AIChE 100

Chapter 2
Why Is AIChE Different?

By Stuart W. Churchill

The American Institute of Chemical Engineers differs significantly from all other professional and scientific societies. These differences are well known to most AIChE members, and certainly to those who are or have been members of other such organizations and have interacted with them through intersociety organizations such as the Accreditation Board on Engineering and Technology (ABET) and Engineers Joint Council (EJC). *My primary objective herein is not to examine the differences per se, but rather some of their origins, the reasons for their continuation, and the consequences.* Chemical engineering itself differs in a number of ways from the sciences and from all other branches of engineering. Although these differences are not focus herein, they are examined first because have had a strong influence on AIChE.

Skill needed in the design and use of continuous as well as batch processing, and thereby in flow, heat transfer, and mass transfer on a large

scale, is the primary characteristic that distinguishes chemical engineers from chemists. The confidence to deal with chemical conversions is the primary characteristic that distinguishes chemical engineers from other engineers. These two sets of differences have many secondary ramifications. For example, the involvement with energetic chemical conversions has forced consideration of reaction kinetics, catalysis, chemical and phase separations, purity, non-Newtonian flow, and explosions, while continuous, large-scale processing has resulted in a unique concern with packed beds, fluidized beds, stirred vessels, and heat integration. These concerns have in turn resulted in expanded and unique (chemical engineering) versions of thermodynamics, fluid mechanics, heat transfer, mass transfer, process economics, simulation, and safety. The broader concerns have led chemical engineers to develop and/or make greater use of generalizations and analogies than have their compatriots. Chemical engineers bear more responsibility than most other engineers for the industrial pollution of the air, water and soil, but are the best prepared and best placed to deal with its prevention and remediation.

Obviously, the differences of AIChE from other professional organizations may be attributed in part to the unique characteristics of the CPI (chemical and petroleum industries). In 1908 and for the ensuing 75 years, the CPI was a rapidly growing and innovative sector of the economy, and the major venue of employment for chemical engineers. Over the past quarter-century, however, the CPI as a whole has matured, and the numerical and fractional employment of chemical engineers has decreased. This decrease in the opportunity for employment has, however, been more than compensated for by the recognition of the unique and useful talents of chemical engineers by new and expanding industries outside the CPI. This transition has been rather painless technically because of the generality and breadth of education in chemical engineering, but somewhat painful personally to those who have lost the security of everyday interactions with fellow chemical engineers. Some in these neo industries abandoned AIChE, but most recognized that the technical resources and networking it provides are more, not less, important to them than to an employee of the CPI.

The requirements for membership, the governance, and the role of academic members are in themselves somewhat unique among professional societies and more akin to those of scientific societies. It is my primary objective to describe the evolution of these three factors during the first 100 years, as well as some of the consequences. ***This chapter differs from other chapters of this book in that it deals with more subjective opinions and anecdotal stories.*** This complementary approach is based on my first-hand experience as an interested observer and active participant, as well as on the written record. Counting student membership, I have been involved in AIChE activities since 1939, and thereby during 70% of its existence and 78% of mine. My second-hand observations encompass to some extent even the prior 31 years (from 1908 to 1939), because the careers of the founders and early members extended into mine and I had the privilege of becoming acquainted with many of them. I have attended nearly every Annual meeting beginning in 1944 and continuing through 2007, as well as many National, Regional, Divisional, and Sectional ones. I served as an elected Council member and then national officer from 1962 to 1967 (in 1963 as President), and have continued to serve AIChE to this day in many formal and informal capacities. If your activities are confined to one professional society, you may have no basis for comparing AIChE with other professional organizations. My qualifications in this respect are somewhat limited but include membership in and involvement to a lesser degree with the American Chemical Society (ACS), the American Society of Mechanical Engineers (ASME), the Combustion Institute, and the National Academy of Engineering (NAE), as well as service as a representative of AIChE in many intersociety activities.

Chapter 1 by Stanley I. Proctor provides an overview of the history of AIChE and a guide to sources for further details of that history, so only those aspects directly relevant to the subject of this chapter are discussed here.

