Alpha Chi Sigma
Sourcebook

A Repository of Fraternity Knowledge
for Reference and Education

ACADEMIC YEAR {2024-2025} EDITION

This Sourcebook is the property of:

_____ _____

Full Name *Chapter Name*

_____

Pledge Class

_____ _____

Date of Pledge Ceremony *Date of Initiation*

_____ _____

Master Alchemist *Vice Master Alchemist*

_____ _____

Master of Ceremonies *Reporter*

_____ _____

Recorder *Treasurer*

_____ _____

Alumni Secretary *Health and Safety Officer*

Members of My Pledge Class

_____

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_____

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A full-color, electronic version of the Sourcebook is available at https://www.alphachisigma.org/collegiate/sourcebook

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Section VI – Songbook and Toasts

Introduction

About the Sourcebook

The purpose of this book is to furnish information about the aims, ideals, history and governance of Alpha Chi Sigma. It is given to all pledges of the Fraternity. So in that respect, it could be considered a pledge manual. However, this is much more than a reference book for pledge tests. Its goal is at least threefold:

- To be a guide for obtaining a working knowledge of Alpha Chi Sigma, its aims and ideals during pre-initiation days. The information herein can be used to answer all who ask "What is Alpha Chi Sigma?"
- To serve as a sort of scrapbook for the individual's college career.
- To become a reminder of college days and early associations with Alpha Chi Sigma.

Additionally, this book provides a brief history of the American fraternity system, American chemistry and alchemy. Why alchemy? The profession of chemistry is based upon alchemy, and there is much in alchemy that has particular significance to our order.

In 1933, Richard K. Toner, then the Master Alchemist of Iota Chapter, prepared a concise, seven-page manual containing information about the chapter and Fraternity. This manual served as the prototype for the first National Manual. Under former Grand Master of Ceremonies Walter Ritchie's supervision, the Manual was issued in April 1935 on a trial basis. In September 1936, a revised issue was distributed. This has long been considered the first edition.

Over the years, this manual has undergone many changes and revisions. Recognizing that the information contained in this volume is of interest to active members as well as pledges, the words "Pledge Manual" were dropped from the title in 1979. In 1982, the book was split into two then three separate manuals. In 1997, Alpha Chi Sigma was recombined into a single volume. In 2001, the printed version of this volume was discontinued by the Supreme Council and was replaced by a smaller version with a supplemental compact disc. In 2004, the Grand Chapter voted to once again issue a full printed booklet. In 2004, the name of the title changed again to the Alpha Chi Sigma Sourcebook, further emphasizing that the document is for use throughout a member's fraternal career. In 2006, Grand Master of Ceremonies John Stipp issued the Pledge Canon to pledge trainers as a companion to the Sourcebook.

Why join Alpha Chi Sigma

It is hoped that this book will convince you that Alpha Chi Sigma is an organization to which you should belong. Through the efforts of its members, there has developed an organization – professional in stature and of national consequence – fully recognized and respected by members of the chemical profession. Membership is not a guarantee of success in chosen fields; neither is it true that all successful scientists belong to Alpha Chi Sigma. It is true, however, that being a member of Alpha Chi Sigma identifies one as a person of worthy ideals and capability.

Aside from the professional advantages offered by Alpha Chi Sigma, one will find that membership provides a catalyst for forming worthwhile, lifelong friendships. It has been said that there is nothing as fine as the affection an individual feels toward a true friend. Cementing such friendships is the First Object of Alpha Chi Sigma. This does not cease with graduation but continues throughout the years in the professional branch of the Fraternity. The rewards of Alpha Chi Sigma are open to every pledge, collegiate and alumni if you will but enter into the Fraternity spirit and work for them.

It is hoped that you will find much of interest and value in this book and that you will continue to use it as a reference after becoming a member. It is also hoped that many years from now when your initiation into this order is but a memory, you will look again through these pages and remember with great fondness your personal discovery of this, your professional chemistry fraternity.

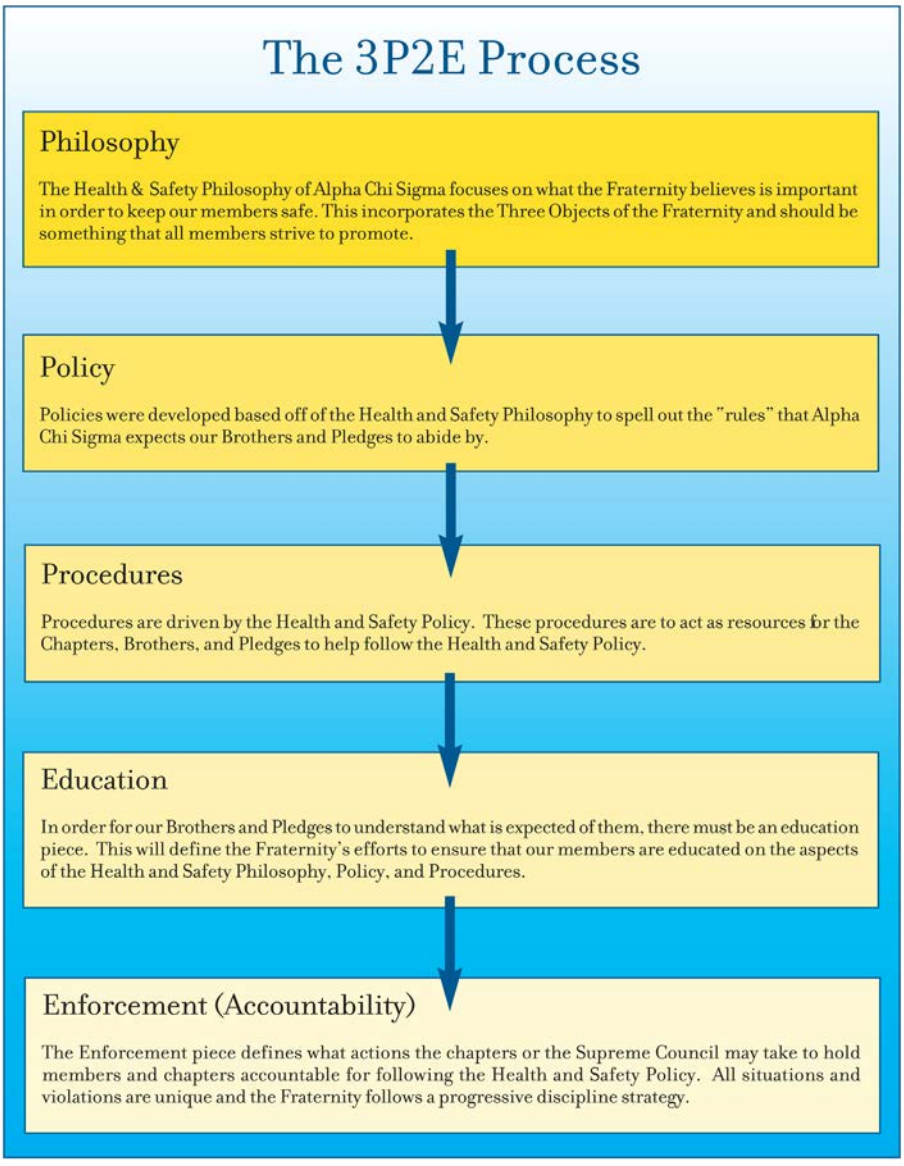
A professional Fraternity…

...is a specialized fraternity which limits its membership to a specific field of professional education in accredited colleges and universities offering courses leading to recognized degrees therein. It maintains mutually exclusive membership in that field but may initiate members of the general social fraternities. It also organizes its group life specifically to promote professional competency and achievement within its field. The professional fraternity may initiate faculty members and qualified students who are pursuing an organized curriculum leading to a professional degree. It usually has a minimum scholastic requirement for membership and elects its members by secret ballot after careful investigation. Membership is for life.

Alpha Chi Sigma Health & Safety Overview

Risk Management Policies began to be developed and adopted by many Fraternities including Alpha Chi Sigma in the late 1980's / early 1990's. In an effort to create a culture in fraternities to improve the health and safety of its members, Dr. Lori Hart, Director of Educational Initiatives, from Holmes Murphy Fraternal Practice created the 3P2E approach to member health and safety. Unlike previous Risk Management Policies which were provided to Alpha Chi Sigma by an attorney or an insurance provider, the Health and Safety Policy, which replaces previous Risk Management Policies, was developed by Alpha Chi Sigma with process guidance from Dr. Lori Hart and Holmes Murphy Fraternal Practice.

Dr. Hart worked for a men's national fraternity for 16 years in the area of risk management. Through her work trying to "change culture" the 3P2E idea emerged over time with some brilliant colleagues and hard work. 3P2E, or Philosophy, Policy, Procedures, Education, and Enforcement is important not only as a reminder of the important parts of maintaining the health and safety of our members, but also lays out how the entire initiative fits together.



Alpha Chi Sigma Health & Safety Philosophy

Health and Safety Philosophy

Alpha Chi Sigma is the professional fraternity specifically for individuals in the chemical sciences. Our membership is comprised of individuals who make some aspect of the chemical sciences their life's work. We promote and live by the Three Objects of Alpha Chi Sigma, which are:

- To bind its members with a tie of true and lasting friendship
- To strive for the advancement of chemistry, both as a science and as a profession
- To aid its members by every honorable means in the attainment of their ambitions as chemists throughout their mortal lives

Membership is for life.

We promote and encourage character development, service to the community, academic achievement, professional networking and social experiences and events.

Our Fraternity values its members, and endeavors above all else to keep them safe. Alpha Chi Sigma is opposed to any activity that could be considered mentally, physically or emotionally unsafe. Our Fraternity believes very strongly in promoting the development of healthy relationships and social environments.

The Fraternity strongly believes in protecting the health and safety of our members, pledges, and guests. The following statements further define the Fraternity's philosophy on the following areas:

- Alcohol
- Illegal Drugs and Other Controlled Substances
- Hazing
- Sexual Misconduct, Domestic Violence, Dating Violence, and Stalking

Philosophy of the Fraternity on Alcohol

Alpha Chi Sigma Fraternity is a values-based membership development organization that focuses on building brotherhood through character enhancement, leadership development, academic achievement, commitment to service, lifelong friendship and social experiences. The Fraternity believes that alcohol abuse prevents individual members from realizing their full potential and from exemplifying these characteristics of brotherhood.

While the moderate and legal consumption of alcohol, in and of itself, does not constitute a problem, the illegal use and abuse of alcoholic beverages is widely recognized as a major problem in our society. Seeking to be a responsible member of the higher education community, Alpha Chi Sigma is highly concerned about alcohol abuse. Our organization upholds the following philosophy specifically related to alcohol:

- The Fraternity expects that our members, pledges, and guests comply with all federal, state, and local laws.
- The Fraternity supports and enhances the missions of the institutions where we are present.
- As a subset of the campus community, the Fraternity collaborates with the host institution to address the problem of alcohol misuse.
- The Fraternity works to address the negative behaviors associated with alcohol misuse and abuse, and not simply the location of those behaviors. As such, Alpha Chi Sigma addresses these behaviors with a comprehensive educational approach.
- The Fraternity follows a consistent discipline strategy with our chapters.
- We are concerned for the safety and well-being of our members.

Philosophy of the Fraternity Regarding Illegal Drugs and Other Controlled Substances

Alpha Chi Sigma Fraternity is a values-based membership development organization that focuses on building brotherhood through character enhancement, leadership development, academic achievement, commitment to service, lifelong friendship and social experiences. The Fraternity believes that drug use prevents individual members from realizing their full potential and from exemplifying these characteristics of brotherhood.

Seeking to be a responsible member of the higher education community, Alpha Chi Sigma is highly concerned about drug use and abuse. Our Fraternity believes very strongly in the betterment of individuals through our chapters.

Our organization upholds the following philosophy specifically related to illegal drugs and other controlled substances:

- We are concerned about the impact that drugs and other controlled substances not prescribed by a licensed physician have on the safety and lifelong well-being of our members, the member experience and the reputation of our Fraternity.
- The Fraternity expects members, pledges, and guests to follow all applicable local, state and federal laws regarding illegal drugs and controlled substances.
- As a subset of the campus community, the Fraternity collaborates with the host institution to address the problem of drug use and abuse including leveraging campus and community resources to assist the membership.
- Alpha Chi Sigma expects personal responsibility from its members and accountability through local self-governance.
- Alpha Chi Sigma will hold chapters accountable for the choices they make through a progressive discipline strategy.

Philosophy of the Fraternity Regarding Hazing

Alpha Chi Sigma Fraternity is a values-based organization that focuses on building brotherhood through character enhancement, leadership development, academic achievement, commitment to service, lifelong friendship and social experiences. The Fraternity aims to promote fellowship and mutual trust among its members, and Alpha Chi Sigma fundamentally believes hazing prevents individual members and chapters from exemplifying these characteristics of brotherhood.

Striving to be a responsible member of the higher education community, Alpha Chi Sigma is highly concerned about any activity that could be considered mentally, physically, or emotionally unsafe. Our Fraternity believes very strongly in the betterment of individuals through our chapters.

Our organization upholds the following philosophy specifically related to hazing:

- The Fraternity is unequivocally opposed to all acts of hazing and expects our members to follow local, state, and federal laws that have made hazing illegal.
- As an organization founded on the principle of true and lasting friendship, the Fraternity expects that all members treat each other with dignity and respect, regardless of their membership classification or level of seniority within the organization.
- The Fraternity expects members, pledges, and guests to follow all applicable university, local, state and federal laws regarding hazing.
- As a subset of the campus community, the Fraternity collaborates with the host institution to address the problem of hazing.
- The Fraternity works to address the underlying causes of hazing, and not simply the observable behaviors. As such, Alpha Chi Sigma utilizes an educational approach that reinforces the Fraternity's concern for human dignity and mutual respect among its members.

- The Fraternity expects personal responsibility from its members and accountability through local self-governance within the boundaries established by Alpha Chi Sigma's Constitution, Bylaws, Grand Chapter Propositions, and Supreme Council policies and propositions.

- The Fraternity follows a consistent and progressive discipline strategy with our chapters. When a member or subordinate chapter is unable to conform to the expectations of Alpha Chi Sigma, the local chapter and/or the Supreme Council may determine that they should no longer share in the privilege of participating in the Fraternity.

- We are concerned for the safety, well-being, and dignity of our members and those who seek to join our Fraternity.

Philosophy of the Fraternity Regarding Sexual Misconduct, Domestic Violence, Dating Violence, and Stalking

Alpha Chi Sigma Fraternity is a values-based membership development organization that focuses on building brotherhood through character enhancement, leadership development, academic achievement, commitment to service, lifelong friendship and social experiences. The Fraternity believes that sexual misconduct, domestic violence, dating violence, and stalking prevent all affected individuals from realizing their full potential and are contrary to both human dignity and the values of the organization.

Striving to be a responsible member of the higher education community, Alpha Chi Sigma is highly concerned about any activity that could be considered mentally, physically, or emotionally unsafe. Our Fraternity believes very strongly in promoting the development of healthy relationships and social environments through our chapters.

Our organization upholds the following philosophy specifically related to sexual misconduct, domestic violence, dating violence, and stalking:

- The Fraternity is unequivocally opposed to all acts of sexual misconduct, domestic violence, dating violence, and stalking and expects our members to follow the local, state, and federal laws that have made these behaviors illegal. Additionally, the Fraternity expects members to follow campus-specific policies that prohibit such behaviors.

- As an organization founded on the principle of true and lasting friendship, the Fraternity expects that our members treat others with dignity and respect.

- The Fraternity supports and enhances the mission of the institutions where we are present. Additionally, we encourage chapters to participate actively in local university programming and resources and to take a leadership role in initiating and supporting prevention activities.

- As a subset of the campus community, the Fraternity collaborates with the host institution to address the problems of sexual misconduct, domestic violence, dating violence, and stalking, including leveraging campus resources to educate our members and assist all parties.

- The Fraternity works to address the underlying causes of sexual misconduct, domestic violence, dating violence, and stalking. As such, Alpha Chi Sigma supports an educational approach that encourages healthy interactions among all people and reinforces the Fraternity's concern for human dignity and mutual respect.

- Through education, we help students make good choices, and to understand the consequences of their choices.

- The Fraternity expects full cooperation from its members and chapters in all accountability processes.

- The Fraternity will hold members accountable for the choices they make through a progressive discipline strategy. When a member or subordinate chapter is unable to conform to the expectations of Alpha Chi Sigma, however, the conduct process may determine that they should no longer share in the privilege of participating in the Fraternity.

- We promote respectful and healthy relationships and the well-being and dignity of all people.

{*Section* I}
Principles

The Purposes of Alpha Chi Sigma

The purposes of Alpha Chi Sigma are reflected in the Three Objects of the Fraternity, which express the true ideals of all its members. The three Objects of Alpha Chi Sigma are:

1. To bind its members with a tie of true and lasting friendship.
2. To strive for the advancement of chemistry both as a science and as a profession.
3. To aid its members by every honorable means in the attainment of their ambitions as chemists throughout their mortal lives.

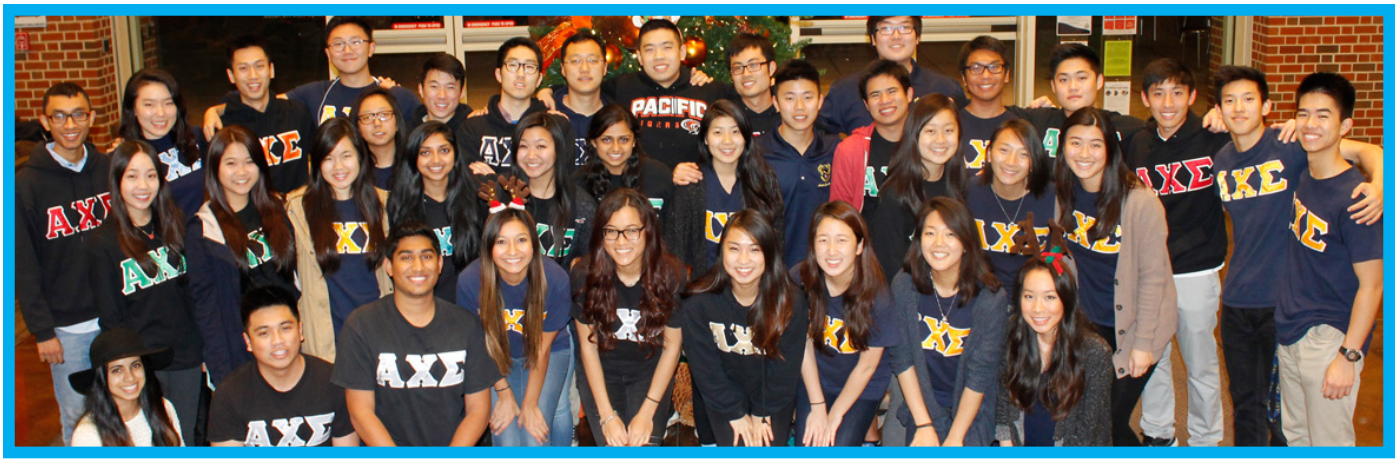
There is no organization quite comparable to a professional fraternity. Socially, it presents members with the opportunity to meet those interested in their work. Fraternal bonds are ever so much stronger than professional ones, but there are no bonds as strong as those created through combined fraternal and professional interests.

As a member of Alpha Chi Sigma you will share common fraternal ideals with all its members, many of whom are leaders in the industrial and scientific worlds. Purely professional organizations have their place, and Alpha Chi Sigma constantly encourages its members to become active in these organizations. Social fraternities also offer much to students. But only a professional fraternity – and Alpha Chi Sigma is the only national professional chemistry fraternity in the United States – can provide both college students and professionals in chemistry and related fields with the interests and bonds of a fraternity.

The Obligations of a Member

The obligations of a member were first introduced in the April 1935 Pledge Manual and have only been slightly modified since that time. They should not be confused with the Three Objects of the Fraternity.

1. That a member will remember the Objects of the Fraternity and endeavor always to further them.
2. That a member will pay promptly all financial obligations.
3. That a member will so act so as never to be a reproach to Alpha Chi Sigma.
4. That a member will cheerfully fulfill any assigned fraternal tasks.
5. That a member will maintain as satisfactory a scholastic record as possible.



The Ideal Chapter

The ideal chapter is one in which members live and carry out the Three Objects of Alpha Chi Sigma. In such a chapter, there always is perfect harmony and accord. All members are tolerant and sympathetic to others' viewpoints. All members are actively engaged in work that reflects credit not only to themselves but to the organization.

Through its officers, the ideal chapter maintains constant efficient contacts with the national organization and the professional members (alumni) of the chapter. Such a chapter continues a program of professional activity that compliments and augments activities of the faculty, the school and the surrounding scientific community.

Its members perform the duties allotted to them promptly and cheerfully to the best of their ability. They remember that the returns from an organization are commensurate with the giving. Each will give to the organization what one can and expect the reciprocity which eventually comes to every giver.

Personal Values and Alpha Chi Sigma

Adapted from an article in The Dipole *by Robin Fishbein, Zeta 1998*

Our society allows the concept of organizations because organizations are beneficial to their members and to non-members. This privilege of existence depends upon an organization accepting responsibility for everything that happens as a result of its existence. Chapters were given their charters because the Fraternity and your educational institution believe your chapter is a beneficial organization. Our members and chapters have the responsibility of accepting and addressing risk.

Anything that members of a chapter do in the course of fraternity business falls under the responsibility of the chapter. Further, anything members of the chapter do that could be perceived as fraternity business falls under the responsibility of the chapter.

In many instances, perception is reality. If something appears to be related to the fraternity, people have every right to believe it is. Fortunately or unfortunately, your chapter is responsible for the things its members do within the broad context of the fraternity.

The Grand Chapter of Alpha Chi Sigma has established the Three Objects of the Fraternity, the Five Obligations of a Member and the Health and Safety Policy to affect the behavior of fraternity members in ways that are of specific value to the members of this fraternity. This fulfills the Fraternity's own responsibility to furnish guidelines for member behavior for its subordinate chapters. From there, the burden rests on the shoulders of the individuals.

Individual expression, diversity and freedom are essential to the organization and its prosperity. However, there are certain expectations for you and your fellow members' behavior. Collectively, the chapters have a set of expectations as well. This is realistic, reasonable and even responsible. It is your chapter's right to explicitly share these expectations among its members and to educate its members about them. When done correctly, this does not demean or belittle people. In fact, this gives people a greater sense of organizational identity and belonging.

Pledge Education and a Fraternal Canon

by Jonathan E. Wenzel, Delta 1996

A canon is a general rule, concept or set of writings. In the context of pledge training, it can refer to the sum of knowledge that pledges are required to learn during their pledgeship.

The canon is provided to help pledge educators educate their pledges. It is designed to give guidance to pledge educators, both about the information to teach their chapters' pledges and how to set up the pledging process. This canon identifies fundamental information that forms the basis of membership and additional information that builds pride and confidence in fraternal life.

There is more to education than learning facts. The combination of information, the rationality of its value, the enthusiasm with which it is taught and the experience of working with one's pledge brothers all empower pledges to participate positively as fraternity Brothers.

The rich history of Alpha Chi Sigma, the colorful lore of alchemy, the multitude of people who make up the Fraternity, local chapter traditions and where we are today are too much for any pledge to learn in a few weeks. Maximum benefit is achieved by a structured education program, through which pledges develop a sense of what is truly important.

Information presented and tested in pledge education must be useful, relevant, significant, purposeful and meaningful. A balance must be struck among rote memorization of crucial information, learning for understanding essential information, familiarization for appreciation of various aspects of the Fraternity and the fact that membership is lifelong – as is the Fraternal learning experience. Only the essentials must be committed to memory, essentials that a future member will need to know to become a positive participant in the Fraternity.

Pledges must be taught where to find fraternal information that will be useful later when they are active members. Pledges also should be taught facts that are significant and that express the purpose and meaning of our Fraternity. Other information should include facts that help pledges get acquainted with the Fraternity, how it works, its history and its members.

The history of the local chapter and of the national Fraternity provide a background that may be useful for developing a sense of being part of the century-long traditions of Alpha Chi Sigma. Also, exposure to the history of chemistry and alchemy may provide a sense of professional purpose and meaning in pledges' education. We should keep in mind, however, that it is the present in which we work and it is the future toward which we work – don't go overboard with too much historical information.

The amount of time spent on each facet of the Fraternity along with how this information is to be taught and remembered is very important. There are four levels of information for pledge instruction:

1. Information of greatest importance to the pledge's life as a member should be learned by rote memorization word-for-word.
2. Information and facts that are important for a pledge to know but not necessarily word-for-word.
3. Topics that are important for pledges to be familiar with but which they are not expected to recite.
4. Resources and information that are not crucial to pledge education but are available for pledges to review at their interest and as needs arise when they are members.

Finally, please note that there must be good reason to require a pledge to know and remember much more information than an active member. To require otherwise is hypocrisy that trivializes pledging and, more importantly, demeans membership in Alpha Chi Sigma.

If you are a potential member: be patient for this is a learning experience for us all.

"It makes very little sense to drill pledges on information that the members themselves do not feel is important enough to remember."

John E. Adams, Beta Delta 1971
Grand Master Alchemist 2002-2004

"It is not what you do that counts. It is what you help others to do that makes progress."

