[2,7] and in previous papers[2-4], the pressure coefficient of Φ_s, $\Phi_s^{-1}(\partial\Phi_s/\partial p)$, in eq. (5) has been derived from the pressure coefficient of the observable flux Φ_s', $\Phi_s'^{-1}(\partial\Phi_s'^{-1}/\partial p)$, for which a correction for flux leakage is required. This flux leakage results experimentally from the fact that the diameter of the search coil actually employed is larger than that of the specimen, and a detailed report of which will be made in the near future. The change in Φ_s' with a pressure Δp, $\Delta\Phi_s'$, has been measured on polycrystalline specimens of Ni and Fe,[1,2] ferromagnetic Cu-Ni alloys up to 29 at. % Cu[2,3] and Pd-Ni alloys up to 82 at. % Pd[4] at 200°K, 273°K and various points between 273°K and 373°K under hydrostatic pressures up to 15 kbar.

The linear compressibility $\kappa/3$ in eq. (5) has also been measured for each specimen at the respective temperatures, by utilizing an Advance wire which is usually used for the strain gauge wire. The technique has been developed by Tatsumoto et al.[8] and has been briefly described.[2]

Ni: A plot of $\sigma_s^{-1}(\partial\sigma_s/\partial p)$ observed for Ni, as a function of reduced temperature T/T_c, is given by solid circles in Fig. 2. From these values of $\sigma_s^{-1}(\partial\sigma_s/\partial p)$, the values of C_1 and C_2 are estimated by the use of such observation equations as described in ($\mathrm{I_a}$) and the results are -2.7×10^{-7} bar^{-1} for C_1 which is plotted with open circle and 4.8×10^{-7} bar^{-1} for C_2.

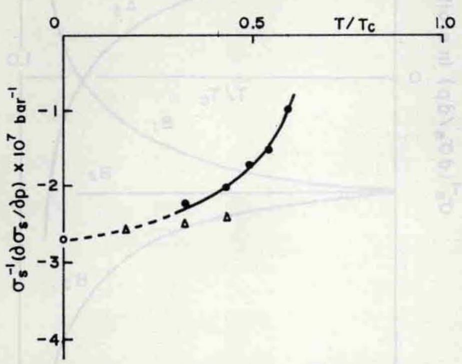

Fig. 2. A plot of $\sigma_s^{-1}(\partial\sigma^s/\partial p)$ vs. T/T_c for Ni. The points ● represent observed values. The points ○ and △ are the estimated values from observation equations and from eq. (3), respectively.

As is found from this figure, $\sigma_s^{-1}(\partial\sigma_s/\partial p)$ versus temperature curve belongs to type B_1 in Fig. 1, which expects the negative and positive sign respectively for C_1 and C_2, and this expectation is verified by the sign of C_1 and C_2 actually obtained. The negative sign of C_1 can also be expected by extrapolating the curve observed back to 0°K.

The pressure effect on the saturation flux has been measured at 4.2°K by Kondorskii et al.[9] and the value of C_1 is -2.9×10^{-7} bar^{-1}. The direct measurements of $\Delta T_c/\Delta p$ have been made by Patrick,[10] Bloch[5] and Okamoto et al.,[11] and the values of C_2 observed are 5.6, 5.4 and 5.1 in unit of 10^{-7} bar^{-1}, respectively. For both C_1 and C_2, the dis agreement