Changes in Requirements for Membership

The requirements for membership in the Constitution of 1908 specified that "All candidates must be no less than 30 years of age and must be

proficient in chemistry and in some branch of engineering as applied to chemical problems, and must at the time of election be engaged actively in work involving the application of chemical principles to the arts. All candidates…. must fulfill one of the following requirements….” These latter requirements included the specification of the number of years of responsible charge for each category of educational qualification.

The requirement of ‘proficiency in … engineering’ eliminated chemists in the classical sense and the requirement of ‘responsible charge’, as interpreted by the Membership Committee, made teachers and researchers ineligible unless they had administrative responsibilities or had gained stature as an industrial consultant. The words ‘chemical engineering’ did not appear in the requirements for membership until 1930. The requirements for membership have been tinkered with periodically every since 1908, testifying to a serious and continuing concern with this defining characteristic of AIChE.

In 1910, a second grade of membership (junior) was created, with the requirement of “a bachelor’s degree or five years’ experience in chemical technology plus active engagement in chemical engineering work.” It, however, attracted so few applicants that it was abolished in 1929 and replaced by associate membership with slightly different requirements. In 1933, the grade of junior member was reestablished, but the grade of Associate Member was retained.

In 1930, the year that AIChE established its first official offices in Philadelphia, it was still effectively an exclusive club with only 763 active members and 109 associate members, whereas the total undergraduate enrollment in chemical engineering had grown to ten times that number. This failure to increase membership in proportion to the growth of chemical industries or the number of graduates with degrees in chemical engineering spurred proposals, apparently beginning at least as early as 1919, to loosen the requirements for membership, but such proposals were regularly voted down in the face of arguments in favor of retaining “sociability among the members.” In 1943, a constitutional amendment permitted, for the first time, chemical engineers engaged purely in teaching or industrial research to become active members,

and in 1949 another amendment approved the automatic transfer of junior members to associate member on the attainment of age 35. Then, in 1954, the following grades of membership were established: member (formally active member), associate member (formerly junior member, a designation many had considered onerous), and affiliate (formerly associate member). No major changes in requirements accompanied this change of titles, but the associate members were now allowed to nominate and vote for the officers and directors. The term "responsible charge" was not eliminated, but the Membership Committee gradually interpreted the responsibilities of non-administrative faculty members and industrial researchers more liberally. These three steps each initiated a more rapid rate of growth in membership.

AIChE was founded later than the other four Engineering Founder Societies: the ASCE in 1852, the AIME in 1871, the ASME in1880, the IEEE in 1884 (as the AIEE). It has always had the smallest membership and has sometimes gone its own way, but has come to be accepted as an equal partner by the others.

By 1962 (the year of my election as Vice-President), the AIChE Council had become aware of and concerned with the growing sense of alienation of the Local Section members from the Secretariat in the national office in New York City, their lack of participation in national activities such as meetings, and their lack of interest in the publications and other services. Informal investigations revealed that increasing numbers of the Local Section members were not even AIChE members and there was a sense of Us (the Local Section members) and Them (the Council and National Officers). This discovery and its confirmation prompted the AIChE Council to undertake a number of steps to reestablish comity. Among these steps were: (1) a monetary subsidy to the Local Section for each new (national) member; (2) regular visits to the Local Sections by the AIChE Presidents (John J. McKetta and Donald D. Dahlstrom, or I visited virtually every Section); (3) a Speakers Bureau to provide a selection of speakers for Local Section meetings with a partial subsidy of their travel expenses; (4) an invitation to the Local Section Officers with subsidized travel to an annual meeting with the Secretarial staff and the National Officers in the United Engineering Center in New York City to

