from the EDITOR

Since we wanted our first issues of **CHEMICAL ENGINEERING EDUCATION** to have as broad an appeal as possible, we included articles in a number of areas of modern chemical engineering. But in this issue, we are using a different approach: we are emphasizing the areas of thermodynamics, kinetics, and stoichiometry—the subjects that were joined together many years ago in a three-volume work called "Chemical Process Principles." As our "ChE Educator" we are featuring one of the brilliant authors of that work, Professor Hougen, and, as our "ChE Department" his Alma Mater, the University of Washington.

Olaf Hougen might well be called the inspirational and intellectual father of modern chemical engineering: he is the inspirer of many prominent chemical engineers who were his students; he developed the areas of chemical engineering thermodynamics and kinetics; and he played an important role in the development of transport phenomena when he brought Professor Bird back to Wisconsin and charged him with the responsibility of placing the engineering computation of heat, mass, and momentum transfer on a sound theoretical and scientific basis.*

In this day of continued debate on the merits of the so-called "chemical engineering science" approach, there are lessons to be learned from the example of this great man. The first and most important lesson is that we cannot expect to know what is at the end of the research path before we get there; i.e., no one could know *a priori* what applications would arise from the first course in mass transport which Professor Bird began to teach back in 1954; nor could Professors Hougen and Watson initially know the extent to which the theoretical subject of chemical kinetics could be extended and applied to the flow, batch, and fluidized reactors of chemical engineering practice; nor could the profession know many decades ago that chemical plants would be designed on the basis of the thermodynamic properties of substances that were predicted by the theoretical methods developed by these same two men. Although talk about the "practicality" of thermodynamics persisted throughout the 1950's, today not even the Neanderthals of the profession question the importance of thermodynamic information on enthalpies, free energies, heats of reaction and P-V-T data to modern industry. The lesson we must again learn is that chemical engineers—and particularly young teachers and graduate students—must be provided an opportunity to delve into those areas of science that are unexplored even if applications are not clearly visible. (An important area of this type today is the entire field of bioengineering and biomedical engineering). It is certainly destructive to stifle the curiosity and dull the initiative of our young scholars by harassing them with demands that they show the immediate application of their work. These men need instead the same kind of encouragement Professor Hougen provided Professor Bird and others.

But another lesson that can be learned from Professor Hougen's career is one that must be learned by many of these same young scholars; namely, that the work of the engineering scholar should ultimately be placed—by himself or by others—in a form that is usable to the practicing engineer. For the real utility of the work of Hougen and Watson lies in the fact that these authors prepared numerous charts that could be easily used by the engineer in practice (e.g. to find the final conditions in a Joule-Thompson expansion or to predict enthalpy or PVT changes in a process.) Without such a step, the important work of the scholar may long go unheeded by engineers in industry who do not have the time or academic background to use it.

The AIChE Research Committee is currently studying the problem of the industry-academic gap. President Max Peters has often spoken of it and it was forthrightly discussed in the last issue of **CEE** by Bob Lenz. Perhaps one answer lies in our thinking again about the work of Olaf Hougen in not only developing the Chemical Process Principles but also in further making them applicable to real engineering problems. **CHEMICAL ENGINEERING EDUCATION** in this issue is proud to present articles on the "Chemical Process Principles Today" and to acknowledge the debts of the profession to a pioneering educator and a very warm and sensitive human being.

R. W. F.

*Professor Bird recognized the inspiration and incentive placed before him by Professor Hougen in the preface of his text on "Transport Phenomena" with the coded acronym: "This book is dedicated to Olaf Hougen."