Herman B. Wells
Former Chancellor of Indiana University

"Ethics is not a policing function. It's about creating the kind of climate in which people are encouraged to make right decisions in the first place."

Kent Kresa
Former President of Northrop Grumman Corporation

{*Section* II}
Origins

Founders of the Fraternity

Top row – J. Howard Mathews, Edward Mattke, B.E. McCormick, James Silverthorn
Bottom row – Joseph G. Holty, Harold Eggers, Frank J. Petura, A.E. Kundert

Photo courtesy of The HEXAGON, 2nd ed., vol. 3, p. 55. Raymond Tracy Conger is not pictured.

The American College Fraternity System

General Fraternities and Sororities

In early Colonial colleges, student enrollment was limited to males from upper class families. The strict classical curriculum was based on memorization of Greek and Latin texts. Discussion or debate with professors was prohibited. The need to seek individual means and opportunities of expression resulted in the students banding together in "literary societies" where disputation and debate could be carried on without professional interference. The societies chose Greek names to identify themselves with ancient classicism.

Such literary societies existed at most colleges. Their object was training and drill in composition and oratory and their exercises consisted of debates, reading of essays and orations. The membership was large and did not foster close friendships.

On December 5, 1776, at the College of William and Mary, five students met in the Apollo Room of Williamburg's Raleigh Tavern to form a secret society for social and literary purposes, Phi Beta Kappa. It was the first organization in the world to identify itself with a Greek letter name. It had all the characteristics of a modern fraternity: the charm and mystery of secrecy, a ritual, oaths of fidelity, a grip, a motto, a badge (a square silver medal with the letters ΦBK and three stars standing for friendship, morality and literature), a background of high idealism, a strong tie of friendship and comradeship, and a desire to disseminate its values through nationwide expansion.

In 1779, the parent chapter of Phi Beta Kappa authorized branches or "chapters" at Yale and Harvard, and these were established in 1781. A chapter followed at Dartmouth in 1789. No others were founded in the next 30 years, and during this time Phi Beta Kappa evolved into an honor society. Its secrets were revealed to the public in the wake of antimasonic feelings that prevailed in the 1820s. Today it is recognized as the outstanding honor society in the liberal arts and sciences.

In 1825, the Kappa Alpha Society was founded at Union College in New York. It is the oldest Greek letter social organization in existence today. The faculty opposed this small secret society, but it appealed to the students. In 1827, Sigma Phi and Delta Phi were established at Union. These three fraternities, known as the "Union Triad," established the pattern for the American fraternity system.

In 1831, Sigma Phi established a chapter at Hamilton College. That same year, Psi Upsilon was founded at Union, and Kappa Alpha established a chapter at Williams. In 1832, Alpha Delta Phi was organized at Hamilton; in 1833 it established the first chapter of a fraternity west of the Alleghenies at Miami University in Ohio. Beta Theta Pi was founded at Miami in 1839. These and other fraternities spread rapidly in the ensuing years.

In 1851, the Adelphean Society was organized by 19 women at Wesleyan Female College in Macon, Ga. In 1913, it changed its name to Alpha Delta Pi and is considered the first sisterhood. Pi Beta Phi was established at Monmouth College in Illinois in 1867 as the first organization of college women as a national college fraternity. The Greek letters were used as a secret motto, and it was not until 1888 that the Greek name was adopted. Kappa Alpha Theta was organized at DePauw University (then Indiana Asbury University) in 1870 as the first Greek letter society for women.

In 1845, the first fraternity house – a log cabin used by students for a rendezvous after the university president demanded they give up fraternity connections – was occupied by students of the University of Michigan. The first "modern" house, containing living quarters, was erected at Williams College in 1864. From this beginning, the "house" concept quickly spread, and indeed, at many colleges and universities fraternity and sorority houses constituted the only dormitories.

While membership of fraternities and sororities was for over a century traditionally drawn from the upper classes, often through strictly-drawn covenants, more democratic membership standards slowly evolved in the 1950s and 1960s. The protest movements of the late 1960s were traumatic for the American fraternity system. Despite its continued expansion, mainly at smaller colleges and universities, the percentage of students who joined chapters decreased significantly. More recently, however, the value of membership in such small intimate groups has provided students with an identity, particularly at the larger, more impersonal universities.

Professional Fraternities and Sororities

During the last half of the 19th century, many universities established professional schools, and new organizations came into being to provide fellowship and recognition for men who had chosen the same profession. In 1864, Theta Xi, the first professional (engineering) fraternity, was established at Rensselaer Polytechnic Institute; it subsequently evolved into a social fraternity. Phi Delta Phi, a legal fraternity established at the University of Michigan in 1869, is the first to persist as such until today. Nu Sigma Nu, the first similar organization for medical students, also was established at Michigan in 1882. In that same year at Michigan, Delta Sigma Delta was founded as the first professional dental fraternity and the following year, Phi Delta Chi as the first in pharmacy. Phi Mu Alpha Sinfonia was established at the New England Conservatory of Music in 1898.

Alpha Chi Sigma, the professional fraternity in chemistry, was founded at the University of Wisconsin on December 11, 1902. The story of that founding and the development of the fraternity is found elsewhere in this booklet. It is worth noting that Alpha Chi Sigma, in common with other professional fraternities, more closely mirrors the original ideals and purposes of Phi Beta Kappa than do the general fraternities that first evolved from it.

The oldest professional fraternity for women is Zeta Phi Eta, speech arts, founded in 1893 at Northwestern University. Others established early were Sigma Alpha Iota in 1903 at Michigan and Mu Phi Epsilon in 1905 at the Metropolitan College of Music in Cincinnati, both in music and Kappa Beta Pi, law, in 1908 at the Chicago-Kent College of Law.

As the system grew, the fraternities with similar purposes joined together to form four conferences and associations representing more than 200 men's and women's fraternities, both general and professional. The women were the leaders in this movement. The National Panhellenic Conference (NPC) first met in Chicago on May 24, 1902. In 1909, the first National Interfraternity Conference (NIC) met in New York City. The Professional Panhellenic Association (PPA) was founded in 1925 and the Professional Interfraternity Conference (PIC) in 1928, both in Washington, D.C.

These four associations of fraternities met as the National Conference on College Fraternities and Societies in April 1946 and in 1950 adopted a constitution as as the Interfraternity Research and Advisory Council (IRAC).

The Professional Interfraternity Conference

The Professional Interfraternity Conference (PIC) came about due to the rapid growth in all types of fraternities in the late 1920s. In order to formalize the distinctions between professional and social fraternities, the National Interfraternity Conference appointed a committee to study professional fraternities and their rightful place in the collegiate world. Particular attention was paid to the issue of dual membership in professional and social fraternities.

On March 2 and 3, 1928, meeting at the Hamilton Hotel in Washington D.C., 38 delegates representing 27 professional fraternities created the framework for the PIC. Representing Alpha Chi Sigma was past Grand Master Alchemist Stroud Jordan, who was elected secretary-treasurer of the PIC. The PIC's first president was Major Jarvis Butler of Sigma Nu Phi (law).

By its own constitution, in order to become "official" the PIC had to be approved by at least 12 fraternities representing at least five professions. On June 18, 1928, during the tenth biennial Conclave in Chapel Hill, N.C., Alpha Chi Sigma ratified the constitution of the PIC, becoming one of its charter members. Alpha Chi Sigma has been very involved with the PIC with several members (in addition to Brother Jordan) serving as officers and members of the executive committee. Among them have been Marvin C. Rogers, Beta 1924, who served as PIC president from 1935 to 1937; John R. Kuebler, Epsilon 1910, who served as PIC secretary-treasurer from 1949 to 1951; GCA Burt Tiffany, who was elected to the PIC board of directors in 1962; and James F. Miller, Nu 1937, who served as president of the conference from 1975 to 1976.

The Professional Fraternity Association

During the United States Bicentennial in 1976, the fraternity world joined in "An Interfraternity Bicentennial Celebration" held Dec. 2, 1976, at Williamsburg, V. In a joint meeting of representatives of the Professional Interfraternity Conference with those of the Professional Panhellenic Association held Dec. 1, one session was devoted to a discussion of the consequences for professional fraternities of the enforcement of Title IX of the Education Amendments of 1972 (Health, Education and Welfare Department). Title IX prohibits single sex organizations. Although the social fraternities were exempted, the professional fraternties were not. Exemption of professional fraternities was under consideration by the Congress, but if this failed to occur, the idea of a combined organization was proposed and favorably received. Congressional action failed, and the executive committees of both PPA and PIC then supported the merger. Together these groups planned a joint three-day meeting held in Indianapolis from Oct. 20 to 22, 1977, at which the merger was accomplished.

The new organization immediately adopted the name Professional Fraternity Association (PFA) and incorporated into its membership as charter members the 20 PIC and 14 PPA national and international fraternities with more than 1.5 million members. Thirteen professional fraternities for women were charter members of the Professional Panhellenic Association. Of these, four – Delta Omicron (Music), Kappa Beta Pi (Law), Phi Beta (Music) and Phi Chi Theta (Business and Economics) – remained to become charter members of PFA.

The purposes of the PFA can best be outlined by referring directly to the Constitution:

- "The purposes of this organization shall be to advocate and encourage excellence in scholarship, advancement of professional and interfraternity ethics, cooperation among member fraternities for the advancement of fraternal ideals, and loyalty to the alma mater.
- "To encourage formation of local professional interfraternity councils on campuses of recognized colleges, universities, and professional schools.
- "To identify and advise member fraternities of social, political, and economic legislation which could affect their operations

The membership requirements also are outlined by the Constitution:

- "To be eligible for membership, a fraternity shall charter its institutional chapters only at appropriately accredited colleges, universities, or professional schools. The fraternity shall be identified by, or related to, a specific discipline, but may initiate members of general fraternities and of other professional disciplines," and supplemented by the By-laws to add:
- "Be mutually exclusive of other member fraternities within the same discipline and have the approval of the interfraternity organization of its profession, if such an organization exists."

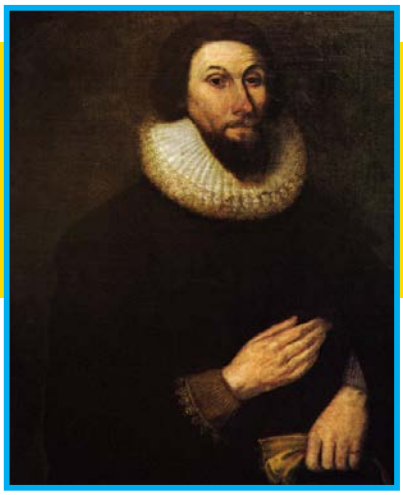
This last provision, a carryover from the very first PIC constitution in 1928, establishes the rule allowing members of social and honorary fraternities to join professional fraternities. This same rule, however, prohibits members of one professional fraternity from joining another professional fraternity serving the same profession. Since chemical engineers make up the membership of both Alpha Chi Sigma and Theta Tau (Engineering) the exclusively clause prevents membership in both organizations.

At various times, membership applications for Theta Tau and Alpha Chi Sigma have required candidates to certify that they are not members of the other fraternity. Some have mistakenly inferred there is a feud between the two fraternities. This is far from the truth as Alpha Chi Sigma and Theta Tau enjoy a very cooperative and friendly relationship.

Like with the PIC, Alpha Chi Sigma members have continued to take leadership roles in the PFA. In 1989, DeWayne Gerber, Beta Delta 1975, was appointed to the PFA Public Relations Committee, and Patrick Johanns, Alpha Theta 1981, was elected president-elect in 2012 with a presidential term running from 2013 to 2014.

The Development of American Chemistry

by Robert F. Gould, Pi 1937



John Winthrop, Jr.

Chemistry began in this country with the occasional practice of alchemy. John Winthrop, Jr. (1605-76), governor of Connecticut, accumulated the first large scientific library in the colonies: included were books on alchemy and chemistry which he loaned to Jonathan Brewster and George Starkey. While he also had alchemical equipment and chemicals, Winthrop's principal interest in chemistry was commercial development of the colonies' natural resources. In 1638 he built a saltworks on the shore of Massachusetts Bay; he began to manufacture iron at Braintree in 1643, and in 1650 he planned a chemical stock company to manufacture saltpeter. In 1651, Connecticut granted him a monopoly to work lead, tin, copper, vitriol, alum, and other materials.

Gershom Bulkeley (1636-1713) was one of the few known 17th century American chemists. He was a clergyman, physician, justice of the peace, and politician, and it is said he was "eminent for his skill in chemistry."

Samuel Danforth (1696-1777) graduated from Harvard, dabbled in medicine, studied law, and became a judge, but he was attracted to alchemy as a young man and practiced it for the rest of his life. A letter to him from Benjamin Franklin commented on Danforth's search for the philosopher's stone.

Christopher DeWitt, born in England in 1675, came to America in 1704 and settled near Philadelphia; he was a "skillful physician, learned man, crystal gazer, and transmuter."

As late as the 19th century George Rapp conducted a school of alchemy at Economy, Pa. "Father" Rapp, a German Pietist mystic, brought 500 followers to America in 1804 to found his Harmony Society, which settled first in Pennsylvania, moved to Indiana, and returned to the final settlement on the Ohio River where it became famous in the 1830's for its fabrics, particularly silks. Their estate, which is now a state museum, included a laboratory with a fume hood and a small round building that was apparently a shrine; it is decorated inside with alchemical symbols. Traces of mercury on the laboratory floor and records of purchases of cinnabar-as much as 300 lb. at a time-are evidence that alchemy was practiced. The group was celibate, and it was dissolved in 1905 when its membership was two.

Development of Chemical Industry in America

Until the mid-18th century, chemistry in the colonies was practiced at the craft level by laymen: salt was made by evaporating seawater; potash was leached from wood ashes; pine gum was collected and converted to naval stores; leather was tanned; soap and candles were made at home; beer, wine, and liquor were made locally. Under its mercantile system, England insisted on supplying most of the colonists' needs and discouraged colonial manufacturing. In spite of this, local efforts were made to develop industry. The second compilation of laws of Connecticut in 1672 included a decree that monopolies shall only be granted for "such new inventions as shall be judged profitable to the country" – a foreshadow of the Federal patent system.

Naval stores were in demand in England; rosin, turpentine, and pitch were sold for bounties in England until the Revolution, when the trade died in the northern and middle Atlantic states. But the demands of New England shipping reopened the naval stores industry in North Carolina and in later years the industry moved down the coast to Georgia and Florida, and west to Mississippi.

Indigo was also an important colonial export. It was introduced as a crop in South Carolina by Eliza Lucas; by 1747 exports had reached 134,000 lbs. per year. The trade embargoes during the Revolution ruined the business, which was taken over by the West Indies, and later by India.

Apothecaries made and sold many drugs and chemicals, including spices, dyes, and paint pigments, both before and after the Revolution. Quinine sulfate was made in Philadelphia soon after quinine was discovered in France in 1820. Some characteristically American products were exported-sassafras, sarsaparilla, witch hazel, and wild cherry bark. In colonial times, production of dyewoods was a distinctive American industry; chemists prepared extracts for dyeing and tanning after the Civil War.

The Revolution gave great impetus to all industry, as contacts with English sources of manufactured products were cut off. After the war the English tried to recapture American markets, but the embargo acts of 1807 and the War of 1812 gave manufacturers time to develop without foreign competition. The first protective tariff (1816) also raised a shelter under which chemical industry was able to grow.

U.S. manufacturers grew from $200 million in 1810 to nearly $2 billion in 1850. Mechanical discoveries and power were being applied to tools to multiply productivity, and the emerging knowledge of chemistry was being applied to the age-old crafts of soap making, glass making, papermaking, and leather tanning to convert them to chemical process industries. Bleaching cloth with sunshine was satisfactory when cloth was made with the spinning wheel and the hand loom, but sunshine bleaching couldn't keep up with the spinning jenny and the power loom. Chlorine could.

Gunpowder was also imported until the Revolution cut off imports, and efforts were begun to make saltpeter. By 1789 there were 21 powder mills in Pennsylvania; in 1810 there were 208. The DuPont Co., founded in 1803, was the nation's largest supplier of gunpowder by 1812. Saltpeter from the caves of Kentucky was an important domestic product from 1812 until the mines began to run out; they were reopened during the Civil War.

Window glass was a craft product and was the principal glassworks product after the Revolution, but bottles and tableware grew with the country. Potash was the principal glassmaking alkali until about 1850 when it was replaced by imported soda from the Leblanc process. Potash, which was a money crop that thrived as the forests were cut down for settlement, was always produced by small, part-time leachers, often by farmers as a sideline, and it never achieved large-scale production as soda ash did. The first U.S. patent, however-granted on April 10, 1790 to Samuel Hopkins-was for an improvement of potash manufacture. The production of potash from wood ashes was finally killed off when potassium salts from the Stassfurt mines of Prussia were first produced in 1861.

White lead was an early chemical import. Samuel Wetherill of Philadelphia started to manufacture it in 1762-the first chemical industry in the colonies. Others followed: Epsom salt was first made in 1790 at Bridport, Vt. and in 1800 at Barnstable, Mass.; copperas was first produced in 1793 at Stafford, Vt.; alum was made in 1812 at Cape Sable, Md. and was protected by the tariffs of 1816 and 1824. Bleaching powder was first prepared in 1824 at Baltimore. Also in Baltimore, chromium salts and pigments were made in 1827. Early chemical manufacturers made dry colors and pigments for paint. Ready mixed paints weren't produced until after 1850 when tin cans became available. In 1886, Stauffer Chemical Co. in San Francisco started making whiting from chalk brought as ballast by English grain ships, then moved into sal soda and refined sulfur. Soon after the Civil War, zinc oxide was added to reinforce white lead in paint, only to be replaced in the 1930's and 1940's by titanium dioxide.

Sulfuric acid was first produced in America in 1793 by John Harrison (1773-1833) of Philadelphia, which was the first center of chemical industry in this country. Later, significant industry developed in New York, Baltimore, and Boston; after 1826 Cincinnati was the chemical center in the West.

The first sulfuric acid plants were lead chamber plants; later, Glover and Gay-Lussac towers were added. John Harrison introduced platinum stills in 1814. Fertilizer production started in Baltimore in 1832 when Davison, Kettlewell & Co. started grinding and acidulating bones. They later turned to oyster shells and still later to phosphate rock. As fertilizer use grew, first in cotton and then in tobacco, sulfuric acid moved south, and Baltimore became the center of manufacture. Sulfuric acid production grew rapidly after the Civil War. Superphosphate production and petroleum refining consumed more acid than all other uses combined. Discovery of phosphate rock in South Carolina in 1867 spurred development of plants in Charleston, which soon became the center of superphosphate manufacture. Later, however, the industry moved on to Florida and Tennessee as sources of phosphate rock were found in those states. By 1890 there were more acid plants in the South than in the North and the West.

The sulfur for sulfuric acid was imported, but when the Sicilian monopoly raised the price, plants converted first to pyrites and later back to sulfur when American sources were opened by the Frasch process about 1904. Tennessee copper plants started recovering byproduct sulfur as acid in 1908 in the largest sulfuric acid plant in the world, and soon other byproduct plants followed. The contact process was developed in Europe in the 1880's, and about the turn of the century U.S. firms began converting to contact with processes purchased from Europe-except Nichols Chemical Co., which had its own process. With this strong position, William H. Nichols formed General Chemical Co. in 1899 in what has been called the first important American chemical merger-12 companies with 19 acid and heavy chemical plants.

The first commercial fertilizer, guano from Peru, was first imported about 1840. Imports increased rapidly, but peaked before the Civil War and died out about the turn of the century. Chile saltpeter was imported in quantity starting about 1876, although U.S. fertilizer mixers also used ammonium sulfate, a gasworks byproduct, as a nitrogen source. The chief source of potassium in mixed fertilizers was Stassfurt potash, which was controlled by the German cartel, Kali Syndikat. Mergers around the turn of the century formed several large fertilizer companies that competed so intensely for supplies that they began buying into German potash companies during what came to be known as the German-American potash war (1902-09).

Salt was first evaporated from sea brines using sunlight. In his salt works on Cape Cod just after the Revolution, John Sears met competition in salt prices by producing Epsom salt and Glauber's salts-an early example of fractional crystallization. The Onondaga Indians built a salt trade based on boiling brine from their salt springs. About 1790, salt industries developed in New York State and Virginia using pan or kettle evaporators; multiple effect evaporators were introduced in 1834. Shipping was a big factor in the cost of salt, and when deposits in Michigan, Louisiana, and elsewhere were opened, the eastern operations declined until they became the bases of alkali plants about 1880-1900.

Lye was the first chemical household product to be sold directly to the public; it replaced homemade potash for soap. Pennsalt made alkalies from cryolite imported from Greenland starting in 1867, and in that same year Church & Dwight Co. started making baking soda at Syracuse, N.Y. While some salts were recovered from western soda lakes during the 1880's, large scale manufacture of alkalies didn't begin until 1884 when Solvay Process Co. at Syracuse produced ammonia and soda products. Michigan Alkali began production in Wyandotte, Mich. (1891). Matheson, and Diamond Alkali, Painesville, Ohio (1912) employed the same process.

Soluble silicates were first produced in 1861 by a firm which became Philadelphia Quartz. They replaced rosin as a builder for soap during the Civil War and came into use as egg preservatives, and as cardboard box adhesives. When the business grew and more production was needed the company built a branch plant at Anderson, Indiana. This exemplifies the pattern of expansion common to the chemical industry. Transportation costs are a large factor in bulk products like chemicals, so distant markets were served by building new plants closer to need rather than building large centers of concentrated production. Thus the chemical industry remained decentralized.

Bituminous beds in Virginia were the first coal supplies in the country, but in the 1790's anthracite from Pennsylvania became an important fuel. The coal tar industry had its roots in coal gas that was developed as an illuminant in the early 1800's. Baltimore first lighted its streets with coal gas June 17, 1816. Boston followed six years later, and many other cities followed in the next 25 years. Candles and whale oil were the earliest illuminants. Lard oil and castor oil were used in the Midwest before 1850; cottonseed oil was burned in the street lights of New Orleans; turpentine often mixed with alcohol was burned in North Carolina and New Jersey. Coal oil (kerosene) came into use in the 1850's, but this gave way in the'60s to petroleum kerosene and to natural gas, which had been used for lighting as early as 1821 in Fredonia, N.Y

U.S. manufacture of coal tar dyes began in 1864 when Thomas and Charles Holliday made magenta in Brooklyn. Schoellkopf Aniline & Color Co. started making coal tar dyes in 1879 and was able to weather the combination of German competition and inadequate tariff protection that killed off many smaller firms. Schoellkopf later became a part of National Aniline, which joined with General Chemical, Solvay, and others to form Allied Chemical & Dye Co., the largest chemical company of its day, in 1920.

Drugs and fine chemicals expanded enormously with the Civil War, which scattered the industry from Philadelphia to St. Louis, Cincinnati, Indianapolis, and Detroit. Bromides were produced in Freeport, Pa. from 1845, in the Ohio and Kanawha River valley from 1865, by Mallinckrodt in St. Louis from 1867, and by Dow Chemical in Michigan from 1889. Chloroform was manufactured by Grasselli in Cincinnati from 1849 and by Pennsylvania Salt during the Civil War. Borax was imported from Italy until its discovery in California in 1856; after the Civil War, deposits in Nevada and California were opened to make the U.S. independent. August Zinsser started making salicylic acid in 1871. Constantine Fahlberg (1850-1910) discovered saccharine in 1879 as a fellow at Johns Hopkins, and Monsanto started to manufacture it in 1902. By 1890, many of the today's large drug firms had been established, including Upjohn Co., Eli Lilly & Co., Norwich-Eaton Pharmaceuticals, G.D. Searle & Co., Abbott Laboratories, Armour Pharmaceutical Co., and Parke, Davis & Co.

By the middle of the 19th century aluminum sulfate or papermaker's alum had taken precedence over the true alums and was being produced by a number of firms-from bauxite after 1877. After Charles Martin Hall (1863-1914) discovered the electrolytic process for making aluminum in 1886, bauxite consumption grew even faster, and imports were needed to supplement the Arkansas sources.

From colonial days, paper usually had a yellowish tint. Chlorine bleaching, introduced in 1830, not only produced white paper, but it boosted production by permitting colored rags and scrap paper to be used. Processes for straw and wood pulp from the 1850's met the burgeoning demand for newsprint; the groundwood process (1867) and the sulfite process (1883) triggered further growth.

The first American electrolytic chlorine plant was built in 1892-at Rumford, Maine. About that time, Herbert H. Dow (1865-1930), who was already producing bromine from Midland brines, started making chlorine and caustic, and Mathieson, which had acquired American rights to the Castner mercury cathode cell, built a chlorine-caustic plant at Niagara Falls, N.Y. This was the first of many electrochemical plants built at Niagara Falls to take advantage of large quantities of low-cost electricity from the new hydro-electric plants. Much of the chlorine went into bleaching powder. Also made at Niagara Falls were sodium metal, chlorates, bichromates, phosphorus, peroxides, calcium carbide, and abrasives.