bring them up to date and "on board," and to help prepare them for their responsibilities; and (5) a greater role for the Local Sections in the National meetings. The requirement of national membership as a prerequisite for Local Section membership was reaffirmed, but the category, Affiliate, was reestablished in 1965 with the requirement of "…being engaged in an activity and possess scientific attainments or practical experience which qualify him to cooperate with engineers in the advancement of chemical engineering knowledge and practice." This latter category was intended to provide a path for legitimization of Local Section members who were not previously qualified for AIChE membership. By and large these tactics were successful, although quite a bit of "selling" was required. Surprisingly, the most outspoken opposition was from veteran members who objected to "the lowering of the standards for membership." I encountered a few such extreme verbal responses as "letting in the unwashed." As an aside, in my visits to Local Sections, I refused, on the advice of my mentor Donald L. Katz and my own predilections, the requests of the Executive Secretary and the Local Sections themselves to present a talk on AIChE, but instead insisted on speaking on a technical topic, and relegating the topics of membership and other issues of interest to the Local Section to informal discussions. As another aside, it was the experience of a lifetime to meet personally, if only for a few words, with a significant fraction of all of the chemical engineers in the U.S.A.

One of the most effective methods of establishing rapport between a Local Section and the national manifestations of AIChE has proven to be the responsibility imposed by a National meeting in its region. Unfortunately, as the national meetings have been reduced from four to two, and held repeatedly at only a few locations, this benefit (cost saving, to AIChE and a sense of involvement to the Local Section) has been largely lost.

During my term as an AIChE officer, an informal decision was made by the Executive Committee to encourage and assist the chemical engineers in Latin America, including Puerto Rico, to form their own chemical engineering societies, rather than become part of AIChE. (The implementation of this decision provided a considerable burden of travel for me and the other officers of that era but compensation in the form of the opportunity to meet many of the leaders in chemical engineering

outside the continental U.S.A.) A similar position was taken with respect to the chemical engineers and existing chemical engineering societies in Europe and Asia. As discussed in subsequent chapters, this policy is currently being re-examined.

Elections

Although the requirements for membership were initially quite restrictive (in a professional sense), the structure of the governance of AIChE has always been very democratic and has greatly influenced its development and character. As noted in Chapter 1, the governing body of AIChE, consisting of the Directors and the Officers, was called the Council until 1999, when it became the Board of Directors. Initially all active members were allowed to nominate candidates for Directors and Officers of the Institute by mail, and anyone receiving ten or more nominations was placed on the final ballot. With growth in the numbers of members, this process became unwieldy, and responsibility was transferred to a Nominating Committee, which is required to submit to the voters at least two candidates for Vice President (now President-Elect), Treasurer, Secretary, and each opening on Council.

In my subjective judgment, both the annual selection of the Nominating Committee members and their choice of nominees have been carried out even-handedly, and moreover, in recent years, if not in the past, with due regard for more diversity. The openness of the electoral process has been further enhanced by the small number (originally 50 and now 100) of signatures required to add a nominee by petition. (As another aside, I was nominated for Vice President by petition and won a closely contested three-way election.) A slight retreat from the openness of the nomination and electoral process occurred in 1977, with the adoption of the requirement that a nominee for Vice President, President, or Treasurer must have previously served as a Director. This requirement appears to be reasonable, even though it was adopted hastily in response to the candidacy by petition of someone who threatened to make major, and perhaps radical, changes in the policies of AIChE.

This democratic and open structure has generally resulted in younger and more diverse Directors and Officers than in the other engineering

societies. I personally believe that this has resulted in a greater vitality and a greater willingness to adopt appropriate revisions and reforms as called for by changing times. My peers in aeronautical, mechanical and civil engineering expressed envy that I, an academic, should be elected to the Council of AIChE at the tender age of 42 and to its Presidency at the age of 46, asserting that one must be a retired industrial executive to achieve such positions in their societies. At the same time, they countered that the actual electoral process of AIChE was flawed relative to their own societies in that our unsuccessful candidates were sometimes renominated until they were elected. That did indeed occur a few times in the past, but not in recent years. The elections for Director, President-Elect, Treasurer and Secretary are usually contested vigorously. Indeed, to minimize what it deemed to be excessive and improper "electioneering," the Council in 1969 established stringent guidelines in this respect.

The path to nomination is usually by virtue of the visibility provided by participation in AIChE activities, including Local Sections, National Committees, Divisions, and National meetings. This "open" process is evidence to all members that they are not excluded from the governance.

