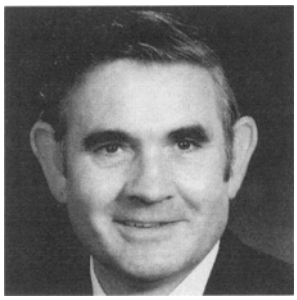
Editorial



Perusing the Table of Contents of the *Journal of Phase Equilibria* or scanning the published papers could create the impression in the mind of the new reader that the subject matter of Phase Equilibria is divided into several rather water-tight subdivisions. Thus papers tend to fall into distinct categories, such as experimental phase diagram studies, thermodynamic measurements, computer calculations of phase diagrams, thermodynamic assessments, or ab-initio theoretical calculations, with a minimum of overlap.

These apparent subdivisions have arisen mainly as a result of the rapid advances made in the subject in recent years, which have led to the present situation where no one person can expect to be an expert in every branch of the subject. However, we must never lose sight of the fact that although the subject of phase equilibria has many different facets, it is essentially a single entity. If calculation specialists talk only to other calculation specialists, and if experimentalists talk only to other experimentalists, then something valuable will be lost.

International conferences devoted to topics within the general field of phase equilibria studies present ideal opportunities for specialists of various types to congregate, to present their work, to attend review lectures by other specialists, and to interact informally. Such meetings should help break down the artificial barriers that are likely to develop when specialist groups of researchers meet in isolation.

The recent highly successful international conference on the "Thermodynamics of Alloys" organized by Professor Riccardo Ferro and colleagues from the University of Genoa and held at Santa Margherita Ligure, Portofino, Italy, 25-28th April 1994, is a good example of such a meeting attended by a variety of specialists. Thus, calculation experts were able to learn, for instance, about the difficulties associated with (a) the measurement of enthalpies of formation of solid phases and heat capacities of liquid and undercooled liquid metals by calorimetry, and with (b) the measurement of partial Gibbs energies of mixing by emf, gaseous equilibration, and isopiestic measurements. These are typical of the basic thermodynamic quantities that are required together with phase diagram data for carrying out system assessments, and an appreciation of the likely error margins is essential. Also at this meeting, experimentalists were able to learn about the complexities of thermodynamic calculations and assessments not only of binary alloy systems but also of multicomponent aluminium alloy systems and the silicon nitride - silicon carbide - titanium carbonitride system. Applications of thermodynamics to the understanding of the behavior of other important engineering materials were also illustrated by several papers on, for example, the effect of alloying elements on the M_s temperature in steels, on understanding active filler alloys for brazing titanium to alumina, on a new lead-free solder system, and on the development of new cobalt-base hard metals. Thus conferences of this type remind one of the richness of the subject, of the sound thermodynamic foundation on which it rests, and of its incredibly wide range of application. The late F.N. Rhines expressed it well when he wrote in the Preface of his well-known book: "Phase diagrams mean more to the metallurgist than mere graphical records of the physical states of matter."

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