being essentially similar to that of free liquid water, $\Delta\nu_{iso}$ is expected to be zero and Eq. 9 will reduce to

$$\Delta\nu_{obs} = f_b \Delta\nu_b \quad [10a]$$

$$\Delta\nu_b = 3/4\ \chi_c S_b \quad [10b]$$

Here, χ is the quadrupolar coupling constant and S_b is the order parameter. Equation 10a takes into account the complex averaging through the random dispersion of the lamellar domains. Values of S_b derived from the observed splittings are usually in the range of 10^{-2} to 10^{-3}. A plot of $\Delta\nu_{obs}$ against the mole ratio of surfactant/water (Fig. 4) shows the linear portion predicted from Eq. 10 for the $C_{12}EO_5$–water system studied.

It may be concluded from these observations that the quadrupolar splitting of the water in the lamellar phase depends on

1. The degree of headgroup solvation as manifested by f_b
2. The amount of dynamic order in the bound sites as expressed in the order parameter, S_b

The utility of these facts has recently been made use of in a study of the interaction of commonly used hydrotropic agents with surfactant bilayers (25).

B. Surfactant–Water–Enhancer

The partial phase diagrams of the host surfactant–water system containing laurocapram (Azone), oleyl alcohol, and propylene glycol, respectively (Fig. 5), show that the amount of propylene glycol that can be accommodated is much smaller than the other two oils. It can also be seen that the incorporation of either oleyl alcohol or Azone increases the ability of the lamellar phase to accommodate water, with the maximum water content rising from about 50% in the host system to about 85% in the presence of the enhancer. This is not observed for solubilized propylene glycol for which, in fact, the water capacity of the bilayer phase is reduced on incorporation. Such an enhancement in the water retaining capacity of a bilayer system is of importance in the consideration of penetration enhancement, because it has been shown that the water content of the skin affects delivery rates in several cases (26–28).

Some information about the state of surfactant hydration in the presence of these agents may be derived from the variation of the quadrupolar splittings of the surfactant–$[^2H]H_2O$ system. Studies made of samples with a fixed surfactant/water mole ratio in the