

# The American Institute of Chemical Engineers

A Summary of Its Accomplishments in the Establishment of the Professional Status of the Chemical Engineer and a Statement of Its Influence in the Promotion of Chemical Engineering Education and Chemical Industry

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A HUMAN organization or institution should be able to show that it serves some useful purpose in society. If it cannot do so it should be disbanded. Undoubtedly Dr. Osler's suggestion that a man should be chloroformed after he has passed the age of usefulness might be applied often with profit to institutions which have outlived their usefulness. Respectable or even honored ancestry should not be made to serve as an excuse for present day inactivity. The question proposed by the editor of CHEMICAL AGE, "What Has the American Institute of Chemical Engineers Accomplished?" certainly deserves an answer.

Richard K. Meade, in an article in the July, 1919, issue of CHEMICAL AGE has given an excellent account of the extended discussion which preceded the organization of the American Institute of Chemical Engineers. The objects sought by the organizers were so clearly set forth in that discussion that very little change has been found necessary in the constitution or methods of operation of the Institute. The most prominent of the purposes of the organizers was recognition of Chemical Engineering as a profession and raising ethical standards among chemists.

## Strictly Professional Societies Are Necessary

As human society is organized the establishment of a profession is of very great importance. The public must not only recognize the special qualifications which constitute a Physician, for instance, but the members of this profession must be conscious of certain very clearly defined obligations to the public and of limitations upon personal conduct. It was vital to the development of chemical industry that the special qualifications which enables a man successfully to design, construct or operate chemical plants should be clearly set forth and recognized by business men and the public in general. There were and still are many who have been trained as chemists who do not recognize the existence of the chemical engineer as distinguished from chemists generally.

## Quibble Over the Difficulty of Distinguishing the Practitioner

One objection strongly urged against forming an organization of chemical engineers was that it would be found impossible to define chemical engineering or make an intelligent distinction among applicants for membership. The anticipated insuperable difficulties

have not materialized. Under the able leadership of Dr. Arthur C. Langmuir the Membership Committee has generally found very clearly marked characteristics by which the designing, the constructing, or the operating chemical engineer can be differentiated from the analytical, research or other class of chemist.

It was inevitable that there should be individual cases where education or experience was such that it was found difficult to draw the line. Such cases have not been found numerous. That the distinction is not an imaginary one is shown by the frequently heard remark by those who attend meetings of the Institute that its membership, its programs and discussions are distinctly different from those of other chemical societies. Educational authorities by this time have generally recognized the chemical engineering profession by the introduction of chemical engineering courses in all the leading universities and technical schools.

## Standardization of Chemical Engineering Education

Having established the process of selection of the chemical engineer by an examination of a man's education and practical experience and success, it was a logical step that the Institute should devote some of its energies to a study of chemical engineering education in universities and technical schools. A committee on this subject was appointed at the first meeting of the Institute. Reports have since been made by this Committee semi-annually. Some of these have been very extensive and taken together constitute probably the most important contribution to the literature on this subject.

The last report rendered by the Committee under the chairmanship of Dr. Arthur D. Little showed a truly astonishing lack of uniformity in the courses prescribed by the various schools offering courses in chemical engineering. It is evident that there has been very little cooperation or discussion by those drafting these courses. The result has been wide variations in the training and qualifications of the chemical engineering graduate and what is still more serious, he has been in many cases very poorly qualified by education for his professional work. This situation has no doubt arisen from the fact that there has been no organization which could take the initiative and leadership in bringing about uniformity and raising the standard in the educational institutions.

The American Institute of Chemical Engineers occupies an excellent strategic position from which it



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can, with fair prospects of success, exert its influence to bring about greater uniformity and improvement in the courses offered. As the membership of the Institute is composed very largely of chemical engineers occupying responsible positions, who must employ the young graduate chemical engineer and observe his success or failure, the opinion of the members of the Institute as to the results of educational processes must be excellent. The various reports of the Committee on Chemical Engineering Education have expressed the judgment of the Institute on many phases of chemical engineering education.

A new committee soon will be appointed which will attempt by cooperation with educational authorities to secure modification of existing courses in order to bring them into closer harmony with the views of the Institute. An attempt also will be made to prepare a list of the universities and colleges which offer approved courses in chemical engineering. The work of this committee undoubtedly will lead to substantial improvements in educational methods which in turn will increase the efficiency and success of the chemical engineering graduates. The American chemical industry will profit greatly by an advance in this direction. The improvement in the quality of the graduates of chemical courses since the introduction of courses in chemical engineering has been very marked during the last decade or two. It may confidently be expected that quite as marked an improvement will be shown as the result of the improvement and standardization of chemical engineering courses.