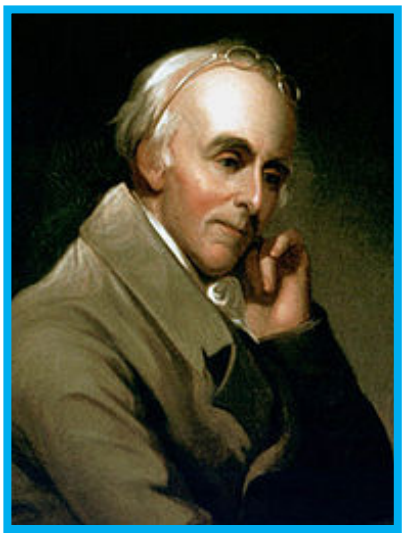
Many other heavy chemicals were produced in the United States as sources and needs developed so that by the start of World War I the country was independent in these lines and was a modest exporter of some of them. In 1910 the United States produced three times as much sulfuric acid as Germany, twice the alkalies produced by England. The value of chemical products just before World War I, $2 billion, was one twelfth of all manufactured goods and was exceeded only by food, textiles, and steel.

Chemical industry had expanded parallel with general manufacturing but differently-through small companies and expansion by decentralization, by building additional plants rather than through truss and mergers. Small plants served local markets; long distance shipping was costly, and there were few carload lots because of small demand. After World War I, however, these conditions changed.

The Origins of American Chemical Education

Chemistry in America was first taught in medical schools: at the University of Pennsylvania in 1765, at Columbia University in 1767, at William & Mary in 1774, at Harvard in 1783, at Princeton in 1795, and by 1800 at Dartmouth, Transylvania University of Kentucky, and the University of Georgia. The arrival in the United States of two eminent English chemists – Thomas Cooper and Joseph Priestley – in 1794 stimulated interest in chemistry. Priestley was offered the professorship of chemistry at the University of Pennsylvania's Medical School, but he declined and settled in Northumberland, Pa., Cooper turned for a while to law, but he later taught chemistry at Dickinson College, the University of Pennsylvania, and at the University of South Carolina, of which he was president from 1821 to 1834.

The early chemists of this country were either immigrants or were trained in Europe, and well into the mid-19th century the majority of chemists were teachers. **Benjamin Thompson (Count Rumford, 1753-1814)**, a Tory who emigrated to England and to Bavaria, where he made significant contributions to the knowledge of heat and energy, was the most eminent American-born chemist at the turn of the 19th century.



Benjamin Rush

Benjamin Rush (1745-1813), professor of chemistry and materia medica at the University of Pennsylvania Medical School, wrote the first American chemistry textbook, "Syllabus of a Course of Lectures on Chemistry" (1770).

Benjamin Silliman (1779-1864), professor of chemistry at Yale from 1804, made Yale a center of chemical education. He founded the America Journal of Science, which is still published today, and wrote a textbook, "Elements of Chemistry," that was a standard for years. **Amos Eaton (1776-1842)** introduced laboratory work in chemistry at Rensselaer Polytechnic Institute in 1824, a year before Liebig opened his similar but more famous laboratory at Giessen.

General interest in science was cultivated in the period after the Revolution and well into the 19th century by courses of public lectures offered by many chemists for fees; much of the attraction of these lectures lay in the promise of spectacular demonstrations that chemists performed.

In the early days, many colleges would permit chemists to offer courses for fees they themselves would collect before establishing them as regular offerings. However, by 1853 over 100 chemistry courses, most of which were linked to materia medica, mineralogy, or even to botany, were offered in American colleges. Only four schools offered facilities for experiment and research. The best opportunity for real laboratory experience a young chemist could find in the mid 1800s was in the analytical laboratories of consulting chemists in Philadelphia and New York, which took a limited number of students as pupils or assistants. As science became more popular, scientific schools were started to fill the need-Sheffield at Yale and Lawrence at Harvard. Graduate training could be obtained in the U.S., but for advanced degrees a student had to go to Europe, principally to Germany. A great many German chemists came to the United States to escape the unsettled conditions in Europe around the middle of the last century, and for a long time, on into the 20th century, a German degree or a German accent was the hallmark of a chemist. Yale granted its first Ph.D. in science in 1863 (to J. Willard Gibbs) and Harvard its first in 1877 (to Frank Austin Gooch). By the end of the century graduate schools in science were also operating at Johns Hopkins, Pennsylvania, Columbia, Michigan, Wisconsin and the Massachusetts Institute of Technology, among others.

At such schools brilliant and dedicated chemists, trained in Europe, developed graduate education in chemistry so that it ultimately equaled, and then surpassed levels attained on the continent. The systematic training of chemists may be traced to the founding of The Johns Hopkins University in 1876, and the development of an outstanding center of graduate chemical education there by Ira Remsen. In the Northeast, Harvard (Theodore William Richards, Nobel Prize, 1914) and the Massachusetts Institute of Technology (A. A. Noyes) "exported" outstanding students to the West Coast and the Midwest, Noyes himself became president of what was to become the California Institute of Technology, which produced brilliant scientists such as Linus Pauling, Sigma '40. Gilbert Newton Lewis, Sigma '13, joined the faculty at the University of California at Berkeley after service at Harvard and M.I.T. and developed a program which produced the likes of Nobel laureates Glenn T. Seaborg, Beta Gamma '35, and Melvin Calvin. In the Midwest, Remsen-trained W. A. Noyes, Sr., Zeta, '14, Harvard-educated Roger Adams, Omicron '12. Farrington Daniels, Beta '04, and John C. Bailar, Jr., Eta '22, were developing Big Ten chemical education at the time Alpha Chi Sigma was taking root.

The success of these and other pioneers in American chemical education can be judged from the fact that while some twenty years elapsed from the award of the first Nobel Prize in Chemistry to an American (T.W. Richards) to the award of the second, in 1932, since that time some twenty other Americans have received this coveted honor.

While the science of chemistry was developed largely in Europe, some early American chemists nonetheless made their marks. James Woodhouse (1770-1809), professor of chemistry at the University of Pennsylvania School of Medicine, made potassium by heating wood ashes with lampblack in the same year (1807) that Sir Humphrey Davy independently discovered the element in England. Robert Hare (1781-1858) who succeeded Woodhouse at Pennsylvania, invented the oxyhydrogen torch. Samuel Guthrie, Jr. (1782-1848), of Sackett's Harbor, N.Y., made chloroform in 1830 prior to the independent discoveries by Soubeiran in France (1831) and Liebig in Germany (1832). Charles Goodyear (1800-60) in Woburn, Massachusetts rescued the floundering rubber industry when he developed vulcanization in 1839. John Wesley Hyatt (1832-1920) in New Jersey founded the plastics industry when he invented celluloid in 1868. J. Willard Gibbs (1839-1903) of Yale enunciated the phase rule in his work on equilibrium of heterogeneous substances in 1876 and thereby inaugurated the science of physical chemistry. Moses Gomberg (1866-1947) at the University of Michigan, about 1904, prepared the first free radical-triphenylmethyl.

Chemistry in Modern America

At the start of World War I, the United States made some organic chemicals but was short on intermediates for dyes and drugs. Hectic development of new plants and processes, however, filled the gaps and laid the base for strengthened chemical industry in the postwar period. The wartime experience broke the German dominance in organic chemicals and on German training in chemistry. It also underlined the value of research.

Thomas A. Edison (1847-1931) pioneered the industrial research laboratory in this country with his shop at Menlo Park, N.J., geared to produce inventions for profit. Many companies followed his lead by embarking on research programs that paid off handsomely in new processes and new products. Among the chemical products of these programs were cellulose esters for rayon and lacquers, furfural from corncobs, tetraethyllead for antiknock gasoline, sausage casings from viscose, and a whole range of solvents and special products from petroleum hydrocarbons. Many other plastics materials and products were spawned during the postwar period, including styrene, vinyls, acrylates, nylon, alkyds, and ureas.

World War II found chemistry equal to the challenge of new products for new and severe service-aviation gasoline that required new synthetic and catalytic processes in the refinery, synthetic rubber, quinine substitutes, silicones, polyethylene, penicillin, DDT, rocket fuels, and RDX.

Radiochemistry developed in Europe, but U.S. chemists came on strong with isotopes and many new elements, starting with the discovery of heavy hydrogen by Urey, Murphy, and Brickwedde in 1932. Just prior to and during World War II came the transuranium elements from the University of California accelerators by E. O. Lawrence and Glenn T. Seaborg, Beta Gamma 1935, and others. In the Manhattan Project, chemists and physicists worked together to develop nuclear fission, including separation of uranium isotopes and production of plutonium, the latter by a 10 billion-fold scale-up of a process that was developed on microgram quantities of the element.

Science became the darling of government after World War II, and a number of government agencies lavished funds on research programs for medical research, atomic energy, rocket fuels, and space flight. In addition, Fulbright grants provided access for scientists to foreign travel and study. The honeymoon lasted until about 1968 when Congress began questioning those policies, and austerity set in. During the post-World War II period, inorganic chemistry enjoyed a resurgence in popularity as a result of its involvement in the atomic energy program. And the march of new products and new fields continued-cortisone and the sex hormones, transistors and solid state chemistry, fluorocarbons, polyurethanes, polycarbonates, boron hydrides, and organometallic chemistry, to name a few.

Evidence of the maturity of American chemistry is the record of 23 Nobel prizes in chemistry and 20 in medicine awarded to American chemists for a total that tops the 28 prizes in chemistry and medicine won by German chemists through 1979.

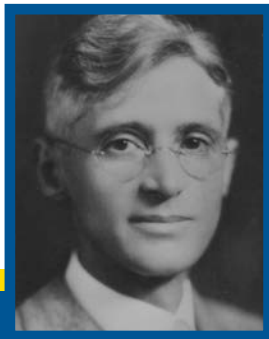
The continued growth of population and the concentration of industry have given rise to pollution problems-air, water, and solid waste-that created an awareness of the dangers they pose to the environment. New governmental standards for environmental and pollution limits, many with zero or infinitesimal tolerances, offer new challenges to chemists and to chemical industry.

For those further interested in the development of chemistry, particularly over the past one hundred years, the series of articles in Chemical and Engineering News, Centennial Edition, April 6, 1976, and The Proceedings of the 20th Robert A. Welch Foundation Conference on Chemical Research, "The American Bicentennial," W.O. Millgan, Alpha Tau 1948, are highly recommended. A series of articles in J. Chem. Educ. published throughout 1976 (Vol. 53) in honor of the Bicentennial also discusses American chemical history.

The Development of Alpha Chi Sigma

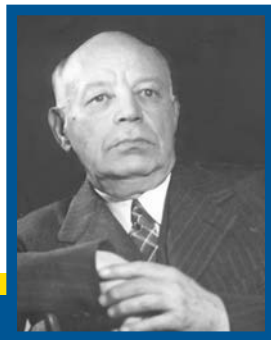
Alpha Chi Sigma Fraternity was organized at the University of Wisconsin at Madison in late 1902 by a group of undergraduates who were fellow students in chemistry at that time. Later documents set the date of founding as December 11, 1902. The founders of the Fraternity are:

Joseph H. Mathews
1881-1970

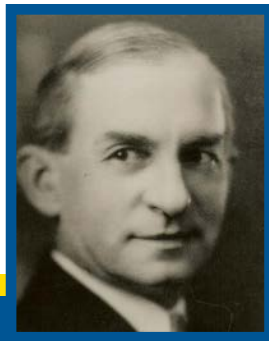


Frank J. Petura
1881-1959

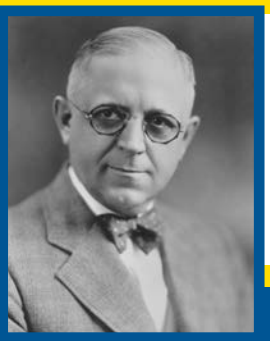
Harold E. Eggers
1882-1966



James C. Silverthorn
1880-1950

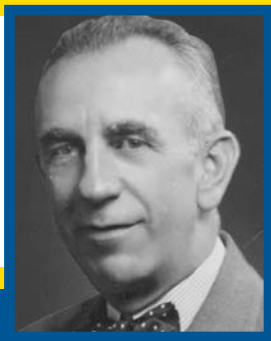


Alfred E. Kundert
1876-1948



Bart E. McCormick
1882-1934

Edward G. Mattke
1881-1939



Raymond T. Conger
1882-1947

Joseph G. Holty
1878-1919

Conger had to leave school shortly after the founding, but the Fraternity still grew by conducting two initiations within its first six months. The creation of the Fraternity was a collaborative effort of the founders and the new initiates, but Mathews was the driving force behind the organization. Of the nine founders, four (Petura, Holty, Kundert and Mathews) eventually became national officers.

The founders held a vision of a national fraternity right from the start, contacting the University of Illinois early in 1903. To expand beyond the boundaries of Wisconsin, Petura and Silverthorn were assigned the task of incorporating the fraternity. After a flurry of rapid, two-way correspondence between Alpha Chi Sigma and the Wisconsin Secretary of State, the fraternity was officially incorporated on January 22, 1904.

It turned out that the second chapter of this fledgling fraternity would be at the University of Minnesota, not Illinois. The next expansion of the fraternity also came about after a set of chance circumstances that took Mathews to Case Institute of Applied Science in Cleveland for graduate work. In addition to his graduate studies, Mathews organized the Gamma Chapter of the Fraternity there.

Now, more than a century after those early meetings in the boarding house room of "Matty" Mathews, Alpha Chi Sigma stands as the nation's only professional chemistry fraternity, still dedicated to the ideals and visions of the nine founders.

The story of the founding of the Fraternity is probably best told by those who were there. In a 1913 article appearing in *The HEXAGON,* founders Mathews and Kundert describe those first days of the Fraternity. That article follows on the next page.

Reminiscences

By J. H. Mathews and Alfred Kundert

The historical box made famous by the curiosity of Pandora certainly contained no more interesting material than the old strong-box containing the documentary records of the early development of Alpha Chi Sigma. Unfortunately for the reader, much of the material is of such a nature that it cannot be spread out upon the pages of this journal. Would that all the members of the fraternity might have the opportunity to see the old box and examine its contents!

In the spring of 1902, several students of the chemistry department of the University of Wisconsin got together and decided that it was for their best interests to found some sort of an organization whose purposes should be to promote good fellowship and scholarship in the department. At the time there happened to be a number of very congenial men studying chemistry, men who had become very well acquainted with each other both in and out of the laboratory. The number of students taking chemistry as a major was much smaller in those days than it is now, and it was much easier for the men to become well acquainted. Numerous sporadic attempts had been made to found and maintain a chemical club, but after about two years of existence the club would die a quiet and apparently unmourned death. These failures made it evident that the new organization must be something more than a club, else it would follow its predecessors to an untimely end. It was realized that the ends sought could only be attained by limiting the membership and by making the order of a fraternal nature. It is a well-known psychological fact that anything that is difficult to obtain is more desirable than that which is easy to obtain. The more difficult it is to get a thing the more enjoyment we get out of it. The founders, therefore, wisely decided that high standards of scholarship and of personality must be maintained; and each man who went into the movement knew that he, personally, would get out of it just what he put into it, and nothing more. This has been the spirit that has characterized the fraternity as a whole, and to it must be ascribed a large proportion of the success we have attained.

Those who have come into the fraternity in late years can have but little idea of the discouragements which the fates hand out to a newly organized society of this character. Neither can they have much of an idea as to how much hard work is entailed in the early development of such an organization. We were told that such an organization would tend to the formation of cliques and jealousies in the department, that favoritism would be expected from any faculty members who might align themselves with us, that the organization would develop into a social fraternity, and-direst calamity of all-that there was no field for such an organization anyway. All these prophecies were made in good faith, and probably contributed their share to our ultimate success; but, fortunately, they did not discourage the founders. It is gratifying that not one of these dire prognostications has come true.

Our fraternity has grown faster than any other professional fraternity ever organized. It would be conventional to say that the founders little dreamed what a brief decade would bring forth. But to be truthful rather than conventional, the growth of this order has been no surprise to its founders, for the simple reason that each of these nine men had faith in the magnitude of their idea. We well recall our discussions on probable development, and the prediction that ultimately we expected to see some thirty or thirty-five chapters on the roll. We see no reason for filing an amendment to that prediction.

After a number of preliminary meetings, at which the aims and purposes of the future order were formulated and agreed upon, and at which many of the details of organization were worked out, the fraternity was formally launched in December, 1902, with the following membership: R. T. Conger, H. E. Eggers, J. G. Holty, A. E. Kundert, J. H. Mathews, E. G. Mattke, B. E. McCormick, F. J. Petura, and J. C. Silverthorn. No statement was given out to the press until February 10, 1903, when the announcement appeared in the Daily Cardinal…

A New Greek Letter Fraternity
Alpha Chi Sigma is Organized by Chemical Students
Membership is limited to Those Upperclassmen Whose Major is in Chemistry. Object is to get Students in This Department More Acquainted With One Another.

Alpha Chi Sigma is the name of a new fraternity which has been added to the list of Greek letter organizations at the University. The society has been organized by students of the chemical department. The members have been working quietly since last year and already have a coterie of good men to swell their roll. The membership, though limited to those upper-classmen whose major is in chemistry, extends to all departments of the University and includes technical as well as Hill students. The Cardinal was not able to obtain the names of the charter members for this issue.

The advanced chemical students, with interests naturally allied, are so widely separated among the departmental laboratories that they have long felt the need of a more perfect organization to advance interests common to all. The new society was organized with a view of filling this long felt want. Another of the prime objects is to extend its influence to the commercial life into which the members will soon enter.

We had a happy solution of the difficulty always arising when a new organization is named. Our Greek scholar was Eggers, and by common consent the conjuring up of a title was delegated to him. How appropriately it was fashioned is evident from the fact that so far as we are aware there has arisen no sentiment favoring a change of this original title.

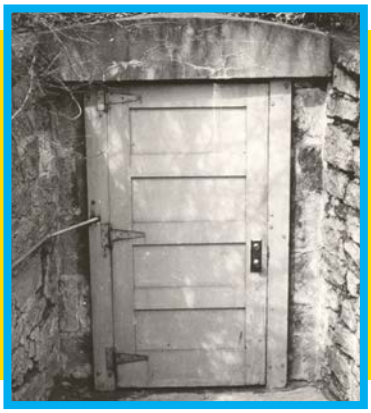
Although the name of the organization had been agreed upon and a tentative constitution drawn up, the question of a suitable design for our pin was still unsettled. Quite naturally there were about nine ideas as to the proper design of a pin. This momentous question was the order of business for a number of subsequent meetings, but eventually, with the assistance of the Bunde and Upmeyer engravers, we succeeded in getting a design which suited the fancy of all, and which has subsequently been a source of much gratification because of its harmony of design and its symbolism.

The original constitution, fortunately preserved intact in the strong-box, is a very different document from the one which has subsequently been developed; yet such changes as have been made are amplifications of the original idea. The first constitution naturally did not provide for the existence of other chapters. We were organized as a purely local society, although we expected to outgrow our clothes eventually. In the old days our officers were quite content to be called by such plebeian titles as "president," "vice-president," "secretary," etc., but in the reorganization of 1904, when the constitution was first revised and we were incorporated as a national chemical fraternity, such evidences of vulgarity were done away with, and our officers emerged with their present impressive titles. No doubt the new titles serve to inspire the officers-elect with the dignity of their positions and engender a sense of responsibility which would be impossible under the old regime! How much more imposing to be called a "grand master something-or-other" than to be a mere ordinary President!

Among many other interesting provisions in the old constitution we come across the following: "Robert's Rules of Order shall stand as the parliamentary guide for the fraternity in all cases where it does not conflict with this Constitution or By-Laws." In the subsequent reorganization and the numerous revisions our constitution has undergone this time and trouble saving provision disappeared. Have we yet reached a stage of perfection where its inclusion would not be of advantage?

Upon the adoption of a constitution, and after settling the weighty matter of the design of the pin, we were plunged into the throes of ritual making. Brothers Allan Lee and O.W. Wheelwright were elected to membership and it was therefore incumbent upon us to provide a suitable reception. That we succeeded neither of the brothers in question will deny. While we make no claims as to the polish of the ceremony we do claim much for its effectiveness!

Many years before our debut, the university had for some time maintained an underground meteorological station on the south slope of University Hill. At the time of our initiation this old cave, consisting of two unlighted, rough walled rooms, had long been



Old Meterological Lab Door

abandoned and had acquired a high degree of spookishness. The rooms were damp, cold, and cobwebby, and the low ceilings and musty air added to the sense of depression one could not help but feel. What was more natural than that we should decide to use this providentially provided cavern for our first initiation!

We were further favored by the circumstances that comparatively few of the students knew of the existence of such a place. In fact, none of us had ever explored the place before, and we knew that the candidates were ignorant of its existence.

That first initiation was one never to be forgotten! Probably no fraternity event of later years stands out so clearly in memory as the events of that evening. The candidates, after blindfolding themselves, were allowed to wait in the shadow of the chemistry building until they had about concluded that we had forgotten them; then their escorts appeared and silently commenced the long and devious way (about forty rods) to the scene of action. Like the famous general with his army, we "marched them up the hill and marched them down again," being frequently accosted by one of the brothers who possessed a megaphone and about seventeen different speaking voices manufactured for the occasion. After satisfying this very particular person as to our identity, we were allowed to proceed over a few more declivities, whereupon we did it all over again.

Lee speaks in his narrative of a delayed advance to the scene of action. This was due more to a hitch in the initiation of Wheelwright than to a desire to befog his remembrance of the path. Silverthorn had departed long before to prepare the Chamber of Horrors, but word came back by scouts that a loving couple had camped upon the very threshold to our cavern and that they evidenced no disposition to surrender their secluded retreat. To tell the truth we never did know just how they were induced to leave, but knowing the persuasiveness of Silverthorn's rich vocabulary, we always had our suspicions.

Besides furnishing the candidates much food for thought this perilous and tedious trip enabled the four remaining brothers to equip the cave with our paraphernalia and arrange a suitable welcome. Upon arriving at our destination one

candidate was put in the outer room while the other went through the mysterious rites provided for the occasion.

Each man in charge of a point had worked up the material for that point, and as no dress rehearsals had been held the initiation was quite as interesting, and probably far more entertaining, for the brothers assembled than for the candidates. Never can we forget the impression made by Brother Silverthorn as he delivered his unexpurgated contribution to the ceremony. True it is that he was somewhat handicapped by his inability to read his own writing, especially by flickering candlelight, but his extemporaneous interpolations fully made up for what we missed of the original. As Brother Lee is in an excellent position to testify as to the effect produced by this first of Alpha Chi Sigma initiations, we will let him tell the story.

The following account was kindly furnished by Brother Lee: *"The first initiation was anticipated as an important event for the society and its proper consummation was looked forward to with great interest. A ritual must be prepared for the ordeal the new candidates were about to undergo, and the drafting of this fell largely to Silverthorn; how well he exercised his ingenuity and imagination will be well remembered by many of the early members whose entrance into the fraternity was achieved only by running the gauntlet of its questions. But it is unnecessary to recall further the nature of this memorable document, whose features were such as to be rather thought than written, and though it served at several subsequent initiations, its character was eventually found to be incompatible with the increasing dignity of our order, and it was replaced by our present form. But to continue with the initiation. On a windy and threatening April night, when one might well expect to be left staked out to some gravestone, I was given a rendezvous near the chemistry laboratory and told to blindfold myself. I had not long to wait before I was located by whistles and two of the fellows came up to me. By pulling a knitted cap down to my nose, they made certain that I could not see, and then with an arm under each of mine, led me off over the hill. The walk was conducted in absolute silence on their part. Mattke I soon recognized by his height and I believe it was McCormick who had my other arm, but to my remarks about the various declivities and ascents encountered en route were returned invariable orders of silence and I soon took the hint. After an interminable promenade of all kinds of twists and turns, corkscrews, figure eights, and various and sudden changes of elevation, I was at length brought to a sort of cave, the objective point of our excursion. We must have consumed at least three quarters of an hour for a distance of considerably less than half a mile. Wheelwright had arrived by a similar process and was put through first, and during this interim I was consigned to a kind of closet with a not too certain floor. Here I began to be really apprehensive for the first time, feeling that perhaps the fellows' pranks might take the form of leaving me there indefinitely. From my post however, I could hear voices, whisperings, movings about, and suppressed giggles, intermingled with the droning of Silverthorn's voice reading his ritual. That this did not proceed perfectly smoothly was only too evident from the numerous and forcible comments with which his interruptions were generously punctuated. At length my turn came and I was held before the assembled members to hear how insignificant I was, how presumptuous to aspire to actual membership with such an august body, and how indulgent they were even to stoop to consider so infinitesimal a mortal as I, whose ignorance was grosser than that of the veriest worms. The questions next to be answered were certainly startling and added considerably to the merriment among the members. But I took all in good part, pleased to be the principal actor in the scene in my turn, not wishing to miss a sensation of the occasion, and happy to be included by my pals whom I was also soon to call brothers. Following the cross-examination came the stunts, but of these, unfortunately, my recollection is not so clear. One was to pick up something from a pan of water heavily charged with electricity, and in another I was made to bury my hands in putrid flesh (a piece of raw liver), while the rest of the fellows held vials of disgusting odors to my nose and made cavernous noises calculated to add to my feeling of nausea. This was supposed to represent the decomposing remains of a mythological brother alchemist who had been blown to atoms in the process of his alchemical researches."*

"But suddenly my bandage was whipped off and I found myself sure enough in a dimly lighted cave and the fellows, made phosphorescent for the occasion, all standing around. After many congratulations from the crowd, hand-clasps all round, and much patting on the back, we repaired to the room of one of the fellows where we were told the secrets, and the initiation was over. Wheelwright and I stood pledglings no longer, but full-fledged Alpha Chi Sigmas, having undergone that ordeal which tradition has ordained shall be the price of entrance into the mysteries of a secret society."

