REPORT OF EDUCATION AND ACCREDITATION COMMITTEE

Various AIChE Committees concerned with educational matters have furnished CEE with reports of their activities for the year 1970.

S. G. BANKOFF *Chairman*

ACCREDITATION ACTIONS

A total of 39 accreditation actions were recommended by the Committee to Council. A summary has been furnished separately to Council members. This represents a significant increase in work load from last year's total of 22 accreditation actions. These accreditation recommendations were developed by the committee at the San Juan meeting in early May, despite the fact that a number of accreditation visits are scheduled in April. This imposes strain upon the Chemical Engineering inspector, who writes a considerably more detailed report than his fellow inspectors, and also upon the Committee in its evaluation of these reports by mail ballot. We intend to consider proposals for improving this situation.

PERSONNEL

R. E. Treybal left the committee this year, after a six-year period of devoted and effective service. He was replaced by D. M. Mason of Stanford University. Shortly afterwards W. H. Corcoran, Vice Chairman of the AIChE E&A Committee, was elected to the post of Vice Chairman —Operations, Engineering Education and Accreditation Committee of ECPD, so that AIChE was permitted to nominate another member of the E.E. & A. Committee. After consultations with officers of AIChE and of the E&A Committee, George Burnet was chosen to represent AIChE on the ECPD E.E. & A. Committee. At the time time he became a Vice-Chairman of the AIChE E&A Committee, J. G. Knudsen continues to serve on the AIChE E&A Committee as Vice-Chairman, and on the ECPD E&A Committee as an AIChE representative. R. B. Beckman, the Past-Chairman of the E&A Committee, was also Past-Chairman of the ECPD E.E. & A. Committee. M. S. Peters and S. W. Churchill, who served actively as members of the AIChE E&A Committee, in addition represented AIChE on the ECPD Board of Directors. AIChE was thus well represented in the deliberations and policy studies of these important bodies. We continue to have a dedicated and able committee membership, most of whom also served as accreditation inspectors during the past year.

A total of six new inspectors were added to the Ad Hoc Visitors List, while seven were dropped. This represents the largest turnover in recent years. An orientation session was held at the Washington meeting of AIChE last December, in order to brief the accreditation inspectors on current problems and procedures. Nominations for this listing are solicited from the membership at large. All such names are placed on a ballot form, which is then voted upon by the E&A Committee members. Every member of the Ad Hoc Visitors List must annually reaffirm his willingness to serve as an accreditation inspector.

ACCREDITATION PROCEDURES

Several experimental accreditation inspections were held during the year by the E.E. & A Committee of ECPD, in order to judge the effectiveness of institutional accreditation versus departmental accreditation. In each case a departmental accreditation was held concurrently or consecutively, and the accreditation recommendation followed that of the departmental inspection, in accordance with established procedures. J. G. Knudsen was chairman of the subcommittee of the E.E. & A. Committee which conducted these experiments.

The instruction booklets for accreditation inspectors are currently being revised by a subcommittee headed by S. W. Churchill. We continue to operate in accordance with the 1937 agreement between AIChE and ECPD, whereby the more severe of the separate recommendations of AIChE and of ECPD takes effect. It is of interest that the American Nuclear Society has requested that the evaluation procedures of AIChE be adopted with respect to its own area, although in their case the recommendations are not binding.

CHEMICAL ENGINEERING OPTIONS IN NON-SPECIALIZED ENGINEERING CURRICULA

At its meeting in Denver on August 29, 1970, Council approved a resolution forwarded to it by the E&A Committee. This dealt with the subject of chemical engineering options or areas of spec-

ialization in nonspecific engineering curricula, such as general engineering, engineering science, etc. In essence this resolution stated that if schools wish accreditation only as an engineering curriculum, without specifically implying that its chemical engineering option has been separately accredited, ECPD would accredit on that basis. However, if the school wishes to state in any of its informational literature or transcripts that a chemical engineering option has been accredited, the regular procedures and standards of AIChE would have to be followed. This resolution was forwarded to the ECPD E.E. & A. Committee, who now have it under consideration.

ChE book reviews

Elementary Chemical Reactor Analysis
Rutherford Aris
Prentice-Hall, (1969) xii plus 352 pp.
Englewood Cliffs, N. J.

The book is similar in approach and subject matter to Aris' earlier text "Introduction to the Analysis of Chemical Reactors", Prentice-Hall, 1965. The main differences lie in the addition of several detailed examples analyzing realistic situations of the kinetics or reactor design for actual chemical reactions, and in reducing some of the mathematical complexity. As is to be expected of the author, the book is excellently written and reads well. A brief, but adequate list of the most pertinent references of direct use with the text material is included at the each of each chapter.

The use of the term "analysis" in both book titles is appropriate, for the focus is on the formal mathematical aspects of the subject. Because of this, many instructors may not choose the text for an introductory undergraduate course, as is the stated intent of the author, but rather in a basic graduate course. At the latter level, with some prior knowledge of chemical reactor design and advanced mathematics, the more general and absctract mathematical treatment may be better understood and appreciated. Certainly every graduate student should have some exposure to the sophisticated description of of the kinetics of the general reaction $\Sigma\alpha_{ij}A_i = 0$ as often used in modern chemical reaction engineering analysis. Since the text was not really written for graduate students, however, a certain amount of useful material (e.g., catalyst deactivation) might need to be added by the instructor.

The book begins with an over-view of the subject, including a useful flow chart, and gives many of the important sources of information — journals, books, and reviews. Chapter 2 presents the formal logical aspects of stoichiometry. Included are definitions of extent (the use of ζ moles/volume rather than the classical notation ζ moles can be confusing) and rates of reaction along with independence of complex reaction systems. Thermochemistry is discussed in Chapter 3, again from a formal point of view, but including some information on heats of reaction, etc.

Next "The Progress of the Reaction in Time" for elementary (isothermal, batch reactor) integration of the rate equations for the standard simple kinetic schemes is presented, including a brief treatment of reaction paths for complex systems of first order reactions. The final chapter (6) discussing kinetics is concerned with heterogeneous reactions. Adsorption mechanisms, external, and internal diffusion processes are covered in some detail; the reviewer feels that Aris' treatment here is one of the best available from the viewpoint of kinetics required for reactor design.

Chapter 7 on the perfectly mixed flow reactor begins the study of actual reactor design. It starts with derivation and discussion of rigorous general transient mass and heat balances, and some aspects such as incompatible feed and initial conditions which are unavailable elsewhere. The notion of, physical reasons for, and some mathematical treatment of autothermal stability is covered. An excellent detailed design example is given as well as optimal sequences of stirred tank reactors. The discussion of imperfect mixing, segregation, etc., which was kept brief and simplified, may not be very understandable without further explanation in class.

Various types of adiabatic reactor design problems are treated in Chapter 8, including stirred tank and tubular cases. For the latter, it might have been preferable to put this chapter after the one on tubular reactor design. Most of the text material is devoted to the algebraic aspects of optimization of single and sequences of adiabatic reactors. Chapter 9 is devoted to the tubular (plug flow) reactor and begins with the standard steady state design methods, proceeding to optimal temperature profiles, and co-and counter current cooled reactors, the latter with an excellent example of ammonia synthesis.