Council and the Executive Committee.
Since its early days, the governance of AIChE has been entrusted to the Council (now the Board of Directors). Because the formal meetings of the Council have been limited by geographical considerations and the primary professional responsibilities of its members, considerable authority has traditionally been delegated to the Executive Committee (currently made up of the President, the President-Elect, the Secretary, the Treasurer, and the most recent, living Past President). The Executive Committee, although meeting more frequently than the Council, has historically, for similar reasons, delegated considerable responsibility and authority to a full-time employee, the Executive Director (originally called the Executive Secretary). Initially, the Executive Secretary stood for election (uncontested) as Secretary and thereby served as a member of the Executive Committee, but that is no longer the case. The Executive Director has always had responsibility and authority for day-to-day operation of AIChE such as publications, communications, meetings, record-keeping, and fiscal management, and has been subject to oversight

by the Board of Directors. Also, the Executive Director is one of the primary faces of AIChE to the Members and to the public.

In My Opinion
This governing structure has generally worked well with two exceptions. First, it often moves slowly to the point of frustration. Several decisions by the Board of Directors required a year or more to bring everyone up-to-speed and to find a consensus. Initiatives proposed by the newly elected President are seldom translated into action during his term as President or even that as Past President. Second, the Executive Committee often resists change. For example, several initiatives that I proposed as a Director or Officer evoked the difficult-to-refute comment, "We considered a similar proposal in depth 6 years ago and decided against it." The "seniority" supporting this position may arise from a term as a Director followed by two or more terms as Treasurer or Secretary.

I have no experience with the operation or effectiveness of the three recently added Operating Councils on Career and Education, Chemical Engineering Technology, and Social Impact, and so will not comment thereon.

The Role of the Academic Community

Another factor that has resulted in a fundamental difference between AIChE and other engineering societies is the very active role of the academic community that has been maintained from its founding to the present. Those academics who were consultants in chemical processing were welcomed, possibly because they constituted a significant fraction of that practice, but as noted in the discussion of the requirements for membership, other academics were effectively excluded for 35 years. The academics among the founders had a strong and even disproportionate role in the governance, and this trend has evolved to an essentially equal one today although they have never exceeded 15% of the total membership. An unofficial, but obvious, attempt to maintain a roughly equal academic/industrial ratio on the Executive Committee has been the frequent selection of two candidates for Vice President from industry in some years and two from academia in others. In turn, the academics have

made AIChE their primary society, rather than the American Chemical Society (ACS) and its Chemical Engineering Division.

The strong active presence of academics in AIChE as compared to the other engineering societies has, from the very beginning, resulted in a stronger commitment to publication and to a greater involvement in education, as well as to a somewhat different approach to professional, public, and social policies.

Vern W. Weekman in one of his monthly Commmuniques as President in 1998, stated that, "The academic members of the Institute are essential to the profession. Initially they may help attract us into the profession. Later they educate and re-educate us, embue us with our traditions, and through their research keep us relevant in this rapidly changing world. They are also the keepers of the flame through their vigilance in maintaining our core curriculum, which, in turn, contributes to our effectiveness and flexibility in many fields of endeavor." I subscribe to Vern's vision of the contribution of academic members to the profession of chemical engineering, but wish to identify some of their direct contributions to AIChE and vice versa.

Participation

Council members and officers from industry are subject to more severe restraints than academics in two respects. First, they are not always encouraged or permitted to stand for election because their participation comes at the expense of their responsibilities to their employer. As an example, the year I was Past President (and thereby Chair of the Nominating Committee) our first choice for Vice President declined because, although not forbidden to run, he was told that doing so would have a seriously negative impact upon his future career with the company. Although academics may be required to make accommodations (I went on a half-time sabbatical leave during my term as President), such service is generally looked upon favorably as a fulfillment of their expected service to society.

Second, the expenses of Council members and Officers from industry are ordinarily assumed paid by their employer, and their performance may

be scrutinized. At a minimum they are expected not to take positions contrary to the interests of their employer. The expenses of academic members may or may not be assumed defrayed by their department or research contract, but their opinions and actions are their own, not those of the university. As a result of this dichotomy, most initiatives by AIChE with respect to working conditions for chemical engineers and to topics such as industrial pollution have come from the academic members.