#### Code of Ethics

Another activity of the Institute which is of quite as great importance as the educational qualifications of chemical engineers, is concerned with the ethical questions peculiar to the profession. These, broadly speaking, may be considered from two points of view. One of these concerns the character of the individual chemical engineer; the other involves the ownership of patent rights, chemical processes and methods. The personal honesty and trustworthiness of the individual chemical engineer is of the greatest importance on account of the confidential information of great value which he often has in his possession. On the other hand it is equally vital to the welfare of the profession in general as well as to the individual chemical engineer that he should understand clearly his own property rights in this confidential information and the processes which he may develop. While the general principle is well recognized that every man is the rightful owner of the product of his own labor, whether physical or mental, when other men have cooperated with him the determination of ownership is not always a simple matter.

In drafting a Code of Ethics, the American Institute of Chemical Engineers has endeavored to state the principles governing these and other questions of ethics which arise in chemical engineering work. That the Code was carefully drafted is indicated by the fact that no amendments have been found necessary. The enforcement of the Code insofar as the members of the Institute is concerned, is in the hands of the Membership Committee and the Committee on Ethics. In passing on the qualification of new members, the Membership Committee must assure itself that the conduct of each candidate for membership is in accordance with the Code of Ethics. Candidates for membership are, at times, denied admission to the Institute on this account as well as because of lack of educational requirements and successful experience in chemical engi-

neering work. Infractions of the Code of Ethics by members are taken care of by the Committee on Ethics. The fact that no case of this kind has arisen indicates that the Membership Committee has done its work with great care.

The opportunity to visit chemical factories has often been accorded to the Institute as a body on account of its Code of Ethics and the rule by which every member of the Institute pledges himself not to visit a plant in the same line of manufacture as his own without declaring this fact to the management and offering the same privilege of visiting his own plant.

No direct means have been found for enforcing the principles of the Code of Ethics on non-members of the Institute. It is believed, however, that the indirect influence toward raising the ethical standards of the chemical engineering profession has been considerable, and that this influence will increase with the growth of the Institute, and that its Code of Ethics will be accepted more and more as the expression of the recognized ethics of the profession.

#### The Transactions

Another important contribution of the Institute to chemical industry has been the publication of papers on chemical engineering topics. This has been accomplished by offering a hearing and opportunity for discussion at the meetings of the Institute to chemical engineers, whether members of the Institute or not, who are ready to present papers on chemical engineering subjects. An opportunity is afforded in this way to present such papers before a group of experts whose criticism is of great value. Papers on other phases of chemistry have not been accepted for reading or discussion. Papers read, with the discussion, have been published in bound volumes of transactions published annually or semi-annually. These volumes contain a very valuable collection of papers on a great variety of chemical engineering subjects. A large number of these papers also are published in various trade journals, thus giving wide publicity to the subjects presented and to the authors.

#### General Activities

The Institute has endeavored to influence legislation along lines favorable to the chemical industry through its Committees on patents, on the metric system, licensing of engineers and on other matters as occasion has arisen. When the Federated American Engineering Society was organized, the American Institute of Chemical Engineers became a member of this society, and in this way has supported this organization in its endeavor to make the influence of the technical man felt in national and state affairs. This influence has no doubt been of very great benefit to the nation as well as to the engineering profession.

The American Institute of Chemical Engineers is the only national chemical society which is represented in this organization. The influence of the trained engineer in our national and civic life will undoubtedly increase very greatly in the near future and it is of great importance that the chemical engineer should contribute his share to this important movement.

#### The Engineering Professions

The increasing appreciation of the importance of the engineering professions is shown by the very rapid increase in enrollment of engineering students at our universities and technical schools. The large number of technically trained college graduates will serve not only to fill the increasingly numerous positions of responsibility in our industrial establishments, but also will furnish for public service, men who have had the



exact training of the technical professions. Legislation with reference to our industrial problems undoubtedly will be favorably influenced by this change in the character of our public men.

#### Social By-Products

A very pleasing feature of the meetings of the American Institute of Chemical Engineers, which cannot be said to have been anticipated by the founders of the society, has been the close personal friendships which have arisen between a great many of the members as well as in many cases members of their families. This undoubtedly has been made possible by the careful selection of members, the relatively small membership and the large percentage of members who attend each meeting.

This personal acquaintanceship no doubt has made the meetings more pleasant socially as well as more profitable professionally. While the percentage of the total membership in attendance at meetings is large, the total number has not been large enough to make the meetings unwieldy. It has been possible, therefore, to hold meetings in relatively small cities particularly where some interesting chemical engineering development could be seen and studied.

#### Membership Growth

Considerable discussion has arisen at times as to whether it is desirable for this society to grow until its membership has reached many thousands. Undoubtedly many of the advantages of a small group of well-acquainted members would then be lost. Efforts have been made to amend the constitution so as to provide for more grades of membership in order to secure a more rapid growth in membership. All such propositions have been voted down. The present membership is, therefore, convinced that the advantages of a relatively small society of carefully restricted membership outweigh the advantages of a large society of less closely affiliated members.