For a considerable time no attempt was made to extend our order to other institutions, as it was felt that we had not yet perfected our organization sufficiently. But in March, 1904, we received a petition from nine students of chemistry at the University of Minnesota. The charter was granted, and the chapter installed by Brother Kundert as master of ceremonies. At this time our constitution had been revised and we had been duly incorporated as a national organization, but our ritual was still comparatively crude, though it contained the central idea embodied in our present ritual. Because of this weakness, more than anything else, the new chapter was not sufficiently inspired with the spirit of Alpha Chi Sigma, and at the end of the year it became inactive. This reverse in our fortunes was probably favorable, for it demonstrated the necessity of a more perfect organization, and probably prevented us from making the blunder of trying to extend our order in its existing state of imperfect development. These "growing pains" were good for us. Then followed a pause of two years in which no attempt was made to gain other chapters; two years full of hard work on the part of those trying to perfect the organization.

At a recent honorary initiation at Alpha, one of the initiates expressed an appreciation of the large amount of historical lore embodied in our ritual. During the reorganization one of us, having access to a library rich in alchemical history, ferreted out a mass of material which formed the nucleus for a ritual such as few organizations can possess. It is stranger than fiction, for it is founded on fact. Woven through it are the beliefs and sayings of men who have set their imprint on history; they clothed, to be sure, their truths in cloaks of mystery and chicanery, but this was done as much for safety as to perplex, for civilized Europe

at this period was actively resentful of things she could not comprehend. Embodied in the ritual are the hopes and aims of a pseudo scientific period, when alchemy as inherited from the Egyptians was undergoing a transmutation… It is a romance whose sequel is Radium (?).

On October 31, 1906, a petition was sent in from the Case School of Applied Science. As this petition was strongly recommended by one of the founders who was then teaching at Case, and who was chiefly responsible for the movement to petition for a chapter, the council (hastily reorganized for the purpose) saw fit to grant the charter, and the chapter was installed. Brother North went down to install the chapter, and the installation was an impressive one. The ritual went off without a hitch and the boys, some of whom aided in the initiation, appreciated our ritualism thoroughly. At the banquet following the initiation, Brothers North and Mathews talked of our organization and work at greater length, and the spirit of Alpha Chi Sigma took deep root at Case. The real development of the fraternity, as a national organization, began with the installation of this chapter, and too much credit cannot be given to Brothers Hunt, Brewster, Goldberger, Katzenstein, Kessler, Ketterer, Kopfstein, and Ziegler for their hard work in firmly establishing the Gamma Chapter…

Following the re-organization of 1904, the following Grand Officers were elected in June: H. P. Holman, Alpha, G.M.A.; E. McM. Pennock, Beta, V.G.M.A.; H. B. North, Alpha, G.T.; A. E. Kundert, Alpha, G.M.C.; A.V. Dahlberg, Beta, G.R. These officers were elected for a term of two years, as is our present custom. As the newly organized Beta Chapter became defunct, and as no new petitions came in during this two year term, the duties of these Grand Officers were not very arduous.

As no petitions had been received by June 1906, the time when a regular election of Grand Officers should take place, and as there was but one chapter active, no election was held. Upon receipt of the petition from Gamma it became necessary to hold an election before any business could be legally transacted. At this election the following officers were elected: H. B. North, G.M.A.; Frank J. Eaton, V.G.M.A.; A. L. Leasman, G.R.; A. F. Sievers, G.T.; J. Howard Mathews, G.M.C.; and Robert F. Koenig, Supvr.

Although Grand Officers had been elected in 1904 and 1906, the first real Convocation was held at Madison in June, 1908. At the meetings previous to this date delegates from the other chapters had not assembled, for very evident reasons. At the First Biennial Convocation of Alpha Chi Sigma the following chapters were represented: Alpha (F. P. Downing, Delegate), Beta (R. S. McBride, Delegate), Gamma (K. W. Ketterer, Delegate), Delta, (L. S. Palmer, Delegate), Epsilon (W. B. Jadden, Delegate), Zeta (E. J. Bartelles, Delegate), Eta, (represented by F. J. Petura of Alpha), and W. A. Richards (Alpha), Delegate at large for the alumni.

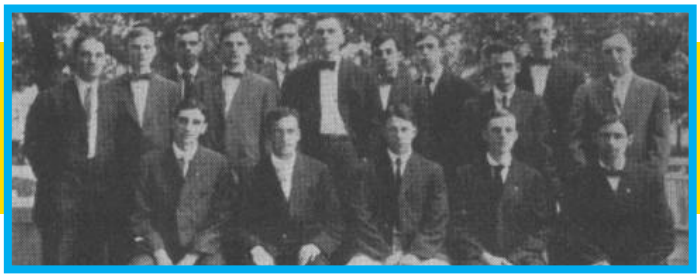
At this Convocation there was considerable discussion of the Ritual, but no actual revision was accomplished. The matter of revision was left to the Supreme Council, which body met the following summer and threshed the matter out thoroughly. The coat-of-arms was also evolved at this Council meeting.

The election of 1908 resulted as follows: J. Howard Mathews, Alpha, G.M.A.; R. S. McBride, Beta, V.G.M.A.; E. L. Leasman, Alpha, G.R.; E. L. Bartells, Zeta, G.T.; W. B. Jadden, Epsilon, G.M.C.; and O. C. Stanger, Zeta, Supvr. In January 1909, W. B. Jadden resigned as G.M.C. and L. S. Palmer, Delta was appointed to the office of G.M.C. for the rest of the term of office.

This brief account must not be closed without some comment upon the versatility of the founders of Alpha Chi Sigma. The present occupations of these nine men doubtless teach us that an Alpha Chi Sigma is qualified to tackle any proposition going. One is taking care of the books and money for a large engineering and contracting company (Conger); one looking after the health and medical training of the Chinese (Eggers); one instilling the fundamentals of chemistry into the heads of high school students (Holty); one dispensing pills, drugs, and elixirs of life from his drug store (Kundert); one attempting to lead the student along the devious paths of physical chemistry (Mathews); one selling lumber (Mattke); one holding the principalship of a large high school (McCormick); one helping to run Wall Street (Petura); and one superintending a gas plant (Silverthorn). At least one man out of the nine (the last) frankly states his profession!

By the National Convention of 1908, chapters had been established at seven collegiate campuses. During that Convention, President H. B. North suggested that the fraternity look into establishing a newspaper or magazine. A motion passed authorizing the Board of Directors to investigate the publication of a journal. O. C. Stanger, from Illinois, was appointed to head the investigation. At the next National Convention, in 1910, Mr. Stanger gave a favorable report, resulting in unanimous approval for a quarterly publication, with one issue devoted to being a National Directory. The first editorial board was created with the fraternity's vice president assigned the duties of Editor-in-Chief, with one collegiate and one alumni appointment rounding out the triumvirate. Today's *HEXAGON* is assembled by a paid editor, appointed by the Supreme Council and given a fixed budget.

The motion approving creation of *The HEXAGON* passed on June 24, 1910. The first issue appeared in October of that same year. Thirty-eight pages long, with an annual subscription price of one dollar, the issue consisted of a report of the 1910 Conclave, a few editorials, and reports from each collegiate and alumni chapter of the fraternity. A second issue, containing a listing of every member in the fraternity, followed in January and it has been published regularly ever since.



Attendees at the First Biennial Conclave in June 1908
Madison, Wisconsin

The HEXAGON remained a quarterly publication until 1920, when Grand Editor, Paul Manning took it to a monthly publication. Twenty-four monthly issues were published under Manning. In 1922 J. R. Kuebler became Grand Editor, and the yearly number of issues became… well, flexible. During the next twenty-odd years, *The HEXAGON* appeared anywhere from nine to five times per year, depending on available news and available budget. In 1944, a fixed publication schedule was set and *The HEXAGON* went to a year-round, bimonthly schedule. By 1947, the July issue was dropped and the official publication schedule became 2 Fall issues and 3 Spring issues. In 1955, *The HEXAGON* dropped back to 4 issues per year, with publication schedules sometime calling for 2 Fall issues/2 Spring issues and sometime calling for quarterly distribution, sometimes designated by month, sometimes by season. *The HEXAGON* is currently on a Fall/Winter/Spring/Summer schedule, and is sent at least once a year to all members of known address.

In as much as Alpha Chi Sigma is a Professional Chemistry Fraternity it should come as no surprise that *The HEXAGON* would publish articles that focus on the chemical industry and chemical research. In addition to contemporary chemistry, *The HEXAGON* has dealt extensively with the subject of alchemy, the pre-history of modern chemistry. *The HEXAGON* also strives to provide general interest articles, such as job hunting guidelines and international travel hints. Among the regular features are editorials from National Officers, personal news clips from members, obituaries, and news from the collegiate chapters. The first humor page, featuring jokes with a chemical or technical twist, appeared in 1917. That page is now called "Hot Retorts" and continues to be one of the magazine's most popular columns. The growth of Alpha Chi Sigma has been a function of the times, and has extended to all parts of the country. The first West Coast chapter was Sigma, University of California at Berkeley (1913); Southern chapters were established at the University of North Carolina (Rho, 1912) and Louisiana State University (Psi, 1914). The East Coast gained representation in 1911, with the establishment of Mu (University of New Hampshire), Nu (Pennsylvania State University), and Xi (University of Maine).

As its collegiate members graduated and moved into industry or academia, alumni came together and formed chapters of their own. The Chicago Alumni Chapter was the first such chapter, being formed in 1910. Washington, D.C. followed in 1911 and St. Louis in 1913. The alumni chapters caught the attention of the Supreme Council which tried to work out a way to make them a part of the fraternity. At the 1916 Conclave, legislation was passed authorizing the Supreme Council to create Active Alumni Chapters with all the privileges of collegiate chapters, except for the initiation of new members. After the end of World War I the question of Alpha Chi Sigma after graduation continued to be an issue for the Sixth Biennial Conclave, held on December 29, 30, and 31, 1919. Alumni chapters were having a great deal of difficulty and lacked direction. Alumni Chapters were considered a drag on the Grand Treasury and were not serving much of a purpose. A number of Alumni, who had formed friendships during the war, wanted a different sort of organization than what was created in 1916. The Alumni Chapter of New York proposed a separate sub-group of the fraternity. They called this sub-group the "Order of the Khems" and it was based on a concept originated by Stroud Jordan in 1917. The proposal became a deeply passionate issue with very little middle ground as nearly everyone took one side or the other. Raised voices and GMA Curtis' gavel pounding punctuated the debates. Some of the opposition to New York's proposal was that it was solely New York's idea. The Order of Khems was presented as an unalterable entity and the New Yorkers were not interested in compromise. Membership in the Order of Khems was limited to Alpha Chi Sigma members, but not guaranteed to all Alumni. The New York group also proposed to divide Alpha Chi Sigma into two separate orders. The Order of Alchemists for collegiate chapters and The Order of Khems for alumni. Each Division would have their own set of National Officers. The two divisions with a common board of directors would comprise Alpha Chi Sigma Fraternity. When the Conclave was over, Alumni Chapters had been abolished and Active-alumni membership (instituted by action of the previous Conclave) was abolished. Finally, the fraternity would not discourage expansion of the Order of Khems nor prohibit members from joining the Order, but it was not officially recognized as a part of the fraternity either.

Over the next 36 months, the harder the Supreme Council and New York Alumni tried to push the Order of Khems, the harder other Alumni resisted it. In 1922, the matter came to a head in St. Louis at the 7th Biennial Conclave. Representatives from the abolished Alumni Chapters met the day before the Conclave and hammered out an agreement that radically altered the Fraternity. The Office of Vice Grand Master Alchemist was gone as was the Office of Grand Alumnus. What emerged was the two branch system we have today with a vice president over the collegiate branch and a vice president over the professional branch. Over the years, the professional branch has grown and declined. At one time there were more than 30 active professional chapters, now there are only a few active professional chapters, yet the majority of the Fraternity's operating budget comes from the voluntary contributions of the professional branch.

In 1970, the fraternity was radically altered again with Conclave motion 15, by NEDC Robert E. Schaffrath, Pi 1945, seconded by Raymond Cousins, Beta Rho 1970, delegate from Beta Rho: "Amend Bylaws Article 1, Section 1, Part 1, Paragraph (a), to read, 'Any chemist or any student of chemistry' and to bring any other Article in the Bylaws into conformity with this amendment." That wording would remove being male as a requirement for membership. The idea of women in the fraternity had actually been around for some time. In a 1946 Hexagon editorial, Louis Monson, Alpha Epsilon 1922, suggested in that the fraternity should regard women as prospective Alpha Chi Sigmas. Tau Beta Pi awarded its first "Women's Badge" in 1923. By 1945, thirty-five other women engineers had earned special recognition, prompting Tau Beta Pi to consider electing women to full membership.

As more women enrolled in chemistry-related majors, the debates would surface on their potential value as members of Alpha Chi Sigma. Arguments of morality, tradition and concerns that women "just wouldn't fit in" always prevailed and the status quo was maintained. Driven by the economics of falling membership, the controversy stirred anew during the late sixties. Ed Schneider, Beta Delta 1942, GCA from 1966 through 1968, recalls the difficulties of the times, "I had a fair amount of correspondence with a number of colleges. I don't want to over simplify it, but it was their feeling that the college could provide all the social needs of the student and that fraternities were neither needed or wanted. My answer to this was that we weren't merely a Social Fraternity but were a Professional Fraternity and were interested in advancing chemistry both as a science and a profession. Their answer was, 'If this was true, why didn't we allow women students to join?' To this I had no answer."

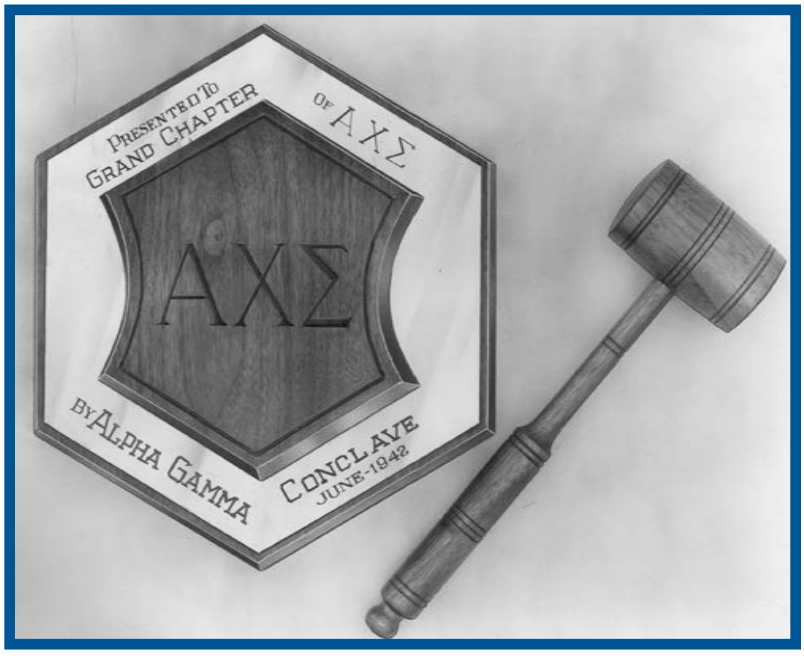
The late sixties also ushered in an anti-establishment attitude among students. Fraternities, with their secret rituals and forced discipline were branded bourgeoisie and were generally shunned. Membership in all Greek letter societies, including Alpha Chi Sigma, was dropping and chapters were closing all over the country. The fraternity was facing a membership crisis and increasing the potential membership base by bringing in women seemed the obvious way to combat the decline. It became a frequent topic of Supreme Council discussions. There were mixed feelings on the subject, but the Council became convinced it was the right course to take. When motion 15 came to the floor heated debate took up most of the morning sessions. Predictions of the fraternity's demise if women were allowed in were made by some, while projections a similar fate if women were kept out were made by others. House chapters feared they would have to close their doors. Amendments and counter proposals were made and rejected. A proposal to create an official Little Sisters Program with the same membership qualifications as Alpha Chi Sigma nearly won approval, but fell short in the end. The session ended with a failing vote that apparently put the issue to rest again. GMA Schneider was not going to give up that easily. A desperate lunchtime negotiation by the GMA, brought an agreement that if the motion was amended to not take effect immediately, it would pass. When the afternoon session was called to order, the Beta Delta Delegate moved to reconsider motion 15. After a little more debate, the amended motion passed by a vote of 65 to 3 (one abstention). On September 1, 1971, nineteen women were recorded as full members of Alpha Chi Sigma. Although a matter of some controversy, the women of Alpha Chi Sigma are referred to as "Brother." From 1971 until 1979, women were called both "Sister" and "Brother" with no consistency causing some women to take offense with one reference, some with the other. In 1978, the Ritual Committee did extensive linguistic research and discovered that within the context of a fraternal organization, "Brother" is the correct term to reflect the equality of all members, regardless of gender. "Sister" on the other hand is used to denote a secondary class of membership.

Important Events in the History of Alpha Chi Sigma

1902	Alpha Chi Sigma founded at the University of Wisconsin.
1903	Badge first displayed.
	First initiation.
1904	Incorporation of Alpha Chi Sigma – the vision of a national Fraternity.
1906	The ritual of initiation revised by J. Howard Mathews.
	Gamma Chapter installed at Case School of Applied Sciences employing the ritual.
1908	The first truly national biennial Conclave held at Madison, Wis.
	Representatives from seven chapters elect J. Howard Mathews as Grand Master Alchemist.
1909	Coat of Arms and pledge pin designs adopted.
	Revision of the ritual.
1910	*The HEXAGON of Alpha Chi Sigma* is first published.
	First alumni chapter formed (Chicago).
	First chapter newsletter published (*The Germ*, Zeta Chapter).
1911	Alpha Chi Sigma expands from the Midwest to the East, with the installations of Mu, Nu and Xi Chapters.
1912	Fraternity expands to the South with Rho Chapter.
1913	Fraternity expands to the West with Sigma Chapter.
	Scholarship Award instituted.
1914	*Alpha Chi Sigma Toast* written by members of the Chicago Alumni Chapter.
1916	Double letters in chapter designation with Alpha Alpha installed at Stanford University.
1917	Loyalty Fund established (eventually evolved into Reserve Fund).
1918	No Conclave – all members of the Supreme Council in military service.
1919	District Deputies (later called District Counselors) attend their first Conclave, the concept having been adopted in 1916.
1922	The professional branch established.
	Restrictive membership requirements instituted.
1923	"Hot Retorts" first appeared in *The HEXAGON*.
1924	Revision of the ritual.
	A Board of Trustees is appointed to manage reserve funds of the Fraternity.
1926	John R. Kuebler becomes Grand Recorder.
1927	*History of Alpha Chi Sigma Fraternity 1902-1927* published by Harry A. Curtis, Eta 1908 as a history of the first 25 years of the Fraternity
1932	Third round of chapters began with Beta Alpha installed at Bucknell University.
	The Objects of the Fraternity approved in present form at the 12th Biennial Conclave.
	Order of Altotus created.
1934	Systematic study of alchemy as it pertains to Alpha Chi Sigma authorized.
1936	Grand Chapter approves publication of the Pledge Manual.
	The T. Dale Stewart Awards for Best House and Non-House Chapters first awarded.
1939	Support of ACS Award in Pure Chemistry instituted.
1940	Supreme Council urges adoption of safety programs by chapters and appoints committee.

1946	Alpha Chi Sigma flag adopted.
1948	Restrictive membership clause modified.
1952	50th Anniversary - 21st Biennial Conclave held in Madison, Wisc.
1954	All restrictive clauses removed.
1958	Alpha Chi Sigma Educational Foundation established.
1959	John R. Kuebler retires as Grand Recorder and Grand Editor.
1961	John R. Kuebler award established.
1964	Professional Recognition Ceremony adopted.
	Boy Scout Activity Committee established.
1966	Alpha Chi Sigma Award in Chemical Engineering Research established.
1970	J.H. Mathews Memorial Scholarship Fund established.
	Admission of women into Alpha Chi Sigma approved at 30th Biennial Conclave.
1971	First women initiated into Alpha Chi Sigma.
1975	Alpha Chi Sigma is designated as an IRS 501(c)(3) charitable organization.
1977	Fourth round of chapters begins with installation of Gamma Alpha at Johns Hopkins University.
	Ritual Committee formed.
1978	Scholarship Award re-established.
	Revision of the ritual.
	First reactivation of a chapter since 1908 with Alpha Zeta at MIT.
1980	Collegiate Activities Committee formed.
1981	Alpha Chi Sigma Hall of Fame instituted.
1982	Professional Induction Ceremony approved for use.
	First Hall of Fame members elected.
	First Clyde B. Hutichson Award presented for best professional activities by a collegiate chapter.
	First Walter T. Schrenk Award presented to the best Conclave attendance by a collegiate chapter.
1983	H.E. Minnerly Memorial Fund established.
1984	Professional Representatives added to the Grand Chapter.
	First woman elected to Supreme Council.
	Edmund E. Dunlap Fund established.
1986	Leadership Development Committee formed.
1989	Star Chapter Award program started with first awardees at the 40th Biennial Conclave.
	Fraternity gets the toll free phone number 1-800-ALCHEMY
1992	Ronald T. Pflaum Award for outstanding Chapter Advisor first awarded.
1995	Alpha Chi Sigma national website created.
2000	Best Professional Chapter Award re-established as the Vincent A. Sedlak Professional Chapter Award.
2002	Alpha Chi Sigma Centennial Celebration.
	J. Haworth Jonte Award Established for Most Improved Collegiate Chapter with first awardee at the 47th Biennial Conclave.
2006	First woman serves as Grand Master Alchemist.
2008	First woman inducted into the Order of Altotus.
2012	Fraternity enters fifth round through the Greek alphabet with the installation of Delta Alpha at University of Rhode Island.
2018	Revision of the ritual.
2020	First Virtual Conclave

{*Section* III}
Organization and Governance



The Governance of Alpha Chi Sigma

The Grand Chapter

The Grand Chapter is the legislative body of Alpha Chi Sigma, and only it can modify the Constitution and Bylaws of the Fraternity.

In all times except during the Grand Chapter Conclaves, the Grand Chapter consists of the Grand Chapter officers, the District Counselors, the Professional Representatives, the Master Alchemist of each active collegiate chapter and the President of each active professional chapter. During Grand Chapter Conclaves, the Grand Chapter consists of the Grand Chapter officers, the District Counselors, the Professional Representatives, the elected delegate of each active collegiate chapter and the elected delegate of each active professional chapter.

Since the delegates from the collegiate chapters greatly outnumber all other members of the Grand Chapter, Alpha Chi Sigma is an organization whose laws are made and modified, to a very great extent, by the collegiate members of the Fraternity.

The Supreme Council

The Grand Master Alchemist, the Grand Collegiate Alchemist, the Grand Professional Alchemist and the Grand Master of Ceremonies constitute the Supreme Council, which acts as the board of directors of the Fraternity. Seniority is decided upon by length of service on the council. The Supreme Council, along with the Grand Recorder, Assistant Grand Recorder, and the Grand Health and Safety Officer, comprise the Grand Chapter officers. Article II, Section D, of the Alpha Chi Sigma Constitution defines their duties:

Grand Master Alchemist (GMA)

The Grand Master Alchemist shall preside over Grand Chapter and Supreme Council proceedings, vote on Grand Chapter and Supreme Council legislation, have general supervisory authority over the activities of the Grand Chapter officers, care for matters of discipline, direct the installation of collegiate chapters, and sign charters and member certificates. The Grand Master Alchemist shall, with the approval of the Supreme Council, appoint committees of the Grand Chapter and of the Supreme Council, fill vacancies in the Supreme Council, and appoint District Counselors.

Dr. Merryn Cole

Alpha Theta, 2003 | Grand Master Alchemist | (President) | gma@alphachisigma.org

Grand Professional Alchemist (GPA)

The Grand Professional Alchemist shall supervise the activities of the professional chapters and of the District Counselors in their relations with the professional chapters, assist the Grand Master Alchemist, vote on Grand Chapter and Supreme Council legislation, and sign charters.

Dr. Faith Yarberry

Alpha Sigma, 1992 | Grand Professional Alchemist | gpa@alphachisigma.org

Grand Collegiate Alchemist (GCA)

The Grand Collegiate Alchemist shall supervise the activities of the collegiate chapters and of the District Counselors in their relations with the collegiate chapters, adjudicate disagreements regarding collegiate branch membership requirements, assist the Grand Master Alchemist, vote on Grand Chapter and Supreme Council legislation, and sign charters.

Matt Schnippert
Gamma Beta, 2003 | Grand Collegiate Alchemist | gca@alphachisigma.org

Grand Master of Ceremonies (GMC)

The Grand Master of Ceremonies shall be the ceremonial officer of the Fraternity, supervise the installation of chapters at the discretion of the Grand Master Alchemist, vote on Grand Chapter and Supreme Council legislation, and sign charters.

