significant upward trend in grade point average, which has recently been in the region of 2.8/4.0 compared with about 2.0/4.0 before the inception of the laboratory. This is not of course a true A-B comparison, but it is generally felt that the average ability of our students has not changed noticeably in recent years. Moreover, ten out of fourteen classes were taught by the author over a period of seven years, which included the transition from a lecture course to the combined lecture-laboratory course. Consistency in standards and grading were thus maintained.

From a qualitative standpoint, there has been a most definite improvement in the students' motivation and interest. The only complaint of substance concerns the lack of multiple set-ups, which results in students performing some of the experiments before the corresponding topics have been covered in the lectures. This situation is dictated by lack of facilities rather than pedagogical philosophy. Whereas students are obliged to study unfamiliar material by themselves, which is salutary to some extent, it would be more effective from the point of view of reinforcement, if multiple set-ups were available to permit parallel operation of the lectures and experiments.

Despite these shortcomings, however, the concept of reinforcing the classroom experience with short experiments has proved successful, and should be extended to other suitable courses in the curriculum, such as transport phenomena, and chemical kinetics and reactor design. □

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REFERENCES

1. J. M. Smith and H. C. Van Ness, *Introduction to Chemical Engineering Thermodynamics*, 3rd edition (McGraw-Hill, New York, 1975).
2. B. R. Brown in *Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry*, Vol. VIII, Supplement I, p. 37 (Wiley, New York, 1964).
3. S. Glasstone, *Textbook of Physical Chemistry*, 2nd edition, pp. 842-3 (Macmillan, London, 1956).
4. R. P. Benedict, *Fundamentals of Temperature, Pressure and Flow Measurements* (Wiley, New York, 1969).

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well as with people in computer science, applied mathematics and operations research. Art is the Director of the DRC which currently has 17 members. As one cooperative project, they are developing the nonnumeric processing capability of computers to do design.

Prof. Powers is actively studying the use of fault trees, a technology growing out of the aerospace industry, to evaluate process safety and reliability. He is developing methods to synthesize and then analyze fault trees, given the process components and their interconnection. He and Prof. Westerberg are also developing process synthesis techniques. They work on such problems as total process flowsheet synthesis, reaction path synthesis (getting the computer to do chemistry), separation system synthesis, energy recovery network synthesis, and control system synthesis—in each case the idea is to get the computer into the act of suggesting alternative flowsheets. Prof. Westerberg is also working on advanced approaches for performing computer-aided process analysis coupled with optimization.

OVERALL IMPRESSIONS

WHILE CARNEGIE-MELLON University may not be all things to all people, the programs in the areas of Industrial Administration, Drama, Computer Science and Engineering are strong with an unusual emphasis on professionalism. The urban surroundings of Oakland—an area filled with parks, a wide selection of ethnic restaurants, the Carnegie Library and Museum, and Scaife Art Gallery—provide a pleasant setting in which to live and work. Within the Department of Chemical Engineering, the research interests of faculty are diverse, from the abstract to the practical. Although our size is expanding, personal contacts among faculty members, and between the faculty and students, are frequent and continuous. From those first impressions of 1974, as well as from my experience of living here for three years, I conclude that Carnegie-Mellon University, as well as Pittsburgh, is "someplace special." □

ChE news

Dr. Billy L. Crynes, professor of ChE at Oklahoma State University, has been approved to head OSU's School of Chemical Engineering. Crynes received his B.S. from Rose-Hulman Institute. His M.S. and his Ph.D. are from Purdue University.