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A New View of Bifurcation

Foreword

L. E. Burkhart

The following papers provide a study of one of the significant problems in chemical engineering education — how to prepare graduating chemical engineers with increasingly diverse ranges of interests to cope with the equally broad spectrum of work that they are likely to encounter during their careers.

Attempts to solve the problem take many forms, apparent from the curriculum changes that have taken place in recent years. One school will take the science vs. practice approach; a second will abandon traditional engineering fields in favor of a completely interdisciplinary approach. A third school might choose simply to continue revising and upgrading its classical engineering curricula.

Much has been written about interdisciplinary programs and much about traditional chemical engineering curricula. However, little has been reported about bifurcation — the approach of providing alternate routes to the B.S. degree in chemical engineering. This practice is more widespread than might be commonly believed, for much of the experimentation with multifurcated curricula in chemical engineering remains unreported.

In the first paper, Dean E. Griffith, a member of the Subcommittee on Undergraduate Curricula of the Education Projects Committee of A.I.Ch.E., estimates the degree of penetration of the bifurcation concept into chemical engineering education in the United States. In the second, Glenn Murphy, a former member of the famous Grinter Committee and a past president of ASEE, discusses the history of bifurcation in engineering programs and presents his opinion of how engineering education will change.

The last two papers give accounts of two specific types of bifurcated curricula in chemical engineering, both current. First, T. D. Wheelock outlines the bifurcated chemical engineering curriculum which has been in use at Iowa State for several years. It is carried out at the undergraduate level within the Department and is not college-wide.

The final paper, by Yerazunis and Burr, describes a new multifurcation concept which involves the entire College of Engineering at Rensselaer and extends into the graduate level.

Curriculum Analysis and Multifurcation of Chemical Engineering Undergraduate Curricula

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The first really detailed survey of chemical engineering curricula was performed by Professor A. X. Schmidt of the City College of New York in 1956-7 (3). To quote from Schmidt's article:

"The curriculum is often a factor of importance in discussions of engineering education and accreditation . . . [To determine what 'the curriculum' is,] the bulletins of eighty-seven United States colleges and universities were examined for the survey, . . . the complete roster of institutions accredited in chemical engineering at the time."

This number of 87 in 1956-7 has increased steadily to 107 by mid-year of 1964-5. It is still growing. Schmidt continues:

"It was felt that a knowledge of . . . the average accredited American B.S. Ch.E. curriculum of 1956-7 . . . would (1) permit comparison with past and future curricula, thus acting as an aid in evaluating changes and trends and (2) afford a ready means for comparing any particular curriculum with the current norm."

Schmidt immediately encountered problems in the treatment of his data. The curricula of six of the 87 institutions were omitted for one reason or another; e.g., some were presented in a manner that precluded inference of credits and student effort per course; others exceeded in content the upper limit for an alleged four-year bachelor's curriculum.

These problems have been somewhat alleviated. Universities are printing more readable catalogs now. The Subcommittee on Undergraduate Curricula of the Education Projects Committee of A.I.Ch.E. has split off five-year