Dr. Hannah Bowman
Beta Nu, 2006 | Grand Master of Ceremonies | gmc@alphachisigma.org

Grand Chapter Officers

Grand Recorder (GR)

The Grand Recorder shall carry out the duties of a secretary and treasurer, and shall sign charters. The Grand Recorder shall act as historian unless the Supreme Council appoints a Grand Historian.

Assistant Grand Recorder (AGR)

The Assistant Grand Recorder, if any, shall assist the Grand Recorder and shall assume the duties of Grand Recorder when the Grand Recorder is unavailable. The Assistant Grand Recorder may be a non-member of Alpha Chi Sigma Fraternity. If a non-member, the Assistant Grand Recorder shall neither witness nor participate in any part of the ritual associated with initiation but may attend Conclaves and Supreme Council meetings and may, if invited, attend any meetings of subordinate chapters.

Grand Health and Safety Officer (GHSO)

The Grand Health and Safety Officer will oversee the entirety of the Alpha Chi Sigma Health and Safety program including, philosophy, policies, procedures, education, and enforcement.

The Order of Altotus

The Order of Altotus is an exclusive organization whose membership is restricted to past Grand Master Alchemists. While not voting members of the Grand Chapter, the Order of Altotus comprises an advisory board to the Supreme Council. By custom, the most recent inductee into the Order is the chair of that advisory body. In 1982, GMA Gerry Dobson conferred the title Grand Vizier on this position.

The Emblems of The Order of Altotus

Several emblems have been adopted by the Grand Chapter for the exclusive use of members of the Order of Altotus. In 1940, a diamond-bordered badge with coat-of-arms guard was reserved for presentation to the retiring GMA upon his induction into the Order. In 1958, GMA Ronald M. Warren designed an Order of Altotus ring. Brother Warren received the first such ring. Prior to the 30th Biennial Conclave (1970), GMA Edward P. Schneider, Jr. was given permission, by the Supreme Council, to create an Order of Altotus tie-bar. Other GMAs have chosen to receive a gold watch upon induction into the Order. In anticipation of the first female member of the Order of Altotus, the 39th Biennial Conclave in 1988 authorized the creation of an Order of Altotus pendant. At the 49th Biennial Conclave in 2008 with the induction of the first female member, a ring designed for women was unveiled.

The rings are gold, set with onyx, bearing a diamond and three gold or platinum stars. The tie-bar and pendant are similarly designed. Upon induction into the Order of Altotus, the retiring GMA may chose whichever emblem he or she desires.

Living Members of the Order of Altotus

Dr. John E. Adams
Beta Delta 1971

Dr. Gary D. Anderson
Alpha Eta 1962

Dr. Kenneth L. Busch
Epsilon 1984

Mark N. Evaniak
Beta Sigma 1980

DeWayne Gerber
Beta Delta 1975

D. Mitch Levings, P.E.
Beta Delta 1975

Col. William A. Myers
Alpha Sigma 1954

Kip A. Nalley
Alpha Sigma 1990

Victor H. Palla
Beta Omicron 1984

Dr. Sean Pawlowski
Gamma Upsilon 2006

Sherrie E. Settle
Alpha Kappa 1983

Jennifer M. Showerman
Zeta 1992

John N. Stipp
Epsilon 1989

Dr. Lynn A. Swanson
Beta 1963

Helen M.M. Webster
Alpha Rho 1994

Dr. Randy D. Weinstein
Alpha Kappa 1990

Dr. Jonathan E. Wenzel
Delta 1996

Michael Zachmeier
Beta Phi 1977

Year(s) Served as GMA	Order of Altotus Member Name	Chapter and Year Initiated
1950-1952	L. W. VanDoren	Upsilon 1923
1952-1954	Merle L. Griffin	Alpha Epsilon 1925
1954-1956	Walter T. Schrenk	Alpha 1917
1956-1958	Ronald M. Warren	Alpha Upsilon 1929
1958-1960	L. Reed Brantley	Beta Gamma 1935
Honorary	John R. Kuebler	Epsilon 1910
1960-1962	Frank J. Zvanut	Beta Delta 1936
1962-1964	Marvin A. Schneller	Alpha Epsilon 1932
1964-1966	Burton E. Tiffany	Chi 1925
1966-1968	James F. Miller	Nu 1937
1968-1970	Edward P. Schneider	Beta Delta 1942
1970-1972	J. Haworth Jonte	Beta Beta 1942
1972-1974	Eldon E. Bauer	Alpha Theta 1953
1974-1976	H. Edson Minnerly, Jr.	Chi 1948
1976-1978	Kenneth N. Edwards	Beta Mu 1954
Honorary	W. Mack Barlow	Kappa 1936
1978-1980	Ronald T. Pflaum	Alpha Theta 1953
1980-1982	Gerard R. Dobson	Beta Eta 1970
1982-1984	Harold J. Wesselman	Epsilon 1938
1984-1986	Lynn A. Swanson	Beta 1963

Year(s) Served as GMA	Order of Altotus Member Name	Chapter and Year Initiated
1986-1988	Maurice M. Bursey	Rho 1967
1988-1990	D. Mitch Levings	Beta Delta 1975
1990-1992	Paul R. Jones	Beta Eta 1970
1992-1994	DeWayne Gerber	Beta Delta 1975
1994-1996	Michael Zachmeier	Beta Phi 1977
1996-1998	Victor H. Palla	Beta Omicron 1984
1998-2000	Kenneth L. Busch	Epsilon 1984
2000-2002	Col. William A. Myers	Alpha Sigma 1954
2002-2004	John E. Adams	Beta Delta 1971
2004-2006	Gary D. Anderson	Alpha Eta 1962
2006-2008	Sherrie E. Settle	Alpha Kappa 1983
2008-2010	John N. Stipp	Epsilon 1989
2010-2012	Jennifer M. Showerman	Zeta 1992
2012-2014	Randy D. Weinstein	Alpha Kappa 1990
2014-2016	Mark N. Evaniak	Beta Sigma 1980
2016-2018	Jonathan E. Wenzel	Delta 1996
2018-2020	Helen M.M. Webster	Alpha Rho 1994
2020-2022	Kip A. Nalley	Alpha Sigma 1990
2022-2024	Sean Pawlowski Grand Vizier	Gamma Upsilon 2006

Jewels of Office

Jewels of Office

The Supreme Council, Grand Recorder and Grand Vizier are issued jewels of office, which are worn on ceremonial occasions. The jewels are hexagonal shaped and are worn around the neck.

Medallion	Officer	Symbolism
	Grand Master Alchemist	Alchemical symbol for gold
	Grand Professional Alchemist	Elixir of life
	Grand Master of Ceremonies	Alchemical symbols for lead, tin, iron, mercury, copper and silver
	Grand Collegiate Alchemist	Scholar's lamp or lamp of knowledge
	Grand Recorder	Quill and scroll
	Grand Vizier	Alchemical symbol for pulvis (dust, powder or scene of action)

Staff, Advisors and Professional Representatives

Grand Recorder and National Office Staff

The Supreme Council makes various other appointments to perform important duties on behalf of the Grand Chapter. Chief among these is the Grand Recorder (Secretary-Treasurer). One or more Assistant Grand Recorders also may be appointed by the Supreme Council.

Grand Recorder
John Stipp
Epsilon 1989
gr@alphachisigma.org

Assistant Grand Recorder
Dr. Jonathan E. Wenzel
Delta 1996
agr@alphachisigma.org

National Office
1-800-ALCHEMY
national@alphachisigma.org

Director of Fraternity Operations
Erin Goodwin
national@alphachisigma,org

Membership & Database Coordinator
Jennifer Showerman Zeta, 1992
reports@alphachisigma.org

Advisors

Grand Health & Safety Officer
Dr. Jason Ellis
Delta 1997
ghso@alphachisigma.org

Grand Editor
Dr. Brian Coppola
Alpha Beta 1989
ge@alphachisigma.org

Grand Historian
D. Mitch Levings, PE
Beta Delta 1975
gh@alphachisigma.org

Grand Vizier
Dr. Sean Pawlowski
Gamma Upsilon, 2006
gv@alphachisigma.org

Grand Parliamentarian
Dr. John Adams
Beta Delta 1971

Professional Representatives

In order to allow alumni members to continue to have a presence in the Grand Chapter in light of declining professional chapters, the 1986 Conclave created the position of Professional Representative. During the annual solicitation for Grand Chapter contributions, Professional Representatives are elected for staggered, two-year terms. The duties of the Professional Representatives include advising the Fraternity on both short- and long-term goals and plans and serving on standing Grand Chapter committees. The number of Professional Representatives for the biennium is no greater than 20 percent of the number of active collegiate chapters (rounded up) at the time of the last Conclave.

The current Professional Representatives are:

(Term Expires 12/31/2024)

Geoff Giarmo
Alpha Beta 2003 • geoff. giarmo@alphachisigma.org

Sandy Lukaszewski-Rose
Alpha Theta 2005 • sandra.lukasewski-rose@alphachisigma.org

Tiffany Matyja
Delta Xi 2017 • tiffany.matyja@alphachisigma.org

Elizabeth Morgan
Delta 2002 • lib.morgan@alphachisigma.org

Jen Schnippert
Gamma Beta 2003 • jen.schnippert@alphachisigma.org

(Term Expires 12/31/2025)

Anna Carey
Alpha Kappa 2017 • anna.carey@alphachisigma.org

Robert Duff
Gamma Iota 1996 • robert.duff@alphachisigma.org

Mic Le
Gamma Iota 2009 • mic.le@alphachisigma.org

Spencer Norman
Beta Delta 2011 • spencer.norman@alphachisigma.org

Eric Puhlmann
Delta 2017 • eric.puhlmann@alphachisigma.org

PR Updates can be found at www.alphachisigma.org.

District Counselors

District Counselors

District Counselors, who constitute the link between the collegiate and professional chapters and the Supreme Council, are appointed by the Grand Master Alchemist with the concurrence of the Supreme Council. The districts of Alpha Chi Sigma encompass areas as are deemed convenient for efficient contact between the chapters and the District Counselor. The District Counselors for the 54th Biennium (2016 to 2018) are:

Atlantic Central District
Francesca Pellegrino, Gamma Omicron 2008
acdc@alphachisigma.org

Central District
Patrick Gillespie, Beta Rho 2014
cdc@alphachisigma.org

Central Coast District
Erin Lewis, Gamma Iota 2009
ccdc@alphachisigma.org

Empire District
Robert Martin, Iota 2005
edc@alphachisigma.org

Gateway District
Natalee von Keyserling, Beta Psi 2019
gdc@alphachisigma.org

Great Lakes District
Anne Ellis, Delta 2000
gldc@alphachisigma.org

North Central District
Matthew Welmers, Iota 2011
ncdc@alphachisigma.org

Northeastern District
Samantha McKenna, Tau 2010
nedc@alphachisigma.org

Northern District
William Lewis, Iota 1995
ndc@alphachisigma.org

Ohio Valley District
Sarah Lynch, Delta Zeta 2016
ovdc@alphachisigma.org

Piedmont District
Courtney Johnson, Beta Rho 2017
pdc@alphachisigma.org

Southeastern District
Kate Cavanaugh, Alpha Theta 2003
sedc@alphachisigma.org

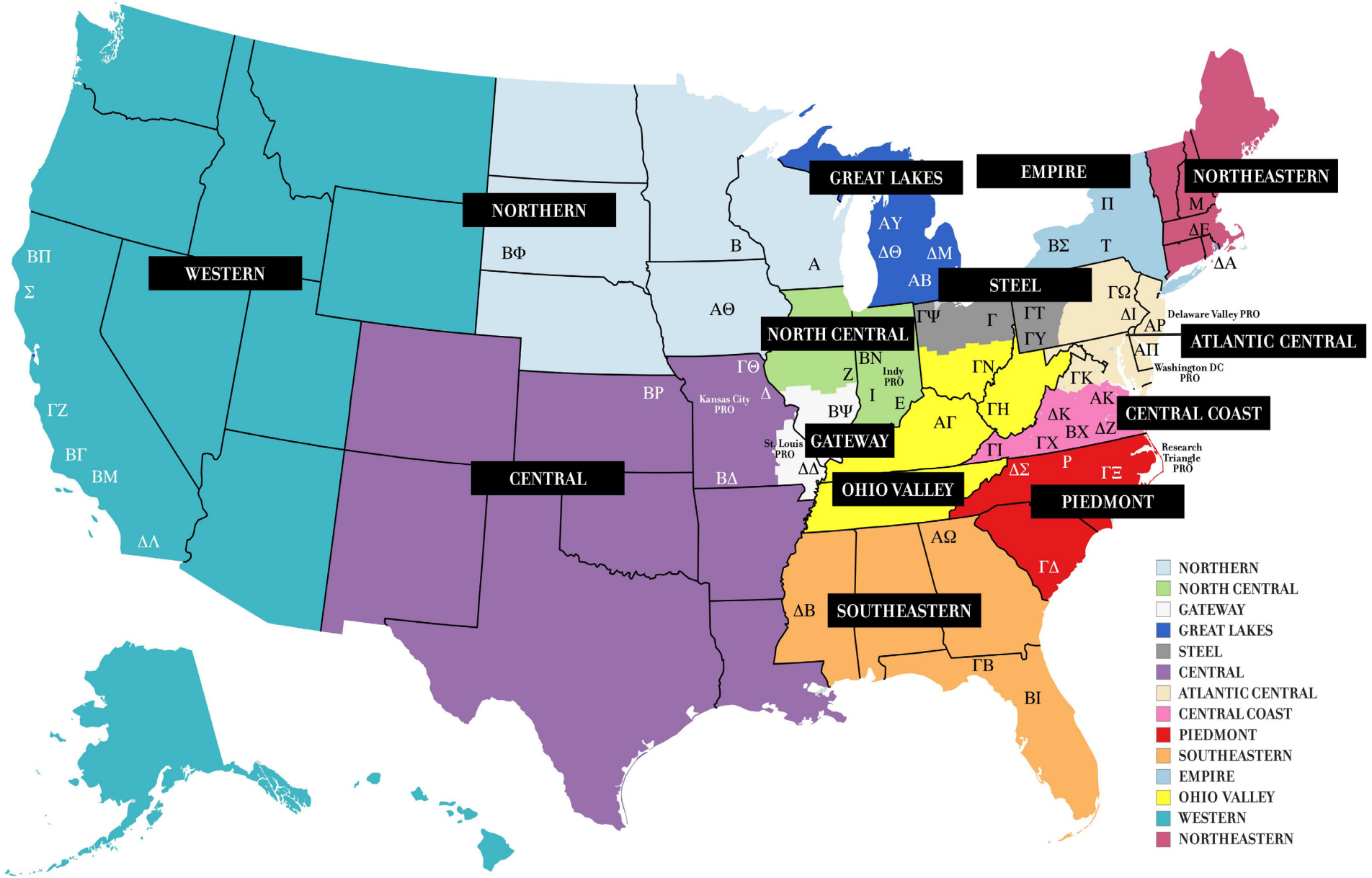
Steel District
Sydnee Webb, Alpha Gamma 2015
sdc@alphachisigma.org

Western District
Don Cole, Iota 1997
wdc@alphachisigma.org

District Map

District Map

The current district map is featured on the next page. Active collegiate and professional chapters are shown. District boundaries should not be viewed as walls. Interaction between chapters always is encouraged regardless of the district in which the chapters are located. Visit www.alphachisigma.org for the most up to date district map.


NORTHERN
WESTERN
CENTRAL
GREAT LAKES
EMPIRE
NORTHEASTERN
STEEL
NORTH CENTRAL
ATLANTIC CENTRAL
GATEWAY
CENTRAL COAST
OHIO VALLEY
PIEDMONT
SOUTHEASTERN
Kansas City PRO
Indy PRO
St. Louis PRO
Delaware Valley PRO
Washington DC PRO
Research Triangle PRO
NORTHERN
NORTH CENTRAL
GATEWAY
GREAT LAKES
STEEL
CENTRAL
ATLANTIC CENTRAL
CENTRAL COAST
PIEDMONT
SOUTHEASTERN
EMPIRE
OHIO VALLEY
WESTERN
NORTHEASTERN

Grand Chapter Vote Distribution

The following chart illustrates the distribution of Grand Chapter votes in the Fraternity.

Grand Chapter Component	Votes
Collegiate Chapters	54
Professional Chapters	6
District Counselors	14
Professional Representatives	10
Supreme Council	4

Summary of Fraternity Employees and Volunteers

Supreme Council

Grand Master Alchemist (GMA) (Volunteer)
- Elected by Grand Chapter at Conclave
- Executive officer of the Fraternity

Grand Collegiate Alchemist (GCA) (Volunteer)
- Elected by Grand Chapter at Conclave
- Responsible for the collegiate branch of the Fraternity

Grand Professional Alchemist (GPA) (Volunteer)
- Elected by Grand Chapter at Conclave
- Responsible for the professional branch of the Fraternity

Grand Master of Ceremonies (GMC) (Volunteer)
- Elected by Grand Chapter at Conclave
- Responsible for the ritualistic and ceremonial aspects

Employees

Assistant Director of Fraternity Operations (Salaried, Full Time)
- Responsible for the daily operations of the Fraternity

National Office Staff (Salaried, Full Time or Part Time)
- Operate the National Office and assist with the daily operations of the Fraternity
- Report to the AGR and GR.

Consultants

Grand Recorder (GR)
- Appointed by the Supreme Council
- Acts as secretary-treasurer of the Fraternity
- Manages AGR, GE, and National Office staff

Assistant Grand Recorder (AGR)
- Appointed by the Supreme Council
- Acts as Assistant Secretary-Treasurer of the Fraternity

Grand Health and Safety Officer (GHSO)
- Appointed by the Supreme Council
- Oversees the Health and Safety Program

Grand Editor (GE)
- Appointed by Grand Recorder
- Responsible for the publication of *The HEXAGON*

District Counselors and Professional Representatives

District Counselors (DC) (Volunteers)
- Appointed by the Supreme Council
- Responsible for collegiate and professional chapters in
- assigned district
- Report to the Grand Collegiate Alchemist
- Elect a chairperson for each biennium from among DCs

Professional Representatives (PR) (Volunteers)
- Elected by active professional members of the Fraternity
- Represent interests of professional members who are not members of professional chapters
- Report to the Grand Professional Alchemist
- Chairperson for each biennium is appointed by the Grand Professional Alchemist

Other Notable Volunteers

Grand Parliamentarian (GP) (Volunteer)
- Appointed by Supreme Council
- Acts as expert on parliamentary procedures during Grand Chapter Conclave

Grand Historian (GH) (Volunteer)
- Appointed by Supreme Council
- Acts as historian for the Fraternity
- Reports to the Grand Master of Ceremonies

Grand Vizier (GV) (Volunteer)
- Most recent inductee into the Order of Altotus
- Acts as chairman of the General Advisory Committee

Chapter Advisors (CA) (Volunteers)
- Liaison between the chapter and the university
- Should be a member of the Fraternity

Grand Chapter Committee Chairmen (Volunteers)
- Appointed by the Supreme Council
- Report to a designated Supreme Council officer
- Terms and duties dictated depending on each committee

Grand Chapter Committee Members (Volunteers)
- Appointed by Supreme Council or committee chairman
- Duties and responsibilities dictated by the committee chairman

District Committee Members (Volunteers)
- Appointed by district counselor
- Must be an active professional member
- Assist the district counselor with his or her duties

Collegiate Expansion Director (Volunteer)
- Appointed by the Supreme Council
- Works with parties interested in starting or reactivating a collegiate chapter

Professional Expansion Director (Volunteer)
- Appointed by the Supreme Council
- Works with parties interested in starting or reactivating a professional chapter or group

Grand Chapter Conclave

The main purpose of the Grand Chapter Conclave is to conduct the business of the Fraternity. However, in actuality, it is much more than that. Conclave is an excellent opportunity to meet Brothers from all over the country and exchange ideas. The collegiate and professional chapter delegates – as well as the Supreme Council, the District Counselors and the Professional Representatives – are required to attend the legislative sessions. And all Brothers are encouraged to attend to learn about how the Fraternity is governed and how business is conducted. The legislative sessions take place for less than half the day, and the rest of the time is filled with activities such as model initiation ceremonies, tours of local attractions and ample opportunity to socialize.

The location of each Conclave is decided upon approximately one year before the event. Interested chapters submit bids to the Supreme Council, and the council decides which bid is the most attractive based upon cost, location and other factors.

Locations and Hosts of Conclaves

Biennial Conclave	Year	Location	Host Chapter(s)
1st	1908	Madison, WI	Alpha
2nd	1910	Madison, WI	Alpha
3rd	1912	Madison, WI	Alpha
4th	1914	Madison, WI	Alpha
5th	1916	Evanston, IL	Upsilon
6th	1919	Columbus, OH	Lambda
7th	1922	St. Louis, MO	Alpha Epsilon, St. Louis Alumni Association
8th	1924	Pittsburgh, PA	Omega
9th	1926	Ann Arbor, MI	Alpha Beta
10th	1928	Chapel Hill, NC	Rho
11th	1930	Minneapolis, MN	Beta
12th	1932	Washington DC	Alpha Pi, Alpha Rho, Washington DC Professional
13th	1934	Bloomington, IN	Epsilon, Iota, Indianapolis Professional
14th	1936	Cincinnati, OH	Alpha Delta, Cincinnati Professional
15th	1938	New Orleans, LA	Alpha Tau, Psi, New Orleans Professional, Baton Rouge Professional
16th	1940	Berkeley, CA	Sigma, Alpha Alpha, Beta Gamma, Los Angeles Professional, San Francisco Professional
17th	1942	Chicago, IL	Alpha Psi, Upsilon, Chicago Professional
18th	1946	St. Louis, MO	Alpha Epsilon, St. Louis Professional
19th	1948	Cleveland, OH	Gamma, Akron Professional, Cleveland Professional
20th	1950	Washington DC	Alpha Pi, Alpha Rho, Washington DC Professional
21st	1952	Madison, WI	Alpha
22nd	1954	East Lansing, MI	Alpha Upsilon
23rd	1956	State College, PA	Nu
24th	1958	Houston, TX	Beta Theta, South Texas Professional
25th	1960	West Lafayette, IN	Beta Nu, Lafayette Professional
26th	1962	Cincinnati, OH	Alpha Delta, Cincinnati Professional
27th	1964	New York, NY	Chi, New York Professional
28th	1966	Ann Arbor, MI	Alpha Beta, Detroit Professional
29th	1968	Iowa City, IA	Alpha Theta
30th	1970	Austin, TX	Beta Theta
31st	1972	Urbana, IL	Zeta
32nd	1974	College Park, MD	Alpha Rho, Beta Upsilon, Washington DC Professional
33rd	1976	Rapid City, SD	Beta Phi
34th	1978	Denton, TX	Beta Eta
35th	1980	Ithaca, NY	Tau
36th	1982	Columbia, MO	Delta
37th	1984	Syracuse, NY	Pi
38th	1986	Chapel Hill, NC	Rho
39th	1988	Berkeley, CA	Sigma, San Francisco Professional

Biennial Conclave	Year	Location	Host Chapter(s)
40th	1990	Tallahassee, FL	Gamma Beta
41st	1992	Indianapolis, IN	Epsilon, Iota, Beta Nu, Indianapolis Professional
42nd	1994	Minneapolis, MN	Beta
43rd	1996	Fayetteville, AR	Alpha Sigma
44th	1998	Atlanta, GA	Alpha Omega
45th	2000	St. Louis, MO	Delta, Beta Delta, Gamma Theta, St. Louis Professional
46th	2002	Madison, WI	Alpha
47th	2004	Blacksburg, VA	Gamma Iota
48th	2006	Los Angeles, CA	Beta Gamma, Los Angeles Professional
49th	2008	Bloomington, IN	Epsilon, Zeta, Iota
50th	2010	Athens, OH	Gamma Nu
51st	2012	Iowa City, IA	Alpha Theta
52nd	2014	Charlottesville, VA	Alpha Kappa
53rd	2016	Atlanta, GA	Alpha Omega
54th	2018	Pittsburgh, PA	Gamma Upsilon
55th	2020	Virtual (online)	Alpha Upsilon
56th	2022	Blacksburg, VA	Gamma Iota
57th	2024	Urbana, IL	Zeta

Conclave Committees

Several Conclave committees exist in order to move legislation and business forward in as efficient manner as possible. Members of the Grand Chapter are selected to serve on the committees.

The following committees are required by the Fraternity bylaws:

Nominating Committee

This committee solicits candidates for the Supreme Council positions and for Professional Representatives. During Conclave, this committee acts as election judges, counting votes for the Supreme Council election. This committee is a standing committee of the Fraternity and functions at all times (not just during Conclave).

Constitution and Bylaws Committee

This committee prepares and/or reviews all legislation related to the Constitution and Bylaws for wording, consistency and accuracy. This committee exists only for the duration of Conclave.

Financial Advisory Committee

This committee reviews all legislation to estimate its effects on the Fraternity's finances. This committee exists only for the duration of Conclave.

Legislative Preparation Committee

This committee assists delegates in presenting all Conclave motions in proper written form. All Conclave motions must go through this committee before they can be presented. This committee exists only for the duration of Conclave.

Resolutions Committee

This committee prepares, reviews and transmits resolutions of greeting and appreciation to the Legislative Preparation Committee. The Resolutions Committee takes care of any legislation that does not fall under the jurisdiction of the Constitution and Bylaws Committee. The Resolutions Committee exists only for the duration of Conclave.