Publications

The history of the publications of AIChE is described in a subsequent chapter and only a few aspects related to the role of the academic membership are mentioned here. In the first issue of the Transactions of the American Institute of Chemical Engineers in 1908, the first President of AIChE , Prof. Samuel P. Sadtler, stated that one of the reasons for forming AIChE was "to publish and distribute such papers as shall add to classical knowledge in chemical engineering and shall increase industrial activity." He went on to say that this "is surely one of the most important of the whole list of aims to be accomplished." Publications more directly oriented to practice have been added through the years, most notably Chemical Engineering Progress (CEP) in 1947.

In the process of preparing a presentation for the 75th Anniversary on the historical role of applied mathematics and modeling in chemical engineering, I undertook (1) to scan all of the archival literature of AIChE involving those two topics. That proved to be an exhausting task, but was very informative and inspiring. I highly recommend it to all chemical engineers as a cultural pursuit. The early issues of the Transactions incorporate written comments evoked by the presentations at AIChE meetings, which are particularly interesting. One such example is a disclaimer by Alan P. Colburn on the theoretical roots of his famous-to-be analogy.

My survey of the published papers and comments revealed that most new products, at least then, resulted from experimentation in industry, but that most of the advances in processes, equipment, design, operation, and safety were signaled or directed by mathematically oriented manuscripts originating in academia. I conclude that theoretical analyses

have a more constructive role in the progress of our profession than is acknowledged by practitioners. For example, the improved design and performance of reactors, distillation columns, heat exchangers, membrane-separators, etc., are a result in large part of the academic-industrial exchange that occurs by means of AIChE publications and meetings. One consequence of the ever-increasing sophistication of "analysis" in the publications is the need, by veteran practitioners, of mathematical and theoretical updating. The AIChE courses in "continuing education" are invaluable in this respect.

Industrial-Academic Interaction

The chemical and petroleum industries have maintained a close and supportive interaction with the faculty of chemical engineering since the beginnings of the discipline. This interaction has generally been recognized as mutually beneficial, providing an advantage to industry in terms recruiting and to the faculty in terms of financial support for the graduate students and thereby for research. This close industrial/academic interaction, which was more or less unique within engineering and within the university as a whole, began to deteriorate in the late 1950s when the the National Science Foundation (NSF) started to provide support for graduate students and academic research. The Chemical Processing Industry (CPI) used that as an excuse to cut back on support of academic research and eventually on internal basic research as well. An equivalent relationship has not developed between academia and any of the diverse current employers of chemical engineers, and probably never will.

Accreditation

Accreditation is discussed as a separate chapter, but the AIChE leadership in this activity is one of the factors that have distinguished it from the other engineering societies and thereby merits some added discussion in that context. The Institute began to accredit undergraduate programs in chemical engineering in 1925. Seven years later in 1932, the other major engineering societies formed Engineers Council for Professional Development (ECPD) [later reorganized and renamed the Accreditation Board for Engineering and Technology (ABET)] to administer the process of accreditation for all branches of engineering.

Because of its experience and seniority in accreditation, AIChE was able to negotiate special rules for itself as a condition of joining ECPD — two important ones being the choice of the *visitor* for chemical engineering and a veto power over actions involving chemical engineering. In my opinion, these special considerations were and remain justified, because most faculty members in chemical engineering know their peers in other schools and are reasonably aware of the strengths and weaknesses of other programs in chemical engineering at other schools, something generally not true for the other branches of engineering. The AIChE Education and Accreditation (E and A) Committee was thereby able to counterbalance a misjudgment by a visitor, the team chair, or ECPD itself. The representatives of the other engineering societies regularly protested the existence of this privileged position. When my term on the Board of ECPD was up, one member said he used to look forward to the replacement of an arrogant representative from AIChE but no longer did because there seemed to be an inexhaustible supply.