#### The Trend of Chemical Segregation

The general tendency in the chemical profession seems to be to maintain a number of smaller societies composed of specialists in a well-defined division of chemistry, with the rapid increase in specialized knowledge in every branch of chemical research. This tendency will, no doubt, become more and more accentuated. The formation in a large general society of divisions of such specialists seems not to have fully satisfied their professional requirements as well as such an organization as the American Institute of Chemical Engineers.

The necessity arises at times for action by the entire body of chemists of all classes. The need might well be met by an organization such as the Federated American Engineering Society. The various chemical societies have on a number of occasions shown the inclination and the ability to cooperate when common action seemed necessary.

It is to be anticipated that the American Institute of Chemical Engineers will continue to grow in membership with the expansion of chemical industry. The qualifications prescribed by its constitution are the only limitations upon its growth in membership and there are undoubtedly many chemical engineers fully qualified for membership who are not at present members. The present membership is firmly convinced that the maintenance of these qualifications is necessary in order that the usefulness of the Institute shall continue to grow. It has been criticized for being too exclusive, but specialists in other branches of chemistry have the same opportunity to organize and establish similar professional standards.

#### Standardization of Chemical Equipment

The Institute will, no doubt, undertake new activities as their desirability becomes evident. One line of professional work for which there seems to be a necessity is the preparation of standard specifications for chemical engineering apparatus. Those which have so far been made seem to have been formulated by men who were not chemical engineers, and in some cases were prepared for entirely different purposes or uses than those which the chemical engineer has in mind. The drafting of such specifications can be satisfactorily made only by a body of specialists organized as a professional society such as the American Institute of Chemical Engineers.

#### Government Cooperation with Chemical Industry

Following the establishment of the chemical division of the Bureau of Foreign and Domestic Commerce and the appointment of Carl R. DeLong, formerly of the U. S. Tariff Commission as head, comes the appointment by Secretary of Commerce Hoover of an advisory committee in the field of heavy chemical manufacture. The duties of the committee will be to consult with Mr. DeLong, regarding the manner in which the new division can best serve the industry in promoting the export trade in heavy chemicals.

The committee comprises: Chairman, Henry Howard, Grasselli Chemical Co., Cleveland; S. W. Wilder, Merrimac Chemical Co., Boston; E. M. Allen, president Mathieson Alkali Works, New York; Robert T. Baldwin, National Aniline & Chemical Co., New York; Dr. Charles L. Reese, E. I. du Pont de Nemours & Co., Wilmington; A. G. Rosengarten, Powers, Weightman & Rosengarten, Philadelphia; Lancaster Morgan, General Chemical Co., New York, and H. H. Dow, Dow Chemical Co., Dow, Mich.

At the initial conference Aug. 30, the general question of foreign trade in heavy chemicals was discussed by Mr. Hoover, who with Mr. DeLong and Dr. Julius H. Klein, director of the Bureau of Foreign and Domestic Commerce, explained to the chemical men the facilities of the Department of Commerce, and the efforts being made to promote foreign trade. Mr. Hoover declared that the new chemical division is willing to assist the industry in any way they suggest, and pointed out that the extent of service rendered will be measured by the co-operation extended by the industry.

What is going to happen in industry in the next ten or twenty years, following the great upheaval in the human mind in the war we have been through? There is going to be a chemical development in industry as great as the mechanical development. The man who does not get his plant under chemical control is going to be left behind. Now, to get your plant under chemical control is not a difficult thing. It does not require a college education but it does require brains. A college education is not brains; it is an index to knowledge, but a lot of men have that index and do not know how to use it. A lot of men who do not have a college education have brains.

What you want in your mills to get advantage of this great wave of chemical development, is to keep the chemist under your control. Put your young chemist in the laboratory and tell him what you want and make him produce it. He can do it, but you will find your chemist has no imagination. Tell him what you want to find out, the wastes there are that you want to disclose, and he can do it for you. That is practical chemical control. *K. I. Herman, president, K. I. Herman Co., Chicago, Ill.*





**Dr. Charles Frederick Chandler**

*"The Grand Old Man of American Chemistry"*

*Born in Roxbury, Mass., December 6th, 1836, the approach of his 86th birthday finds Dr. Chandler in service as Technical Advisor, The Chemical Foundation, Inc., and as keenly alert to the needs and possibilities of American Chemistry as when as a boy he went from Harvard to Göttingen; as when at 21, in '57, he "doubled" as instructor and janitor at Union College; as when in '64 he went to Columbia where until 1911 he personified the progress of chemical science and art in America. Honored beyond all other chemists, to Dr. Chandler has been granted a perspective shared by no other member of his tribe and who in universal affection is addressed as*

*"The Patriarch of Chemical Progress in American Industry*

*Than whom, among chemists, there is no one more beloved, no one more graced with kindly sympathy, no one more potent to inspire, in all America."*