The following committees are not required by the Fraternity bylaws but have been instituted to help make Conclave successful.

Hexagon Reporters

It is important that the activities of Conclave be recorded for publication and for historical reasons. This committee fills this function in cooperation with the Grand Historian and the Grand Editor. This committee exists only for the duration of Conclave.

Conclave Security

The members of this committee collect passwords when necessary and act as doorkeepers during Conclave sessions. This committee exists only for the duration of Conclave.

Grand Chapter Committees and Programs

Alpha Chi Sigma actively provides resources and guidance to collegiate chapters. This is done by various methods, including using committees and developing programs in order to enhance the fraternal experience.

Grand Chapter Standing Committees

Ritual Committee

The initiation ceremony of Alpha Chi Sigma is arguably one of the most elaborate and impressive rituals of any collegiate fraternal order. At various times since the first ritual was performed in 1903, it has become necessary to review and revise the ceremony. Changes to the initiation ceremony have not been made lightly. Major rewrites occurred in 1906, 1910, 1924 and 1978. Prior to each revision, the Grand Master Alchemist formed a committee to perform a scholarly review of the ceremony and to make detailed recommendations.

After the 1978 revision, the Supreme Council made the Ritual Revision Committee of 1977 a permanent standing committee and renamed it the National Ritual Committee. The committee provides assistance to the Grand Master of Ceremonies by conducting research into alchemy, heraldry and the history of rituals.

The Ritual Committee has, at times, published a confidential newsletter called The Spangle. This publication provides information and ideas to Masters of Ceremonies on how to present a more effective initiation rite. The Ritual was most recently revised in 2018.

Nominating Committee

The Nominating Committee, as required by the Fraternity's constitution and bylaws, is made up of both professional and collegiate members of the Grand Chapter. The purpose of this committee is to contact and nominate Brothers to serve as Professional Representatives and on the Supreme Council.

DEI - Diversity, Equity, and Inclusion Committee

The committee is charged with providing Diversity, Equity, and Inclusion training and materials to the membership; address diversity, equity, and inclusion concerns across the Fraternity; and promote improved access and inclusion for all members.

Committees and Programs

Scholar Award Committee

The Alpha Chi Sigma Scholar is selected by the Scholar Award Committee. The committee consists of five distinguished chemists, who are members of Alpha Chi Sigma. Nominations for the award are solicited annually through announcements in *The HEXAGON* and social media. Selection is made on the basis of outstanding scholarship for undergraduates and on the basis of original chemical research for graduate students.

General Advisory Committee

The General Advisory Committee consists of at least the living members of the Order of Altotus willing to serve, and is chaired by the GV.

The General Advisory Committee may be divided into subcommittees to address various planning needs of the Fraternity. The Grand Master Alchemist will assign responsibilities to the subcommittees. Previous and current responsibilities have included the selection of the Alpha Chi Sigma Hall of Fame winner.

Safety Committee

The Council very heartily endorses the safety of its members and pledges, therefore since 1941 they have established a formal standing committee that is composed of 1 to 3 members to advise and recommend a safety program that can be used by all collegiate chapters.

Science Outreach Program (Wyvern Pin Program)

To encourage and recognize participation in science outreach activities and programs, the Fraternity established a program in which participating members earn wyvern pins as they participate in the program. Science Outreach Programs are broadly defined as any activity that promotes the Second Object. Presently there are four levels that can be reached in a member's lifetime, and each has a corresponding colored pin:

Level	Wyvern Pin Color	Number of Activities Required
First Level	Black	1 activity
Second Level	Green	3 activities
Third Level	Red	7 activities
Fourth Level	Blue	15 activities plus photo and article for The HEXAGON

Diversity, Equity, and Inclusion (DEI Pin Program)

To encourage and recognize participation in Diversity, Equity, and Inclusion programs, the Fraternity established a program in which participating members earn DEI pins as they participate in the program. A DEI activity is broadly defined as any activity that promotes a culture that values everyone's unique individuality while also creating a sense of acceptance and belonging. Presently there are four levels that can be reached in a member's lifetime, and each has a corresponding colored pin:

Level	DEI Pin Meaning	Number of Activities Required
First Level	Friendship	1 activity
Second Level	Respect	3 activities
Third Level	Inclusion	6 activities
Fourth Level	Diversity, Equity, & Inclusion	10 activities plus photo and article for The HEXAGON

Scout Merit Badge Programs

Alpha Chi Sigma collegiate chapters participate in chemistry education and outreach programs for a variety of youth organizations. The merit badge in chemistry has been offered by the Boy Scoutof America since 1911. During the 1950s, both Sigma and Kappa Chapters developed and successfully executed programs designed to assist and guide Boy Scouts in chemistry merit badge work. For the 1962-1964 biennium, the Supreme Council thought so well of this activity that it sought the cooperation of the National Council of Boy Scouts of America to establish it as a Grand Chapter-sponsored activity for promotion by both collegiate and professional chapters.

With the cooperation forthcoming, the program was launched. A Grand Chapter Boy Scout Activity Committee was established with Robert F. Gould, Pi 1937, as chairman. Gould was a natural for this chairmanship because he was one of the three authors (all Brothers) of the Boy Scout Chemistry Merit Badge Pamphlet revised in 1973. The others were Douglas G. Nicholson, Zeta 1932, and Philip S. Baker, Alpha Sigma 1938. The pamphlet and requirements to earn the merit badge were completely revised and rewritten in 1992. The program remains under continuous review.

In accordance with the Second Object, work continues in extending the promotion of chemistry to other youth agencies, such as the Girl Scouts and Camp Fire Boys and Girls. The Alpha Chi Sigma Girl Scout Badge for chemistry came into being due to the efforts of Alpha Theta Chapter, led by Heather Adams, Alpha Theta 1991, working with the Mississippi Valley Girl Scout Council. The local patch was first awarded in January 1996.

Insignia

Fraternity Name

Whenever reasonable, the name of the Fraternity should be written completely as Alpha Chi Sigma. When space constraints make an abbreviation more practical, use AXSigma or AXS. Do not use the abbreviation AXE to represent Alpha Chi Sigma. This not only would be confusing but would be an infringement on the abbreviation for the social fraternity Alpha Chi Epsilon. Do not use the abbreviation ACS to avoid confusion with the American Chemical Society.

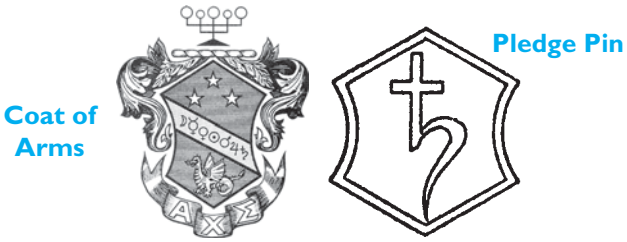
Logo, Badge and Coat of Arms

The logo is used to identify Fraternity items. It is simple enough in design to be reproduced easily in various sizes without losing detail.

The badge is a piece of official Fraternity jewelry and is presented to Brothers at initiation. Other forms of the badge may be obtained from the official Fraternity jeweler. Other badges may have a jeweled border or may be made from different qualities of gold. But the design, graphics and color of the badge never should be altered. The diamond-bordered badge is reserved for the exclusive use of the Order of Altotus. The badge may be worn by a member's family or loved one, but only initiated members may wear the coat of arms.

The full significance of the badge and coat of arms is not be apparent until initiation, but in each the figure of a hexagon is prominent. The hexagon, which students of organic chemistry will recognize as a basic structural symbol for aromatic compounds, has been called the most familiar symbol in chemical literature.

Rules of heraldry govern the appearance and use of the badge and the coat of arms. See the monochrome representation of the coat of arms in the next column. (A full-color representation can be found on the cover of the Sourcebook.) The horizontal lines on the shield are called hashing and indicate that the shield is blue. The dots on the diagonal stripe (called a bend) represent gold. Rules of heraldry dictate that a color cannot go on a color but a metal or a fur must be placed on a color. The absence of hashing on the stars and the wyvern indicate the metal silver.



The other ornaments that make up the coat of arms are the motto ribbon below the shield and the lambrequin, which is draped to each side of the shield. The motto ribbon and lambrequin as well as the torse – the six knots of fabric – are in the Fraternity colors, Prussian blue and chrome yellow. The crest of the coat of arms sits above the shield, lambrequin and torse and is a familiar alchemical symbol. The term "crest" does not mean the entire coat of arms but applies only to the symbol above the shield. A torse connects a crest on a coat of arms to a helmet. Since the Alpha Chi Sigma coat of arms does not have a helmet, the torse connects the crest to the lambrequin.

When using a monochrome of the coat of arms, always use the one with hashing. If using a color representation, be sure the colors are correct.

Pledge Pin

Careful study of alchemy will reveal the meaning of the symbol on the pledge pin. This pin is indicative of your affiliation with Alpha Chi Sigma and should be worn at all times until your initiation. It will mean even more to you at that time, when you will learn its full significance.

Insignia

Professional Pin

The professional (alumni) charm is a reproduction of the badge on a slightly larger scale. The monogram recognition pin, bearing the gold Greek letters ΑΧΣ, is reserved for professional members.

Alpha Chi Sigma Flag

The Fraternity flag was designed by John Baer, Alpha Iota 1939, and first was shown to members on June 10, 1946. The flag contains three stars, arranged in a triangle in the upper left-hand corner. In the center is the hexagon, and superimposed on it are the three Greek letters ΑΧΣ. In the lower right-hand corner are the Greek letters designating an individual chapter, the locality name for a professional chapter or group or the alchemical symbol for gold, which designates the Grand Chapter. The field is Prussian blue, and the devices are chrome yellow.

Alpha Chi Sigma Flag

The color Prussian blue comes from iron (III) ferrocyanide – $Fe_4[Fe(CN)_6]_3$ – and was first synthesized in 1704 in Berlin by the colormaker Heinrich Diesbach. The intense blue color is caused by the electronic transition from the Fe (II) atoms to the Fe (III) atoms. Prussian blue was the first synthesized coordination compound.

The color chrome yellow comes from lead chromate – $PbCrO_4$ – and was discovered in the mineral ore crocoite by Nicolas-Louis Vauquelin in 1797. The preparation of chrome yellow was published by Vauquelin in 1809 in the Annales de Chimie IXX.

Alpha Chi Sigma Tartan

STA ref: 6688
STWR ref: none
Designer: Wilson, R. Scott
Tartan date: 1/1/2005
Registration date: This tartan was recorded prior to the launch of The Scottish Register of Tartans
Category: Corporate

Tartan

Restrictions: Yes. A corporate tartan for the use of the Alpha Chi Sigma Fraternity.

Registration notes: The dark blue and yellow lines represent the fraternity colors. The three yellow lines grouped closely together represent the Three Objects of the fraternity. The six yellow lines represent the six sides of the hexagon. Red represents the Fraternity flower, the red carnation. Red and white together represent the founding of the Fraternity and are the school colors of the University of Wisconsin-Madison, Alpha Chapter. The two white lines represent 1902, the year of the Fraternity's founding. This tartan may be worn by Fraternity members, as well as members of their immediate families.

Fore more information about the tartan or to purchase tartan merchandise, contact R. Scott Wilson (scott.wilson@alphachisigma.org)

Information provided by R. Scott Wilson and The Scottish Register of Tartans.

Social Media Guidelines

Social Media users seek a constant source of quick updates. Post regularly. Post information about outreach, member achievements, awards and any other event or activity that members would find interesting or intriguing. Do not post during chapter sessions as it is in violation of our ritual. The meeting minutes may be a matter of public record; however, the specific discussions as well as ritual information are secret.

- Do not post anything regarding our ritual.
- Actively engage dialogues with followers. Be friendly and conversational.
- Proofread your messages for typos, grammar and any politically incorrect implications.
- Consider who your followers are and remember not everyone who follows your accounts may be brothers.
- Stay away from political conversations and don't engage if there are political replies. Keep posts on topics discussed.
- Retweet or repost any positive comments about the fraternity from other followers/users.
- Block followers that are deemed inappropriate if seen by others viewing your follower list.
- Be sure to include mentions and hashtags when appropriate and relevant in the content of your post.

All photos, audio and video media posted to the account must be appropriate in nature and must adhere to the Risk Management Policy. Do not identify people by full name or last name unless given permission to do so. Only the individual in the content can tag or link themselves to the content if they so desire.

Inappropriate Content

- Do not use photos or other representation of any alcoholic beverages - generic or brand - in connection with the fraternity, directly or indirectly.
- Do not use photos that imply the use of alcohol.
- Do not use photos of illegal activities or behavior inconsistent with the policies, values and Three Objects of the fraternity.
- Do not use distasteful or offensive photos, graphics, audio and video.
- Do not use explicit or vulgar language, photos and graphics, including nudity and profanity.
- Do not use photos or other representation or written references to drugs, alcohol and other paraphernalia.
- Do not use logos, graphics, data and other items with registered trademarks without legal consent of the owner.
- Do not post information about the ritual and regalia or the contents therein.
- Do not use incorrect terminology, including AXE. Whenever reasonable, write the name of the fraternity completely as Alpha Chi Sigma. When space constraints make an abbreviation more practical, use AXSigma, AXS or AXΣ. The abbreviation AXE should not be used to represent Alpha Chi Sigma. To use AXE as an abbreviation not only would be confusing but would be an infringement on the abbreviation for Alpha Chi Epsilon, a social fraternity at several colleges. This is easily handled by downloading a Greek language keyboard for your phone.

Appropriate Content

Remember that nonmembers may have access to your social media accounts/pages. Be sure your content is appropriate, shares correct information about the fraternity and portrays Alpha Chi Sigma and all Brothers in a positive light.

- If you are creating graphics for social media that include the Coat of Arms or any other Alpha Chi Sigma copyrighted images, please email *national@alphachisigma.org* for approval.
- Please note which version of the Coat of Arms you are using when creating graphics for your social media pages, if you are unsure if it is the most up to date feel free to update *national@alphachisigma.org* for confirmation.
- Monitor retweets, comments, etc posted by guests. Immediately remove content that does not adhere to fraternity guidelines and policies.
- Provide context for your posts. Would it make sense to someone who is learning about the fraternity for the first time?
- All content must respect the rights of others, including other Greek organizations, other universities and university personnel.
- Provide a link to the national website whenever appropriate (www.alphachisigma.org).
- Post photos of Brothers.
- Use your posts to show what being an Alpha Chi Sigma Brother is all about. Emphasize the positive aspects of fraternity life.
- Be sure your spelling, grammar and hyperlinks are correct.
- Above all, our communications should be honest and fair. Never post anything you would be afraid for your mom or the president of your university to see.

Final Thoughts

We are a professional fraternity. This is one of the many things that distinguish us from the purely social fraternities. Use social media to share the virtues and accomplishments of our fraternity. Thank you for improving Alpha Chi Sigma's online presence by promoting the fraternity through the use of social media! If you have any questions, please reach out to *national@alphachisigma.org*.

alpha-chi-sigma-fraternity alphachisigma @alphachisigma @alphachisigma

National Office

The Alpha Chi Sigma National Office is located at 6296 Rucker Road, Suite B, in Indianapolis. The Director of Fraternity Operations and other Fraternity employees work in this building. It is from here that the day-to-day operations of the Fraternity are conducted. The office is the responsibility of the Grand Recorder.

Before settling into its current address at 6296 Rucker Road, Suite B in Indianapolis, the National Office sat in a handful of other neighborhoods.

On Jan. 24, 1904, the Fraternity's articles of incorporation were filed with the Wisconsin Secretary of State. The Fraternity House in Madison served as the first "National Office." When Leon Shaw, a chemistry instructor at Northwestern University, was elected Grand Recorder in 1912, the "National Office" moved from Wisconsin to the University Club in Evanston, Ill.

After the United States' entry into the first World War, Brother Shaw was commissioned into the armed forces and was stationed in Washington, D.C. The Council decided to move the Grand Recorder-Treasurer's office to Washington, D.C., in November 1917. After the war, Brother Shaw and the National Office returned to Evanston.

The duties and records of the National Office briefly moved to Oklahoma from 1922 through 1926 as Brother Arthur Davis assumed the role of Grand Recorder-Treasurer.

With the appointment of John R. Kuebler to the Grand Recorder position in 1926, the Fraternity leased four rooms on the second floor of the Irvington State Bank Building in Indianapolis. This address, 5503 E. Washington St., was the home of Alpha Chi Sigma for the next 51 years.

The passage of time brought change and growth to Indianapolis. With that growth, the area around the National Office began to deteriorate. It became clear to the Supreme Council that the Fraternity eventually would have to move.

On May 23, 1975, Alpha Chi Sigma closed a $20,000 deal on 1.8 acres of land on North Franklin Road. The Supreme Council planned to build a 2,400-square-foot office building on a portion of the land. The rest of the land was to be held until it could be sold for enough profit to cover the cost of the land and the building.

The architectural firm of Donald Dick & Associates was hired to design the new office building. The completed floor plan was presented at the 1976 Conclave. The Supreme Council set a target date of August 1978 for occupancy so that it would coincide with the 75th Anniversary Celebration.

By the spring of 1977, it was clear the Fraternity would not be able to raise enough money to complete the project in 1978, so SC Proposition 2800 authorized the GR to negotiate with Donald Dick for leasing the office building at 11 S. Kitley (a converted residence) as a temporary National Office.

The National Office remained at 11 S. Kitley until early 1981 when the Supreme Council received word the building had been sold. The Council was given the opportunity to renew the lease for one more year, which it did. Ronald Pflaum was given the charge of mounting an aggressive campaign to raise enough money through contributions and the sale of a portion of the Franklin Road property to finally erect a permanent home.

Aristocrat Building Corporation was given the job of constructing the new headquarters. Ground was broken for the 2,560-square-foot brick structure on Oct. 3, 1981. The final walkthough was completed in January 1982. The new building, although draining to the Grand Chapter treasury, was enthusiastically embraced by the Fraternity.

On Oct. 2, 2004, the building was christened with an official name, The James F. Miller Building, in honor of Kuebler Award winner and member of the Order of Altotus Jim Miller, who served as Grand Recorder during the construction of the building and several years thereafter.

Like the area around East Washington Street in the 1970s, recently the North Franklin Road area became a less desirable location for the headquarters. In 2012, the Supreme Council authorized the Grand Recorder to start an investigation into other possible sites for a headquarters. After looking at available spaces and crunching the numbers, the new location on Rucker Road became the choice for the Fraternity's new home.

Alpha Chi Sigma as a Charitable and Educational Organization

Alpha Chi Sigma Fraternity is classified by the IRS as a 501(c)(3) Charitable and/or Educational Organization. This means contributions to the Fraternity are deductible for income tax purposes. Very few fraternities have this special tax status.

Collegiate and professional chapters share some of the advantages of a 501(c)(3) classification. At the same time, they share the responsibility to obey IRS codes and rulings by operating in a manner that will not jeopardize this classification. The most important of these codes deal with chapter activities, separating funds used for different purposes and local fundraising campaigns.

All contributions made to chapters or to the national Fraternity are deductible to the donor to the extent the member receives no direct benefit from the contribution. This applies to active members of the chapter and to alumni. It applies to both collegiate and professional chapters. The pledge and lifetime membership fees are not considered tax deductible contributions because they are required payments for membership and provide a direct benefit for the donor.

To be deductible, contributions must be given for specific purposes, such as award programs; scholarships; and professional, educational or charitable activities. Money received may not be used to reduce the cost of membership or the cost of room and board at house chapters nor can it be used in any way that would directly benefit a relative of the donor. This warning applies to the donor, not to the chapter. However, the chapter should be aware of it so that it does not place the donor in jeopardy by misuse of his or her contribution.

For contributions to local chapters, only those for charitable or educational purposes are tax deductible for the donors. These must be kept in an account separate from other chapter funds, and records must be kept to prove that those funds were used only for charitable or educational purposes. Any solicitation for tax-deductible funds must indicate the charitable and/or educational purposes for which the funds will be used.

A housing or alumni corporation is an entirely separate organization that owns and operates property on behalf of a collegiate chapter. A collegiate chapter cannot hold a title to or operate any property related to providing housing or room and board. Housing corporations typically operate under a 501(c)(7) or a 501(c)(2) classification status, which means that contributions to a local housing or alumni corporation are not tax deductible. Any solicitation for such funds must specify, " Contributions are not deductible for income tax purposes." The funds and records for operating a house must be kept in a separate account. The housing corporation may make contributions to the charitable or professional activities of a chapter. However, chapter funds cannot be used for housing purposes. Chapters seeking to acquire a house must establish a housing corporation before any funds can be solicited for this purpose. Additionally, formal approval by the Supreme Council is required.

Careful recordkeeping is essential to the Fraternity maintaining this favorable tax classification status. If you or your chapter has any specific questions about this matter, contact the National Office.

Alpha Chi Sigma Reserve Fund

The Reserve Fund helps provide for the long-term financial security of the Fraternity. Brothers who donate $2,000 or more in contributions to the Reserve Fund, in addition to their annual professional contributions, become Reserve Fund Members and are granted lifetime active professional status.

Alpha Chi Sigma Educational Foundation

The Alpha Chi Sigma Educational Foundation provides funds to support educational activities that promote the Second and Third Objects of the Fraternity. The Foundation was incorporated under the laws of the State of California in 1958, with Carl F. Prutton, Gamma 1919; L. W. Van Doren, Upsilon 1924; T. H. Harms, Sigma 1923; and Robert M. McManigal, Sigma 1922, serving as the incorporators.

The Alpha Chi Sigma Educational Foundation is the source of funding for many of the educational, professional and charitable activities not associated with the day-to-day operations of Alpha Chi Sigma Fraternity. For example, the Foundation funds the American Chemical Society Award in Pure Chemistry and the Alpha Chi Sigma Award for Chemical Engineering Research given by the American Institute of Chemical Engineering. The Foundation also administers the J. H. Mathews Memorial Fund, which provides low-interest loans to Brothers, and the H. E. Minnerly, Jr. Memorial Fund, which supports the expansion of the Fraternity to campuses where there is not an active chapter. The Foundation also administers the Albert H. Cooper Memorial Scholarship Award, the Edmund E. Dunlap Scholarship Fund and the Alpha Chi Sigma Scholar Award. In connection with the Fraternity's centennial celebration in 2002, the Foundation raised money for the marker on the University of Wisconsin campus to commemorate the founding and the founders of Alpha Chi Sigma.

Scholarship endowments constitute a significant fraction of the reserves held by the Foundation. These scholarships recognize the outstanding achievements of our Brothers and help soften the impact of the rapidly increasing cost of higher education. The Foundation also is the recipient of funds provided through various planned giving programs that support the ongoing mission of Alpha Chi Sigma Fraternity and represent a lasting contribution to that mission by the donor.

The Foundation is administered by a board of trustees, which was gradually expanded to a maximum of 20 members appointed to 10-year staggered terms. The Foundation is supported through voluntary tax-deductible contributions and bequests. For more information about the Alpha Chi Sigma Educational Foundation, contact the National Office.

The Foundation is supported through voluntary tax-deductible contributions and bequests. For more information about the Alpha Chi Sigma Educational Foundation, contact the National Office.

For many years, the Alpha Chi Sigma Educational Foundation has sponsored awards presented by both the American Chemical Society (ACS) and the American Institute of Chemical Engineers (AIChE). The recipients of these awards do not have to be members of Alpha Chi Sigma.

ALPHA CHI SIGMA
EDUCATIONAL FOUNDATION
EDUCATION PROFESSIONAL DEVELOPMENT SCIENCE

The Collegiate Branch

Collegiate Chapter Officers

Article IV of the Fraternity's constitution defines collegiate chapters, identification, jurisdiction and officers. Each chapter is required to elect eight officers. Those (as defined in Article IV, Section D) are:

Master Alchemist (MA)

Serves as the executive officer of the chapter and presides at chapter meetings. He or she is responsible for the condition of the chapter and the proper discharge of the duties of its officers. He or she also is responsible for the vote of the chapter during the period between Grand Chapter Conclaves.

Vice Master Alchemist (VMA)

Assists the Master Alchemist and acts as the Master Alchemist in the event of the Master Alchemist's absence. The VMA supervises all pledge functions and arranges for the chapter's Professional Recognition Ceremony (PRC) and/or Professional Induction Ceremony (PIC).

Reporter

The Reporter is responsible for carrying out the chapter's correspondence with the Grand Chapter and the National Office. The Reporter also is responsible for reporting elections, initiations, deaths, expulsion proceedings, changes in the status of members, election of officers and matters of record as required by the Supreme Council.

Treasurer

The Treasurer is responsible for collecting and disbursing the chapter's monies, which includes keeping a systematic record of the chapter's finances. The Treasurer also is responsible for submitting an annual standardized financial statement of the chapter's financial condition to the Grand Chapter, the Supreme Council, the District Counselor and the Chapter Advisor.

Recorder

The Recorder is responsible for keeping the minutes at chapter meetings, assisting the Reporter and acting as the Reporter in the event of the Reporter's absence. The Recorder also is responsible for the documents and records of the chapter and should maintain a biographical record and contact information for the chapter's members.

Master of Ceremonies (MC)

The Master of Ceremonies is responsible for organizing all of the chapter's ceremonial activities except for the Professional Recognition Ceremony and the Professional Induction Ceremony. The Master of Ceremonies is also responsible for safely keeping the chapter's ritual and regalia. This includes accounting for all of the chapter's copies of the ritual and assuring that all regalia is properly cleaned regularly.

