

# **Brice Carnahan's**

## **Predictions on Information Technology**

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It is an honor for me to have the opportunity to spend a few minutes to talk about the accomplishments of Brice Carnahan.

I first became acquainted with Brice in the mid-1960s, after he had completed a PhD in chemical engineering at the University of Michigan, where he had been one of the main driving forces in the Ford Foundation and NSF projects, under the leadership of Don Katz, to study the use of computers in engineering education. Those groundbreaking projects set a direction for Brice that has continued to the present time.

Since the mid-1960s, I have had the pleasure of associating with Brice mainly through the CACHE organization and I would like to direct my comments mainly to his endeavors with CACHE. However, before I begin those comments, I would like to mention two accomplishments outside of CACHE that have impressed me greatly:

1. The textbook, "Applied Numerical Methods", which he co-authored with Luther and Wilkes in 1969. This book, which was dedicated to Don Katz, is still very useful and is a model of theory and application.
2. The "Computing in Chemical Engineering Award" of the CAST Division of AIChE, which he received in 1980. He was the second person to receive that award.

In April of 1969, Brice, together with Warren Seider and Rudy Motard, organized a meeting of chemical engineering educators interested in computing. This meeting led to the formation of the CACHE Committee, in November of that year, 31 years ago. Brice was selected as the first Chairperson of CACHE and has been an active member of CACHE ever since. His first task was to obtain initial funding from NSF, which he accomplished.

During his early association with CACHE, Brice became the leading expert among chemical engineers in FORTRAN programming style and documentation. His program, GOLDEN, served as a model for others to follow. Brice's interest in the numerical

solution of ODEs, led him to develop one of the first dynamic simulation programs, DYSCO. In the early 1980s, Monsanto gave permission to CACHE to prepare load modules for all of the popular computers from the FORTRAN source code for their steady-state simulator, FLOWTRAN. Brice prepared the first load module, with detailed documentation of how he did it so that the development of load modules by other educators for 13 other computers would be facilitated.

In 1974, Brice assumed the responsibility for editing, printing, and distributing CACHE publications. He has continued with this responsibility for the last 26 years, During that time, he has distributed more than 20 different CACHE publications, including 15,000 copies of the FLOWTRAN books.

Brice was one the first chemical engineering educators to recognize the potential of the PC. In 1978, Brice, together with Scott Fogler, took the leadership in the use of PCs for education and obtained a significant NSF grant, which included the development of an authoring program. I still remember the first time I saw an IBM PC. Brice had it and demonstrated it to me. I remember asking him, when the A: \ appeared on the screen, “Now what do you do?”

In 1996, in connection with the 25<sup>th</sup> anniversary of CACHE, Brice edited, published, and distributed the volume, “Computers in Chemical Engineering Education”, consisting of 20 solicited papers by 35 authors. The last paper, entitled “2001”, was written by Brice. His paper was a short review of computing and a set of predictions for 5 years into the future. The final sentence of his paper was, “The conjectures about the future are largely my own; fortunately, I can’t be proved wrong until 2001,....”, Well, 2001 is almost here. Let’s see how some of the predictions of Brice have turned out:

1. Yes, Moore’s law continues to hold.
2. Yes, the operating system is largely integrated with the worldwide web.
3. Yes, chemical engineering students are largely being taught high-level languages rather than FORTRAN and C.
4. Yes, JAVA has become a predominant operating system because of its cross-platform compatibility.
5. Yes, many educators have web home pages and information links for their

courses.

6. Yes, the worldwide web allows universities to keep in touch with and deliver continuing education courses to their alumni.

Chemical engineering educators have been greatly benefited by the vision and efforts of Brice Carnahan during the past 40 years. It has been an honor for me to know him and to associate with him.

Editor's note: The 1996 paper by Brice Carnahan is included in this issue of CACHE News.