The differential vapour pressures and the heats of mixing for solutions of different low molecular weight fractions of polyoxypropylene glycols in benzene, pyridine and water have been determined in the present investigations. A differential micromanometer, devised by Puddington\textsuperscript{101,102}, was fabricated for determination of differential vapour pressures of solutions and an isothermal phase-change calorimeter\textsuperscript{109}, using diphenyl ether as the dilatometric fluid, has been used for measurements of heats of mixing.

The experimental data has been processed to evaluate the various thermodynamic properties of these solutions. From the discussions of the various thermodynamic properties, the following general conclusions have been drawn.

1. From the comparative study of the experimental data on the heats of mixing for solutions of polyoxypropylene glycols in benzene and pyridine, the higher values of $\Delta H_m$ for pyridine solutions have been attributed to the breaking of relatively
strong intermolecular interactions between pyridine molecules on mixing with polyoxypropylene glycols. Similar to the behaviour of aqueous solutions of polyoxyethylene glycols\textsuperscript{112}, the heat of mixing data for aqueous solutions of polyoxypropylene glycol (Mol. wt. 150) suggest almost quantitative formation of hydrogen bonds between water molecules and the chain-oxygen atoms of the molecules of the polyglycol. The interchange energy, \( w \), has been found to be about \(-1.9\) Kcal. per mole of hydrogen bonds formed as compared to a value of \(-1.6\) Kcal. for aqueous solutions of polyoxyethylene glycols.

2. The values of the various thermodynamic functions of mixing for solutions of polyoxypropylene glycols in benzene and pyridine suggest high degree of randomization in these solutions. The positive values of \( T \Delta S_m^E(a) \) for pyridine solutions have been attributed to entropy production resulting from the dissociation of pyridine into individual molecular species on mixing, besides the configurational entropy of mixing of the components. A perusal of the thermodynamic properties of aqueous solutions of polyoxypropylene glycol (Mol. wt. 150) suggests that these solutions experience a high degree of restriction on random mixing of components. It has been suggested that these solutions form a structural net-work due to the bridging of chain-oxygen atoms of different molecules of the polyglycol, through formation of hydrogen bonds with water molecules.

3. The values of polymer-solvent interaction constant, \( \chi \), calculated from the Flory-Huggins equation,
suggest that $\gamma$ can be considered a characteristic index of polymer-solvent interaction for solutions of purely non-polar components. For solutions where even one of the components has polar nature, $\gamma$ loses its significance as an index of polymer-solvent interaction.

4. On comparison of thermodynamic behaviour of the solutions of polyoxypropylene glycols with those of the solutions of polyoxyethylene glycols$^{112}$, it is found (i) that polyoxypropylene glycols exercise more randomization in solution than do the polyoxyethylene glycols and (ii) that water forms stronger hydrogen bonds at the chain-oxygen atoms in aqueous solutions of polyoxypropylene glycols than in solutions of polyoxyethylene glycols. The role of the $-\text{CH}_3$ groups adjacent to the chain-oxygen atoms have been suggested to stabilize the hydrogen bonds between water and chain-oxygen atoms. In many other ways, the behaviours of the solutions of polyoxypropylene and polyoxyethylene glycols$^{112}$ have shown qualitative similarities.