Health and Safety Officer (HSO)

Works to foster a culture of healthy behaviors, provide opportunities for members to develop positive decision-making skills, and oversees the execution of safe chapter events and activities. This officer will be the primary person responsible for ensuring that the Health and Safety Policy and relevant Federal, State, and Campus rules are followed and understood by all members, pledges, and guests in attendance at all fraternity events and activities.

Alumni Secretary

The Alumni Secretary is responsible for assisting the chapter in its professional activities and soliciting articles for *The HEXAGON*. The Alumni Secretary is responsible for gathering and preserving the chapter's historical data. The Alumni Secretary is the only chapter officer who is not required to be an active collegiate member of the chapter.

Electing Collegiate Chapter Officers

Collegiate chapters may elect additional chapter-specific officers as necessary. However, all collegiate chapters must have the eight required officers listed above.

Bylaw VI of the Fraternity's bylaws further defines collegiate chapters, the officers a chapter must have and the duties of those officers:

Bylaw VI – Collegiate Chapters
Section A – Election of Officers

1. The Reporter, Treasurer, and Alumni Secretary shall be elected for a term of one year. All other officers shall be elected for a term of no longer than one year.
2. Officers may be reelected.
3. All officers shall serve until the installation of their successors.
4. Vacancies in the Collegiate Chapter offices shall be filled as follows:
   a. The Vice Master Alchemist shall succeed the Master Alchemist, and a new Vice Master Alchemist will be elected.
   b. The Recorder shall succeed the Reporter, and a new Recorder will be elected.
   c. Where assistant chapter officers are provided by chapter bylaws, the assistant shall succeed to the higher office, and a new assistant will be elected.
   d. Vacancies not otherwise provided for shall be filled by chapter election.
   e. The Master Alchemist may appoint temporary officers to fill vacancies until the next meeting of the chapter, when an election shall be held.
5. The officers, with the exception of the Alumni Secretary, should be matriculated students at an institution with which the chapter is associated. The Alumni Secretary should be an active member of the chapter.

Collegiate Chapter Committees and Miscellaneous Procedures

Bylaw VI of the Fraternity's bylaws further defines the collegiate chapter committees as well as miscellaneous chapter procedures:

Bylaw VI – Collegiate Chapters
Section B – Committees

Each Collegiate Chapter shall have the following standing committees:

1. Auditing – to consist of the Vice Master Alchemist and two other members of the chapter appointed by the Master Alchemist. It shall audit the books of the Treasurer at least once annually and immediately following the Treasurer's installation.
2. Membership – to consist of the Vice Master Alchemist and two collegiate members of the chapter appointed by the Master Alchemist. It shall investigate the qualifications of persons proposed for membership and shall report to the chapter those eligible for membership.
3. Budget – to consist of the Treasurer, the Master Alchemist, the District Counselor, and one or more members elected by the chapter. It shall create a budget of chapter finances and submit it to the chapter for approval, within the first month of the fall term of the school year.
4. Conduct –to consist minimally of either:
    a. no less than 5 active members, including the Health and Safety Officer, appointed as described in chapter bylaws or,
    b. the Health and Safety Officer, Vice Master Alchemist, Treasurer, Master of Ceremonies, Reporter, and Recorder.

Section C – Miscellaneous Chapter Procedures

1. A Manual of Procedure shall be provided by the Supreme Council for the guidance of all officers and chapters in routine Fraternity matters. It shall include instructions to officers, methods of finance and accounting, methods of reporting, the Fraternity laws with indices, and ceremonial instructions not included in the ritual.
2. The Supreme Council may assist any chapter in collecting unpaid obligations of its members.
3. There shall be no penalty for absence from a regular chapter meeting if the member is not in residence in the chapter locality or if the member is excused by a two-thirds vote of the members present at the next regular chapter meeting.
4. A Collegiate Chapter may provide an organization for its pledges, with the consent of the District Counselor and the Supreme Council and subject to the regulations of the institution. The chapter shall be responsible for the activities of such an organization.
5. A majority of the active collegiate members residing within the chapter locality, less those excused, shall constitute a quorum. Proxies toward a quorum are prohibited.
6. The order of business at Collegiate Chapter meetings shall be as follows:
    a. Call to order
    b. Secret ritual opening
    c. Roll Call
    d. Reading of minutes
    e. Reports of officers
    f. Reading of correspondence
    g. Reports of regular committees
    h. Reports of special committees
    i. Unfinished business
    j. New business
    k. Proposals for membership
    l. Election to membership
    m. Appointment of committees
    n. Election of officers
    o. Installation of officers
    p. Secret ritual closing
7. A member who moves to another institution where a chapter of the Fraternity exists may become a member of this chapter if desired. Before affiliating that member, the new chapter shall ascertain his status of membership from the former chapter and from the Grand Recorder. Any disputes shall be referred to the Grand Collegiate Alchemist for resolution. A member can be an active member of only one (1) collegiate chapter at a time.
8. A Collegiate Chapter shall not incorporate, nor shall it own any real property for the purpose of providing housing for its members or producing rental income. Housing Corporations may not be formed on behalf of subordinate chapters without the approval of the Supreme Council. Such Housing Corporations are separate and distinct from the Alpha Chi Sigma Fraternity. Members of Alpha Chi Sigma residing in chapter houses should not be voting officers or voting members of the Board of Directors of the housing corporation.

Costs to Join a Collegiate Chapter

Collegiate chapters have the exclusive right to initiate members, therefore all members of the fraternity must join through a collegiate chapter. The financial requirements to become a member are defined in Article 7 of the Fraternity's bylaws:

Bylaw VIII – Fraternity Finance
Section B - Pledge and Lifetime Membership Fees and Surcharges

1. Immediately following the Pledge Ceremony, a pledge fee for each candidate shall be paid directly to the Grand Chapter or, alternatively, shall be collected by the Collegiate Chapter and forwarded promptly to the Grand Recorder. For each biennium the pledge fee shall be established by the Supreme Council with the concurrence of the Grand Chapter. From time to time, the Supreme Council also may assess a mandatory surcharge on the pledge fee for a period not exceeding two years. The pledge fee is non-refundable.

2. a. For each candidate initiated into the Fraternity by an established Collegiate Chapter of the Fraternity, a lifetime membership fee and applicable surcharge shall be paid to the Grand Chapter. The fee shall be collected by the Treasurer of the chapter or paid directly to the Grand chapter.

   b. For each biennium the lifetime membership fee shall be established by the Supreme Council with the concurrence of the Grand Chapter. From time to time, the Supreme Council also may assess a mandatory surcharge on the lifetime membership fee for a period not exceeding two years.

   c. The Treasurer shall forward all fees collected on behalf of the Grand Chapter to the Grand Recorder prior to the initiation date.

3. The Supreme Council may set reduced pledge and lifetime membership fees and specify extended payment schedules for candidates who will become Collegiate members.

4. A Collegiate chapter may submit a written petition to the Supreme Council for a waiver of all or part of pledge and lifetime membership fees and applicable surcharges on behalf of qualified faculty members at the Collegiate Chapter's institution.

Chapter Advisors

The District Counselors, upon the recommendation of the collegiate chapters, appoint Chapter Advisors. These individuals typically are members of the faculty of the institution in which the chapter is located. The Chapter Advisor should be an individual toward whom the chapter can turn for advice. A Chapter Advisor who is interested in the welfare and activities of the chapter is one of the most valuable assets a chapter can possess.

Collegiate Chapter Awards

The Grand Chapter presents awards to collegiate chapters for exemplary performance in several areas. Some of these awards are:

One-Star Chapter Award

The One-Star Chapter Award is earned by collegiate chapters that participate and document a set number of professional, service and alumni activities. These documented activites are required for Alpha Chi Sigma to retain its tax classification status. This is the minimum level of activity that any healthy chapter should maintain. This award is presented annually.

Three-Star Chapter Award

The Three-Star Chapter Award is earned by collegiate chapters that participate and document a set number of professional, service and alumni activities. These documented activites are well above and beyond the level required for Alpha Chi Sigma to retain its tax classification status. This is the desired level of activity that any healthy chapter should maintain. This award is presented annually.

T. Dale Stewart
Sigma 1913

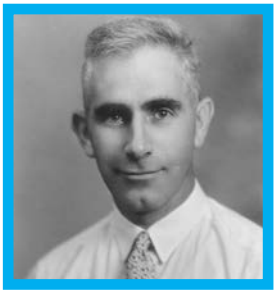
T. Dale Stewart Best Chapter Award

This award was established in 1934. T. Dale Stewart, Sigma 1913, was a charter member of Sigma Chapter and the chapter's first house manager. He also was a trustee and a member of the chapter's housing corporation. Brother Stewart served as Pacific District Counselor and chairman of the Alpha Chi Sigma board of trustees. This award first was presented at the 1936 Conclave. The winner of this award is selected by the district counselors.

J. Haworth Jonte
Beta Beta 1941

J. Haworth Jonte Award for the Most Improved Collegiate Chapter

This award was established at the 2002 Conclave to recognize the collegiate chapter that demonstrates the most improvement over the previous biennium. J. Haworth Jonte, Beta Beta 1941, was instrumental to the creation of Beta Omicron Chapter and Beta Phi Chapter. He was elected to the Supreme Council in 1966, serving as Grand Master Alchemist from 1970 to 1972. The winner of this award is selected by the district counselors.



Clyde B. Hutchison
Alpha Delta 1919

Clyde B. Hutchison Award for Best Professional Activities

This award was established for the 1982 Conclave to recognize the collegiate chapter that demonstrates the most outstanding professional activities at Conclave. Clyde B. Hutchison, Alpha Delta 1919, served on multiple committees, including a term as Southern District Counselor. He was elected to the Supreme Council in 1948 and was elected Grand Master Alchemist for the 1948 to 1950 Biennium. The winner of this award is selected by the district counselors.

Walter T. Schrenk
Alpha 1917

Walter T. Schrenk Award for Conclave Attendance

This award is earned by the collegiate chapter that has the most attendees at the Grand Chapter Conclave. The attendees must be active collegiate members of their chapter. Walter T. Schrenk, Alpha 1917, led the efforts to install Beta Delta Chapter. Dr. Schrenk served as Midwest District Counselor from 1939 through 1948, Grand Master of Ceremonies from 1948 to 1950, Grand Collegiate Alchemist from 1950 to 1954 and Grand Master Alchemist from 1954 to 1956.

Collegiate Chapter Roster

Chapter	Greek Letter	School	Location	Year Founded
Alpha	Α	University of Wisconsin	Madison, WI	1902
Beta	Β	University of Minnesota	Minneapolis, MN	1904
Gamma	Γ	Case Western Reserve University	Cleveland, OH	1906
Delta	Δ	University of Missouri	Columbia, MO	1907
Epsilon	Ε	Indiana University	Bloomington, IN	1908
Zeta	Ζ	University of Illinois	Champaign, IL	1908
Eta	Η	*University of Colorado*	*Boulder, CO*	*1908*
Theta	Θ	*University of Nebraska*	*Lincoln, NB*	*1909*
Iota	Ι	Rose-Hulman Institute of Technology	Terre Haute, IN	1909
Kappa	Κ	*University of Kansas*	*Lawrence, KS*	*1909*
Lambda	Λ	*The Ohio State University*	*Columbus, OH*	*1910*
Mu	Μ	University of New Hampshire	Durham, NH	1911
Nu	Ν	*Pennsylvania State University*	*State College, PA*	*1911*
Xi	Ξ	*University of Maine*	*Orono, ME*	*1911*
Omicron	Ο	*Harvard University*	*Cambridge, MA*	*1912*
Pi	Π	Syracuse University	Syracuse, NY	1912
Rho	Ρ	University of North Carolina	Chapel Hill, NC	1912
Sigma	Σ	University of California	Berkeley, CA	1913
Tau	Τ	Cornell University	Ithaca, NY	1913
Upsilon	Υ	*Northwestern University*	*Evanston, IL*	*1913*
Phi	Φ	*Allegheny College*	*Meadville, PA*	*1914*
Chi	Χ	*Yale University*	*New Haven, CT*	*1914*
Psi	Ψ	*Louisiana State University*	*Baton Rouge, LA*	*1914*
Omega	Ω	*University of Pittsburgh*	*Pittsburgh, PA*	*1915*
Alpha Alpha	ΑΑ	*Stanford University*	*Stanford, CA*	*1916*
Alpha Beta	ΑΒ	University of Michigan	Ann Arbor, MI	1916
Alpha Gamma	ΑΓ	University of Kentucky	Lexington, KY	1917
Alpha Delta	ΑΔ	*University of Cincinnati*	*Cincinnati, OH*	*1917*
Alpha Epsilon	ΑΕ	*Washington University*	*St. Louis, MO*	*1917*
Alpha Zeta	ΑΖ	*Massachusetts Institute of Technology*	*Cambridge, MA*	*1919*
Alpha Eta	ΑΗ	*University of Oklahoma*	*Norman, OK*	*1919*
Alpha Theta	ΑΘ	University of Iowa	Iowa City, IA	1921
Alpha Iota	ΑΙ	*University of Pennsylvania*	*Philadelphia, PA*	*1921*
Alpha Kappa	ΑΚ	University of Virginia	Charlottesville, VA	1922
Alpha Lambda	ΑΛ	*Dartmouth College*	*Hanover, NH*	*1923*
Alpha Mu	ΑΜ	*Lafayette College*	*Easton, PA*	*1923*
Alpha Nu	ΑΝ	*Colgate University*	*Hamilton, NY*	*1924*
Alpha Xi	ΑΞ	*University of Utah*	*Salt Lake City, UT*	*1925*
Alpha Omicron	ΑΟ	*Montana State University*	*Bozeman, MT*	*1926*
Alpha Pi	ΑΠ	George Washington University	Washington, DC	1926

Chapter	Greek Letter	School	Location	Year Founded
Alpha Rho	AP	University of Maryland	College Park, MD	1927
Alpha Sigma	AΣ	*University of Arkansas*	*Fayetteville, AR*	*1928*
Alpha Tau	AT	*Tulane University*	*New Orleans, LA*	*1928*
Alpha Upsilon	AϒY	Michigan State University	East Lansing, MI	1928
Alpha Phi	AΦ	*University of Tennessee*	*Knoxville, TN*	*1929*
Alpha Chi	AX	*Iowa State University*	*Ames, IA*	*1929*
Alpha Psi	AΨ	*Illinois Institute of Technology*	*Chicago, IL*	*1930*
Alpha Omega	AΩ	Georgia Institute of Technology	Atlanta, GA	1932
Beta Alpha	BA	*Bucknell University*	*Lewisburg, PA*	*1932*
Beta Beta	BB	*Washington State University*	*Pullman, WA*	*1933*
Beta Gamma	BΓ	University of California	Los Angeles, CA	1935
Beta Delta	BΔ	University of Missouri	Rolla, MO	1936
Beta Epsilon	BE	*Clemson University*	*Clemson, SC*	*1939*
Beta Zeta	BZ	*University of Alabama*	*Tuscaloosa, AL*	*1952*
Beta Eta	BH	*University of North Texas*	*Denton, TX*	*1952*
Beta Theta	BΘ	*University of Texas*	*Austin, TX*	*1952*
Beta Iota	BI	University of Florida	Gainesville, FL	1953
Beta Kappa	BK	*University of Delaware*	*Newark, DE*	*1954*
Beta Lambda	BΛ	*University of Akron*	*Akron, OH*	*1954*
Beta Mu	BM	Occidental College	Los Angeles, CA	1954
Beta Nu	BN	Purdue University	West Lafayette, IN	1955
Beta Xi	BΞ	*Wayne State University*	*Detroit, MI*	*1955*
Beta Omicron	BO	*University of Houston*	*Houston, TX*	*1958*
Beta Pi	BΠ	University of the Pacific	Stockton, CA	1960
Beta Rho	BP	Kansas State University	Manhattan, KS	1965
Beta Sigma	BΣ	Rochester Institute of Technology	Rochester, NY	1966
Beta Tau	BT	*University of Arizona*	*Tucson, AR*	1967
Beta Upsilon	BY	*The American University*	*Washington, DC*	*1969*
Beta Phi	BΦ	South Dakota School of Mines	Rapid City, SD	1970
Beta Chi	BX	Hampden-Sydney College	Sydney, VA	1972
Beta Psi	BΨ	Southern Illinois University	Carbondale, IL	1975
Beta Omega	BΩ	*Arizona State University*	*Tempe, AZ*	*1975*
Gamma Alpha	ΓA	*Johns Hopkins University*	*Baltimore, MD*	*1976*
Gamma Beta	ΓB	Florida State University	Tallahassee, FL	1978
Gamma Gamma	ΓΓ	*Eastern Michigan University*	*Ypsilanti, MI*	*1980*
Gamma Delta	ΓΔ	The College of Charleston	Charleston, SC	1981
Gamma Epsilon	ΓE	*Vanderbilt University*	*Nashville, TN*	*1981*
Gamma Zeta	ΓZ	California Polytechnic State University	San Luis Obispo, CA	1982
Gamma Eta	ΓH	Marshall University	Huntington, WV	1985
Gamma Theta	ΓΘ	Truman State University	Kirksville, Mo.	1985
Gamma Iota	ΓI	Virginia Polytechnic Institute & State University	Blacksburg, VA	1987
Gamma Kappa	ΓK	James Madison University	Harrisonburg, VA	1991

Chapter	Greek Letter	School	Location	Year Founded
Gamma Lambda	ΓΛ	*Southeastern Oklahoma State University*	*Durant, OK*	*1996*
Gamma Mu	ΓΜ	*Northern Arizona University*	*Flagstaff, AZ*	*1997*
Gamma Nu	ΓΝ	Ohio University	Athens, OH	2000
Gamma Xi	ΓΞ	North Carolina State University	Raleigh, NC	2003
Gamma Omicron	ΓΟ	*Lehigh University*	*Bethlehem, PA*	2003
Gamma Pi	ΓΠ	*University of Washington*	*Seattle, WA*	*2004*
Gamma Rho	ΓΡ	*Loyola University*	*New Orleans, LA*	*2005*
Gamma Sigma	ΓΣ	*Kent State University*	*Kent, OH*	*2006*
Gamma Tau	ΓΤ	Indiana University of Pennsylvania	Indiana, PA	2006
Gamma Upsilon	ΓΥ	Duquesne University	Pittsburgh, PA	2006
Gamma Phi	ΓΦ	*University of Buffalo*	*Buffalo, NY*	*2010*
Gamma Chi	ΓΧ	Longwood University	Farmville, VA	2011
Gamma Psi	ΓΨ	*University of Toledo*	Toledo, OH	2012
Gamma Omega	ΓΩ	Widener University	Chester, PA	2012
Delta Alpha	ΔΑ	University of Rhode Island	Kingston, RI	2012
Delta Beta	ΔΒ	Alcorn State University	Alcorn State, MS	2013
Delta Gamma	ΔΓ	*Georgia Southern University*	*Statesboro, GA*	*2014*
Delta Delta	ΔΔ	Southeast Missouri State University	Cape Girardeau, MO	2014
Delta Epsilon	ΔΕ	Boston University	Boston, MA	2016
Delta Zeta	ΔΖ	Christopher Newport University	Newport News, VA	2016
Delta Eta	ΔΗ	*University of New Orleans*	*New Orleans, LA*	*2017*
Delta Theta	ΔΘ	*Albion College*	Albion, MI	2017
Delta Iota	ΔΙ	Thomas Jefferson University	Philadelphia, PA	2017
Delta Kappa	ΔΚ	University of Richmond	Richmond, VA	2017
Delta Lambda	ΔΛ	University of California - Irvine	Irvine, CA	2018
Delta Mu	ΔΜ	Kettering University	Flint, MI	2018
Delta Nu	ΔΝ	*Northern Illinois University*	*DeKalb, IL*	2018
Delta Xi	ΔΞ	*University of Tampa*	*Tampa, FL*	*2018*
Delta Omicron	ΔΟ	*Florida A&M University*	*Tallahassee, FL*	*2018*
Delta Pi	ΔΠ	*York College*	*York, PA*	*2019*
Delta Rho	ΔΡ	*Oregon State University*	*Corvallis, OR*	2020
Delta Sigma	ΔR	High Point University	High Point, NC	2022
Beta Kappa Collegiate Group of Delta Iota Chapter		University of Delaware	Newark, DE	2023

Inactive chapters are in italics.

Collegiate Houses

The Sigma House
Berkeley, Calif.

The Tau House
Ithaca, N.Y.

The Alpha Beta House
Ann Arbor, Mich.

The Alpha Theta House
Iowa City, Iowa

The Alpha Kappa House
Charlottesville, Va.

The Professional Branch

A professional fraternity is the medium through which students with common professional interests can develop lasting relationships among themselves as well as with practicing professionals. Professional fraternity chapters generally enjoy strong faculty support because they help bridge the gap among students, faculty and practicing professionals. Professional fraternities emphasize the importance of professional development programs sponsored by their chapters to supplement the regular scholastic program.

A major benefit of professional fraternity membership is the opportunity for association with alumni. Through first-hand information and contemporary experience, these "pros" are able to help students define academic, personal and career objectives.

Fraternity members learn to live and work with other people; to share experiences and ideas; to observe and develop principles of leadership, communication and human relations; and to practice tolerance, consideration and mutual respect (Adopted from Your Professional Fraternity, published by the Professional Fraternity Association).

In Alpha Chi Sigma, the alumni organization is called the professional branch. The professional branch includes all members of Alpha Chi Sigma who are not listed on the membership roll of a collegiate chapter.

Professors and other professional candidates become members of the professional branch immediately upon initiation. In localities where numbers make it possible, eight or more active Alpha Chi Sigma professionals may petition the Supreme Council to establish themselves as a professional chapter to carry out the programs and activities of the professional branch. Each chapter draws its name from the locality in which it exists.

In places where professional chapter formation is not practical, professional groups may be formed.

There currently are chapters of the professional branch near major chemical complexes. The result is that in many places where a graduate Alpha Chi Sigma member may be located, he or she can find a professional chapter through which the professional development of the individual can be advanced.

The purpose and aims of the professional branch are identical to those of the collegiate branch and are centered around the Three Objects of the Fraternity. One of the principal activities of the professional branch is maintaining a close relationship between the professional organization and collegiate chapters, where physical proximity makes such contact possible. The professional organization stands ready at all times to give help to the collegiate chapters. This assistance includes counsel and advice and vocational guidance leading to the "attainment of their ambitions."

The local programs of the professional chapters involve cooperation not only with the collegiate chapters but also with the American Chemical Society (ACS), the American Institute of Chemical Engineers (AIChE), the American Institute of Chemists and other technical societies in allied fields. In keeping with the Second Object of the Fraternity, it is the duty of all members to take a keen interest in the affairs of the societies so that they may help in advancing chemistry "both as a science and as a profession." Other activities of the professional branch include providing publicity on the accomplishments of individual members, establishing awards and scholarships, maintaining contact with all members within each district and fulfilling established Grand Chapter programs.

In addition to professional chapters and groups, professional members are active through Professional Representatives elected by the professional branch. These representatives serve on permanent Grand Chapter committees and as members of the Grand Advisory Committee.

Beyond these important activities, members of the professional branch participate in social activities on a regular basis, meeting Alpha Chi Sigma members from many parts of the nation to further the First Object.

At the 27th Biennial Conclave in 1964, a ceremony was adopted to honor the transition from the collegiate branch to the professional branch. This official but non-secret ceremony is called the Professional Recognition Ceremony, or PRC. The PRC served well as an event to honor collegiate members who were graduating from school but was not appropriate for faculty members or professional chemist initiates.

To fill some of the gaps in the PRC, the Ritual Committee developed the Professional Induction Ceremony, or PIC, which was adopted at the 36th Biennial Conclave in 1982 as an alternative to or in addition to the PRC. The PIC consists of two parts – the first is a secret ritual to mark the transition from the collegiate branch to the professional branch, and the second part is a non-secret ceremony that welcomes new professional Brothers into the professional branch. Members of the professional branch are entitled to wear the gold Alpha Chi Sigma Greek letter lapel pin.

Professional Groups
Five or more professional members residing in the same locality and holding meetings may notify the Grand Recorder of their activities. Upon receipt of notice, the Grand Recorder shall be authorized to designate such a local organization as a professional group. Professional groups do not have a vote in the Grand Chapter and are not required to elect officers.

Professional Chapters
A professional group of eight or more active professional members that has been designated as such for at least six months may petition the Supreme Council to obtain professional chapter status. As with professional groups, professional chapters are identified by the name of the city or locality in which they exist. Professional chapters have a vote in the Grand Chapter. Additionally, each professional chapter must elect five required officers:

President
Serves as the executive officer of the chapter and presides at chapter meetings. He or she is responsible for the condition of the chapter and the proper discharge of the duties of its officers. He or she also is responsible for the vote of the chapter in Grand Chapter during the period between Grand Chapter Conclaves.

Vice President
Assists the president and acts as the President in the event of the president's absence.

Secretary
Carries out the chapter's correspondence with the Grand Chapter. The secretary also is responsible for reporting the election of officers and matters of record as required by the Supreme Council. The secretary is responsible for keeping the minutes at chapter meetings and should maintain contact information for the chapter's members.