When first appointed to the AIChE E and A Committee I was warned by its then Chairman, J. Henry Rushton, that accreditation would be an effective mechanism only as long as its operation remained in the hands of faculty members from those schools with irreproachable programs in engineering, because representatives of schools with weak programs would be motivated to lower the standards. The validity of the fears of Rushton was eventually confirmed. With the passage of time, the members of the AIChE E and A Committee began to be chosen from a broader band of schools. On the urging of these particular members, AIChE surrendered its privileged position. Soon thereafter, the specific requirements for an acceptable curriculum in chemical engineering, for example, chemistry taught by chemists, were replaced by diffuse criteria such as a grading of the program by the students and of the graduates by their employers. Inevitably, the process of accreditation became so abstract and diffuse that it no longer influences the content or quality of the curricula. AIChE has a long history of leadership in accreditation of which it may be very proud, even though that role has now been diminished.

Blue-Ribbon Committee Reports

From time to time one or the combinations of engineering societies decides to establish guidelines for engineering education as a whole. AIChE has several times served the chemical engineering academic community as a court of appeals with respect to unrealistic conditions imposed by such organizations and their "studies."

An example of such a study is the "Grinter" Report of 1955, which was prepared under the aegis of the ASEE on the initiative of ECPD. Most of the recommendations were ill-advised and were rejected, but one proposal was not only accepted but produced a significant change in engineering education. That proposal was to replace all courses in the art of engineering by ones in engineering science. The near-coincidence of that requirement with the appearance of *Transport Phenomena* by Byron Bird, Warren E. Stewart, and Edwin N. Lightfoot in 1960 made its adoption almost a knee-jerk reaction by every school, whereas otherwise many years might have been required at some schools to get up to speed in this respect. Despite cries of alarm from some industrialists and faculty members about the impact of the loss of the art and practice of engineering in education, the sudden and real mismatch in impedance between new graduates and their employers as a result of this change faded after a few years. In this case, separate intervention of AIChE was not required.

A decade latter, another study of engineering by the ASEE was initiated by ECPD and endorsed by the National Academy of Engineering (NAE). The initial report of this five-year-long study, called the Goals of Engineering Education, included the following proposals: (1) replacement of the individual curricula engineering with a common one and thereby accreditation on an institutional basis, (2) a 15% reduction in total undergraduate course work, (3) a reduction in mathematics and science in favor of courses involving social and economic factors, (4) accreditation based on a five-year program with one year of graduate work, and (5) the requirement of industrial experience and professional registration for new faculty hires regardless of their academic degree(s). Obviously, the implementation of these recommendations would have

eliminated chemical engineering as an academic program and eventually as a profession.

Howard F. Rase and I were appointed to represent chemical engineering on a so-called "Board of Analysts" for the Goals Study. The Board of Analysts, however, had no part in drafting the report. We were simply given the opportunity to read the Preliminary Version and submit independent criticisms. When we complained that only trivial changes were made in response to our criticisms, we were invited to submit "minority reports." Howard and I each submitted one. The Goals Committee did not ask the individual engineering societies for comments but AIChE publicized the Intermediate Version, held an open discussion on it at its Annual meeting in 1965, and invited written discussion of my two critiques that appeared in Chemical Engineering Progress in May and August of 1967. These steps stimulated the other engineering societies to look hard at the report and, as a consequence, none of the recommendations of the Final Report, which was finally issued in 1968, were implemented by ECPD. AIChE rescued chemical engineering and indeed the entire engineering profession from oblivion on this occasion, something that the academic community of chemical engineering could not, by itself, have done.

How did such a report materialize? It was eventually revealed to be conceptually the work of only three members of the Goals Committee. They interpreted the results of a survey of opinions of practicing engineers to support their own preconceived idea of an ideal education for engineers. Many engineers who had been practicing for a decade or more, when asked what elements of their education in engineering had proven relevant, responded, as would be expected, that they no longer used and perhaps had never used calculus, physics, or chemistry, and that they were deficient in the skills required to interact with others and to deal with the economic side of engineering. Such responses merely reflect their progression or sought-after progression from engineering to management.

White papers
"*White papers*," even by panels of distinguished academic and industrial chemical engineers have generally had little impact on education in chemical engineering, because, as contrasted with accreditation, the lack of an effective mechanism or motivation for their implementation. Examples are the 1961 AIChE Report on The Dynamic Objectives of Chemical Engineering and the 1988 National Research Council Report on Frontiers in Chemical Engineering Research. Needs and Opportunities ("The Amundson Report").

