Ernest J. Henley
Wins the
ASEE Excellence in Computing in Chemical Engineering Education Award
(sponsored by CACHE) for 2001

Citation

Professor Henley has made seminal contributions to chemical engineering education as evidenced by his books with H. Bieber in 1959 and E. Rosen in 1967 that explained the algebraic concept of solving material and energy balances. He helped establish the CACHE Corporation, a group that has focused for over 25 years in promoting the use of computers in teaching. As part of his activities for CACHE he funded and produced over 250 educational models, the CHEMI series still sold by the AIChE. Finally, one must mention his insightful classroom teaching, and ability to provide the perspicacity that makes complicated problems seem easy to students.

Rationale for the Nomination

Ernest J. Henley has been a faculty member for over forty years at Columbia University, Stevens Institute of Technology, and the University of Houston. His biosketch indicates that while he is retired from University of Houston, he continues to contribute publications to the profession, as indicated by recent editions of two books. Professor Henley is one of the pioneers in chemical engineering computing and in computer-assisted learning. He was a trustee of CACHE from 1971-1986 and was President in 1975. In 1968, Professors R.L. Motard and Ernest J. Henley introduced an advanced simulation program called CHESS (Chemical Engineering Simulation System). CHESS was based on a sequential modular architecture, in which models of the operating units were solved one at a time. For each unit, the inlet stream conditions were known or assumed and the outlet stream conditions and heat and work transfer rates were computed by the operation model. If the process included one or more recycle loops, the user could provide a guess for the conditions of one stream in each loop and the program would automatically iterate each loop to convergence to some specified tolerance. The CHESS program included an expanded library of unit-operation models and a physical property package, making it easy to use. CHESS was one of the first prototype flowsheeting packages that was later followed by Aspen Technology for development of their commercial software. But the Motard-Henley package clearly was an early significant contribution to chemical engineering computing.

In the 1960s computing software in chemical engineering was highly fragmented, with many programs being written by individual faculty. In 1971 Professor Ernest Henley, Chairman of the Curriculum Committee of CACHE, devised a plan for the collection, review, and publication of small stand-alone FORTRAN computer programs in seven curriculum areas: stoichiometry, kinetics, control, transport, thermodynamics, stagewise computations, and design. The programs were solicited from faculty and proposals for almost 500 FORTRAN programs were submitted to CACHE from all over the world. Of these 97, representing the efforts of almost 100 faculty members, were

selected for publication. Each selected program had to be thoroughly documented and tested by the curriculum area coordinator. The seven volumes were issued over the next three years, and they had significant impact and amazing longevity. Copies of the programs were still being requested in the late 1980s. It was one of the first examples of shareware in the engineering community.

In the area of computer-aid learning, Ernie wrote the first CACHE proposal to a Federal agency for a specific project. Funded by the NSF in 1975 for a total of $145,790, the CHEMI (Chemical Engineering Modular Instruction) Project had as its goal the development and distribution of 80 self-study, single concept, text modules covering the entire chemical engineering undergraduate curriculum. This included the seven areas covered in the earlier CACHE computer program volumes. Each module was to be from 7 to 15 pages in length, containing theory and examples suitable for a one-hour lecture and with homework exercises. The modules were solicited from the worldwide chemical engineering community. By 1979 111 modules were completed in six areas. An agreement was reached with AIChE to publish the modules, which ultimately numbered 230. CACHE donated its copyrights to all the modules developed under the CHEMI, and AIChE printed and distributed all six volumes under the title *AIChEMI Modular Instruction*.