In 1979-1980, I took part in a study with an otherwise distinguished group of academics and industrialists chosen by AIChE to predict the future need for chemical engineering graduates. Our analysis, as reported by Arthur B. Metzner in *Chemical Engineering Progress* in October 1980, predicted a modest increase in demand in the next few years owing to an anticipated attempt by the U.S. to become less dependent on foreign sources of petroleum. That source of increased demand did not materialize, but, even so, the overall predictions of the report are not embarrassingly out-of-order. Indeed, the report may now serve as a case study concerning the possibilities and validity of long-range forecasting with respect to manpower needs in our profession on technical, rather than statistical, grounds.

Meetings
Although the unique interaction of the academics and industrial members of AIChE by virtue of the support of fellowships and research by the CPI, as well as by their predominant recruitment of chemical engineers, has virtually ended, close relationships persist as a result of the attendance of both at National and Local Section meetings, and their joint presence on the Board of Directors.

In contrast to most other engineering societies, AIChE has, by and large, resisted the replacement or supplementation of the Annual and Spring meetings by specialized ones. This policy has some shortcomings but they are overbalanced by the comity that has been maintained.

Industrial and academic attendees do have a basic conflict over programming at AIChE meetings. Academics generally prefer to present work in progress with the hope that the presentation will provoke constructive criticism and perhaps establish informal proprietary rights. Accordingly, they resist the burden of preparing and distributing a document that will soon be out of date. They are also inclined to entrust the presentation to a graduate student because of the provision of (1) the invaluable professional experience, (2) the experience in networking, and (3) the encouragement to participate in future meetings. Academic attendees who are not making presentations understand and support this posture. On the other hand, most industrial participants attend the technical presentations hoping to learn something that will help with their current project and to acquire manuscripts to take back to their work place as evidence of their attendance and as proof that it was worth the time and cost. They also would favor a presentation by the faculty member who supervised the work rather than by the graduate student who actually did the work but may not speak as decisively with as much perspective.

In 1970, the Program Committee, hoping to increase industrial attendance, promulgated the policy "No paper, no podium." A group of young members led by Andreas Acrivos, among others, struck back. Their efforts led to the formation of the Fundamentals Section of the Program Committee and a policy of 15-minute presentations with 5 minutes for discussion. The inauguration of this policy had the unexpected effect of producing a virtual revolution in fluid mechanics. I believe it is fair to say that as a result of the new format the primary frontier in that subject shifted from all fields of engineering in all countries to the Annual AIChE meeting. Overall, the Fundamentals Section became so popular that most presentations from the academic community now take place in that format. I don't believe that this has had any adverse effects other than an increase in the total number of sessions and thereby a reduction of the audience for each one.

A significant fraction of all faculty members in chemical engineering attend the Annual meeting, not only to keep up to date technically and to showcase their own work, but also to participate in AIChE committee

meetings and to interact informally with both academic and industrial members. The meeting also serves as an informal venue for graduate students seeking faculty positions.

Summary and Conclusions

Some of the factors that differentiate AIChE from other professional and scientific societies have been identified along with their origin. Some of the differences reflect deliberate choices by the founders (for example, the restrictive conditions for membership and the democratic governance), while others arose unconsciously or accidentally in the process of adaptation to the changing times and/or increasing membership. Some of the differences stem from the unique characteristics of the CPI and others from the unique characteristics of chemical engineering itself.

Vive la différene!
It is my conclusion that, whatever their origins, these differences are generally significant and have made AIChE more vital and more flexible than other comparable societies. In particular, the more democratic structure has resulted in younger and more diverse officers. The closer academic/industrial relationship has made AIChE a leader in accreditation, and was an essential factor in avoiding the acceptance and implementation of the recommendations of the "Goals" Report, the implementation of which would have resulted in the elimination of chemical engineering as an undergraduate field of study and in time AIChE itself. The other branches of engineering and their professional societies have AIChE to thank for its critical leadership in this matter, which would have eliminated them as well.

References

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