Treasurer
Collects and disburses the chapter's monies, which includes keeping a systematic record of the chapter's finances.

Hexagon Correspondent
Solicits articles for *The HEXAGON.*

Professional Representatives
Professional Representatives exist to enhance the lifelong membership within the Fraternity. To accomplish this, they provide representation for professional members at large who may not live near or belong to a professional chapter.

Professional Chapter Awards
As with the collegiate chapters, the Grand Chapter presents awards to professional chapters for exemplary performance.

Vincent A. Sedlak Professional Chapter Award
This award is presented to the best professional chapter for each biennium. Vincent A. Sedlak, Alpha Pi 1946, was a longtime contributor to the Fraternity. A donation from his estate established a fund that provides grants to promote the professional branch of the Fraternity. The winner of this award is selected by the district counselors.

Professional Chapter Roster
Active Professional Chapters
- Delaware Valley
- Indianapolis
- Kansas City
- Research Triangle Park
- St. Louis
- Washington, D.C.

Active Professional Groups
- Atlanta
- Bluegrass
- Boston
- Cincinnati
- Detroit
- Las Vegas
- Los Angeles
- Mid-Missouri
- New Jersey
- Northstar
- Omaha
- Pittsburgh
- San Diego
- Southwest Virginia
- Wisconsin

{*Section* IV}
Individual Awards and Recognition Programs

ACS Award in Pure Chemistry
1931 - 1967

The Pure Chemistry Award of the American Chemical Society recognizes outstanding chemists not older than 35 years. It was financed from 1931 to 1937 by Drs. A. C. and Irving Langmuir. In 1938, James Kendall, Alpha Alpha 1923, was the sponsor, but in 1939 there was no award due to the lack of a donor.

Recipients from 1931 to 1938 were:

1931	Linus Pauling, Sigma 1940
1932	Oscar Rice
1933	F. H. Spedding
1934	C. Fredrick Koelsch, Alpha 1926
1935	Raymond M. Fuoss
1936	John Gamble Kirkwood
1937	E. Bright Wilson
1938	Paul D. Bartlett, Omicron 1929

After two or more years of thought and argument, it was decided at the Tenth Professional Conference luncheon in Baltimore in the spring of 1939 that Alpha Chi Sigma would support the ACS Award in Pure Chemistry. William Higberg, Beta 1914, and Stewart S. Kurtz, Omicron 1921, insistently advocated support of the award. Kurtz later contributed largely to the success of the program as chairman of the Alpha Chi Sigma Pure Chemistry Award Committee from 1940 to 1944. Currently, the award consists of $5,000 plus a travel stipend of $1,000.

These recipients received the award under Alpha Chi Sigma sponsorship:

1940	Olin Brockway, Alpha Beta 1941
1941	Karl A. Folkers, Zeta 1942
1942	John L. Oncley, Alpha 1929
1943	Kenneth S. Pitzer, Sigma 1940
1944	Arthur C. Cope, Chi 1945
1945	Frederick Wall, Zeta 1938
1946	C. C. Price, Zeta 1941
1947	Glenn T. Seaborg, Beta Gamma 1935
1948	Saul Winstein, Beta Gamma 1951
1949	Richard T. Arnold, Zeta 1935
1950	Verner Schomaker, Theta 1932
1951	John C. Sheehan, Alpha Zeta 1948
1952	Harrison S. Brown
1953	William von E. Doering

1954	John D. Roberts, Beta Gamma 1939
1955	Paul Delahay, Psi 1951
1956	Paul M. Doty, Nu 1939
1957	Gilbert Stork,
1958	Carl Djerassi
1959	Ernest M. Grunwald, Beta Iota 1960
1960	Elias J. Corey, Zeta 1952
1961	Eugene E. Van Tamelen,
1962	Harden M. McConnell, Alpha Pi 1945
1963	Stuart A. Rice
1964	Marshal Fixman
1965	Dudley Herschbach
1966	Ronald Breslow
1967	John D. Baldeschweiler

ACS Award in Pure Chemistry
1968 - 2022

1968	Orville L. Chapman
1969	Roald Hoffmann,
1970	Harry B. Gray, Upsilon 1958
1971	R. Bruce King,
1972	Roy G. Gordon
1973	John I. Brauman
1974	Nicholas J. Turro
1975	George M. Whitesides
1976	Karl S. Freed
1977	Barry M. Trost
1978	Jesse L. Beauchamp
1979	Henry F. Schaefer III
1980	John E. Bercaw
1981	Mark S. Wrighton
1982	Stephen R. Leone
1983	Michael J. Berry
1984	Eric Oldfield
1985	Ben Freiser, Gamma Beta 1985
1986	Peter Wolynes
1987	George McLendon
1988	Jacqueline K. Barton
1989	Stuart L. Schreiber
1990	Peter G. Schultz
1991	Nathan S. Lewis
1992	Charles M. Lieber
1993	Jeremy M. Berg
1994	Gerard F. R. Parkin
1995	M. Reza Ghadiri
1996	Ann McDermott
1997	Erick M. Carreira
1998	Christopher C. Cummins
1999	Chad A. Mirkin
2000	Chaitan Khosla
2001	Carolyn Bertozzi, Sigma 2001
2002	Hongjie Dai
2003	Jillian M. Buriak
2004	Mei Hong
2005	Peidong Yang
2006	David R. Liu
2007	Xiaowei Zhuang
2008	Rustem F. Ismagilov
2009	Garnet K.L. Chan
2010	Phillippe S. Baran
2011	Melanie S. Sanford
2012	Oleg V. Ozerov
2013	Theodor Agapie
2014	Sara E. Skrabalak
2015	Adam Cohen
2016	Jonathan S. Owen
2017	Dr. Neal K. Devaraj
2018	Mircea Dinca
2019	Danna Freedman
2020	Corinna Schindler
2021	Rebekka S. Klausen
2022	Gabriela S. Schlau-Cohen
2023	Julia Kalow

The award is announced at the fall meeting of the American Chemical Society and is presented at the following spring meeting, at which a symposium honoring the recipient is usually held.

Alpha Chi Sigma Award in Chemical Engineering Research 1966- 1990

In 1966, following extensive discussions between GPA James F. Miller, Nu 1937, and the Awards Committee of the American Institute of Chemical Engineers (AIChE), the institute agreed to administer an award in chemical engineering research to be sponsored by Alpha Chi Sigma and to be financed through the Alpha Chi Sigma Educational Foundation.

The Alpha Chi Sigma Award in Chemical Engineering Research, which stipulates no age limit, recognizes individual research carried out during the 10 years preceding the year in which the award is to be presented. The current award is $5,000.

Recipients include:

1966	Harry G. Drickamer, Zeta 1949
1967	Donald B. Broughton
1968	Klaus Timmerhaus
1969	Rutherford Aris
1970	A. E. Dukler
1971	J. Sinfelt
1972	C. Dwight Prater
1973	Cornelius J. Pings
1974	Sheldon K. Friedlander
1975	Arnold S. Bondi
1976	Howard Brenner
1977	Eli Ruckenstein
1978	John A. Quinn
1979	Reuel Sinnar
1980	Roy Jackson, Alpha Upsilon 1959
1981	Warren E. Stewart, Alpha 1945
1982	Edward W. Merrill, Omicron 1943
1983	Charles W. Tobias, Sigma 1954
1984	John C. Berg, Sigma 1960
1985	Richard E. Rosensweig
1986	Keith E. Gubbins
1987	Doraiswami Ramkrishna
1988	Norman N. Li
1989	Bruce C. Gates
1990	Robert J. Madix

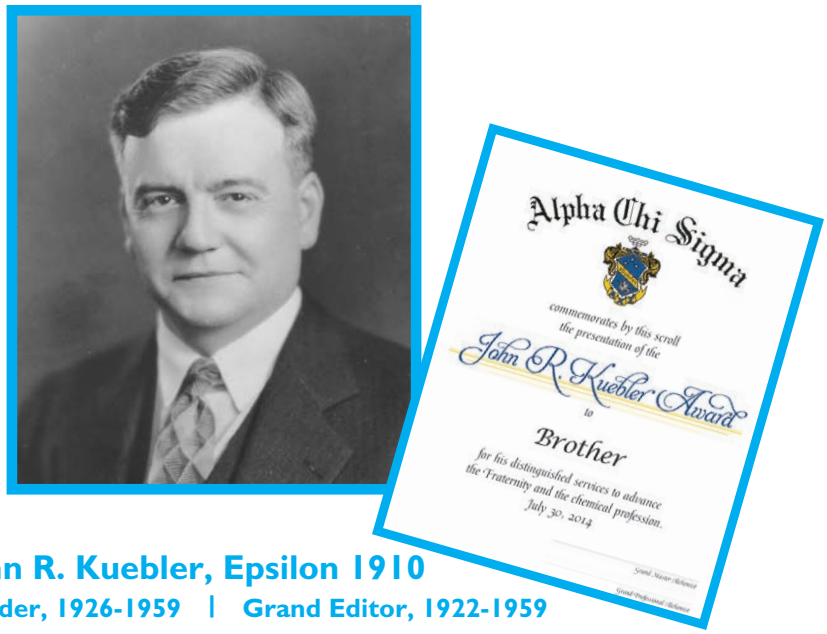
Alpha Chi Sigma Award in Chemical Engineering Research 1991 - 2022

1991	Jacob N. Isrealachvili
1992	Gianni Astarita
1993	Lanny D. Schmidt
1994	Julio M. Ottino
1995	Dennis C. Prieve
1996	Liang-Shih Fan
1997	Dudley A. Saville
1998	Peter T. Cummings
1999	Glenn Fredrickson
2000	Ronald Larson
2001	Mark Barteau
2002	Charles F. Zukoski, Zeta 1989
2003	E. Terry Papoutsakis
2004	Michael F. Doherty
2005	Darsh Wasan
2006	Rakesh K. Jain
2007	Antonios Miko
2008	Jeffrey Allan Hubbell
2009	James C. Liao
2010	William B. Russel
2011	Enrique Iglesia
2012	Nicholas Abbott
2013	Dr. Michael Tsapatsis
2014	Dr. Paula Hammond
2015	Dr. James Dumesic
2016	Dr. Sharon Glotzer
2017	Dr. Rakesh Agrawal
2018	Dr. Eric Shaqfeh
2019	Pablo Debenedetti
2020	Nicholas Kotov
2021	Zhenan Bao
2022	Patrick Doyle
2023	Zhen-Gang Wang

The award usually is presented at the annual meeting of AIChE. The recipient is requested to present an award address at one of the national meetings, or a symposium on the work is held at the annual meeting of AIChE the following year.

Alpha Chi Sigma has several awards and programs to recognize its members. Awards recognize areas from superior scholarship to outstanding service to the Fraternity, while programs provide grants and low interest loans for members. Most of these awards and services have been named for members who have contributed greatly to the Fraternity.

Membership Awards and Programs



John R. Kuebler, Epsilon 1910
{Grand Recorder, 1926-1959 | Grand Editor, 1922-1959
Grand Historian, 1957-1967}

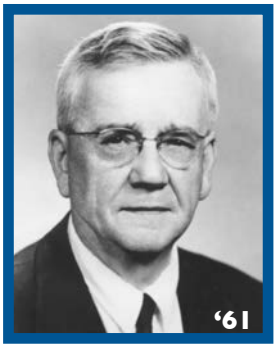
John R. Kuebler Award

The highest award Alpha Chi Sigma can bestow on one of its members is the John R. Kuebler Award.

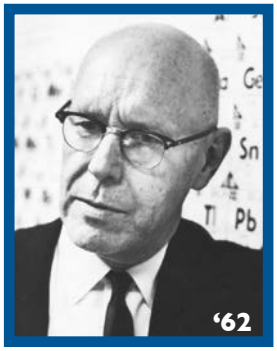
This award is presented for outstanding service to the Fraternity and outstanding service to the profession or accomplishment in the science of chemistry. Established in 1961, it honors John R. Kuebler, Epsilon 1910, who served Alpha Chi Sigma for 33 years as Grand Recorder (1926 to 1959), 37 years as Grand Editor of *The HEXAGON* (1922 to 1959) and 10 years as Grand Historian (1957 to 1967).

The award, consisting of a hand-lettered scroll, was presented annually until 1978 and since then biennially in Conclave years. It is customary to present the award at the Conclave banquet and for the recipient to deliver an award address.

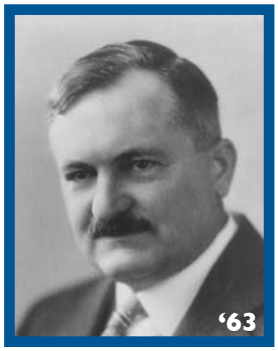
John R. Kuebler Award Recipients



John R. Kuebler
Epsilon 1910

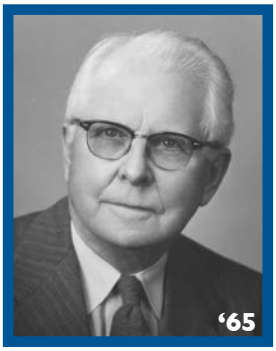


John C. Bailar
Eta 1922



Harry A. Curtis
Eta 1908

Reynold C. Fuson
Sigma 1920



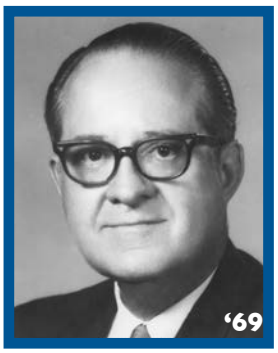
J. Howard Mathews
Alpha 1902

John R. Kuebler Award Recipients

Roger Adams
Omicron 1912

Carl F. Prutton
Gamma 1919

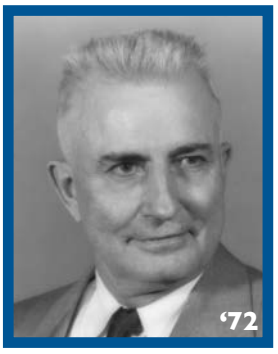
Marion E. Dice
Eta 1920



Ronald M. Warren
Alpha Upsilon 1929

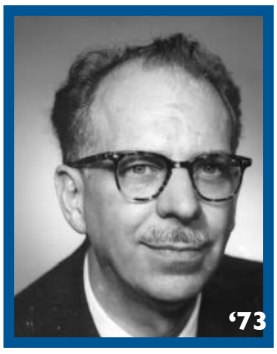
Carl S. Marvel
Zeta 1918

Foster Dee Snell
Alpha Nu 1925

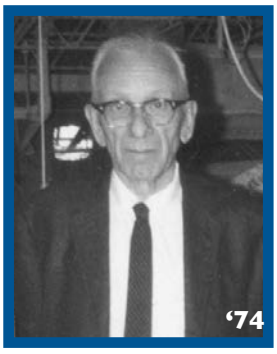


Walter T. Schrenk
Alpha 1917

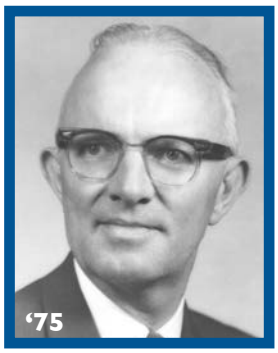
Sidney D. Kirkpatrick
Zeta 1914



L. Reed Brantley
Beta Gamma 1935



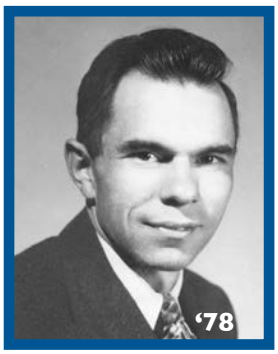
Albert H. Cooper
Alpha Phi 1929



George W. Irving
Alpha Pi 1929

Richard T. Arnold
Zeta 1935

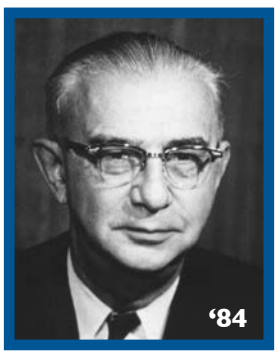
J. Haworth Jonte
Beta Beta 1941



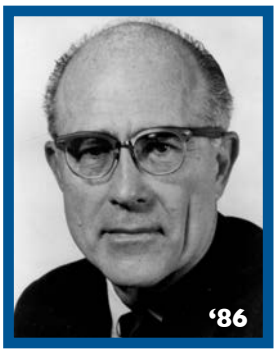
Glenn T. Seaborg
Beta Gamma 1935

Mary L. Willard
Nu 1971

Herbert A. Laitinen
Zeta 1943

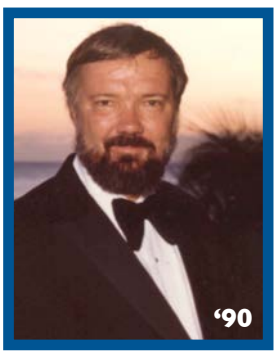


Cyril J. Staud
Alpha Zeta 1923



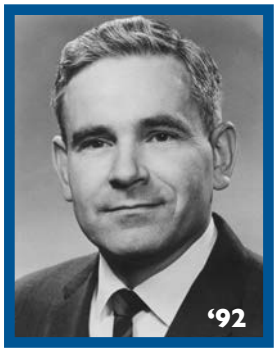
Robert C. Brasted
Alpha Pi 1935

R. Linn Belford
Zeta 1962

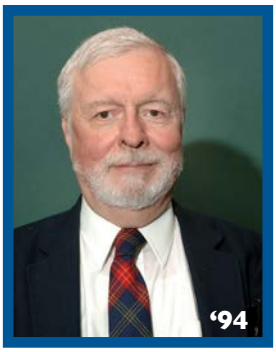


Gerard R. Dobson
Beta Eta 1970

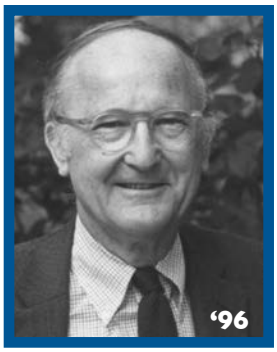
John R. Kuebler Award Recipients



Ronald T. Pflaum
Alpha Theta 1953



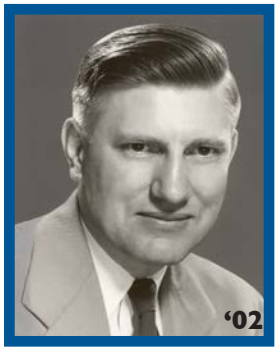
Maurice M. Bursey
Rho 1967



Herbert S. Gutowsky
Zeta 1953

Robert E. Lyle
Beta Eta 1977

James F. Miller
Nu 1937



Harry G. Day
Epsilon 1942

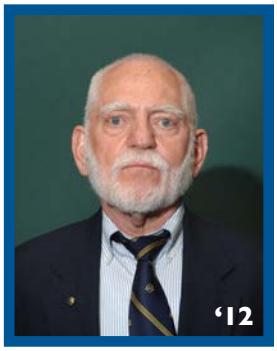
Bob McManigal
Sigma 1921

Donald E. Green
Sigma 1947

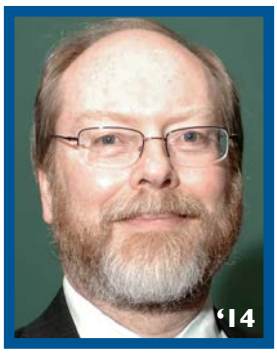
Paul R. Jones
Beta Eta 1970

Peter L. Yochim
Nu 1963

Edward P. Schneider
Beta Delta 1942



Col. William A. Myers
Alpha Sigma 1954



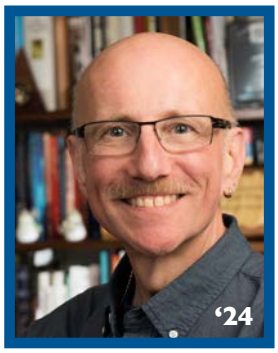
D. Mitch Levings, P.E.
Beta Delta 1975

Gary D. Anderson
Alpha Eta 1962

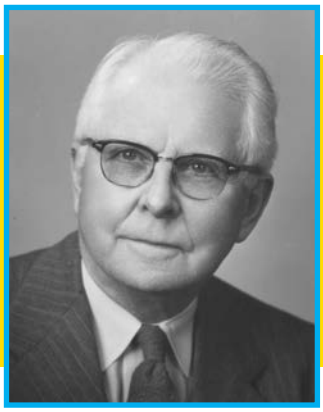
John E. Adams
Beta Delta 1971

Walter R. Benson
Eta 1956

Bassam Z. Shakhashiri
Zeta 1970



Brian Coppola
Alpha Beta 1988



J. Howard Mathews
Alpha 1902

H.E. Minnerly, Jr.
Chi 1948

Ronald T. Pflaum
Alpha Theta 1953

J. Howard Mathews Memorial Fund

Following his death, in 1970 the J. Howard Mathews Memorial Fund was established to honor founder "Matty" Mathews. Since then, all contributions to the Alpha Chi Sigma Fraternity or to the Alpha Chi Sigma Educational Foundation made in memory of a deceased member are deposited in the fund unless specifically directed otherwise.

The fund provides low-interest loans to collegiate members of Alpha Chi Sigma, who become eligible to participate in the program on the first anniversary of their initiation. Loans from $100 to $4,000 are available at an interest rate based on the current market rate. Applications may be obtained from the National Office and must be transmitted by the Chapter Advisor together with a letter of recommendation. If the student is enrolled at a college or university where no active chapter exists, a faculty member who is a member of Alpha Chi Sigma can submit the application and a letter of recommendation. Loan repayment may start at any time but no later than six months following graduation or after leaving school for any reason.

H. E. Minnerly, Jr., Memorial Fund

This fund, in memory of past GMA H. E. Minnerly, Jr., Chi 1948, provides grants to members of Alpha Chi Sigma who are enrolled in colleges and universities where there is no active chapter of Alpha Chi Sigma. The purpose of the grants is to encourage expansion or reactivation at such schools by giving the necessary funds to establish a new chapter or reactivate a dormant chapter. Upon the successful reactivation or establishment of a chapter, the student responsible for the expansion will receive an honorarium and a certificate of appreciation from the Supreme Council.

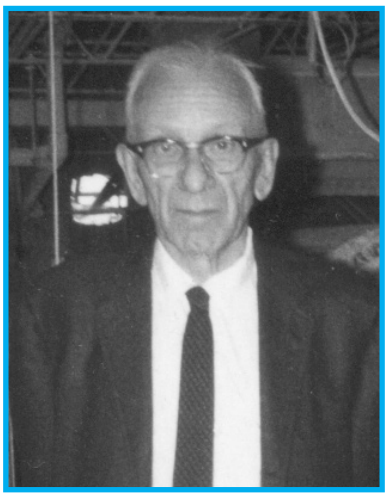
Ronald T. Pflaum Outstanding Chapter Advisor Award

The Ronald T. Pflaum Outstanding Chapter Advisor Award is presented to a Chapter Advisor in recognition of ongoing contributions to the success of a chapter and continuing service to the interest of the Fraternity.

The award honors Ronald T. Pflaum, Alpha Theta 1953, who served as Alpha Theta's Chapter Advisor, Grand Recorder, Grand Editor, Grand Master Alchemist, Grand Collegiate Alchemist and District Counselor.

The award consists of an engraved plaque and an invitation to participate at Conclave.

Year	Advisor	Chapter
1992	Dr. Anne E. Moody, Rho 1981	Gamma Theta
1994	Col. William A. Myers, Alpha Sigma 1954	Alpha Sigma
1996	Dr. Steven McDowell, Beta Phi 1991	Beta Phi
1998	Dr. Pedro L. Muiño, Beta Rho 1995	Beta Rho
2000	Dr. Howard L. McLean, Iota 1989	Iota
2002	Dr. Herbert J. Sipe, Jr., Alpha 1962	Beta Chi
2004	Dr. Gary L. Asleson, Alpha Theta 1971	Gamma Delta
2006	Dr. Thomas C. DeVore, Gamma Kappa 1991	Gamma Kappa
2008	Dr. Howard R. Mayne, Mu 2001	Mu
2010	Dr. Mary Kinsel, Beta Psi 2005	Beta Psi
2012	R. David Hayes, Alpha Sigma 1966	Alpha Sigma
2014	Dr. Andrea E. Martin, Gamma Omega 2010	Gamma Omega
2016	Dr. Philip Costanzo, Gamma Zeta 2008	Gamma Zeta
2018	Sonia Eley, Delta Beta 2009	Delta Beta
2020	Dr. Lauren McMills, Gamma Nu 2001	Gamma Nu
2022	David B. Martin, Alpha Theta 2021	Alpha Theta
2024	Dr. Erin Peters, Alpha Gamma 2015	Alpha Gamma



Albert H. Cooper
Alpha Phi 1929

Albert H. Cooper Memorial Scholarship Award

To recognize the lifelong dedication to students and to chemical engineering by Albert H. Cooper, Alpha Phi 1929, a scholarship award was established by Louise K. Cooper, his widow.

This award serves as a memorial to Dr. Cooper's devotion to Alpha Chi Sigma, particularly Alpha Phi Chapter, of which he was a charter member and a Chapter Advisor.

The award is granted annually to a senior with exceptional merit and high scholastic standing. The senior must be eligible to receive a bachelor's degree in chemical engineering from the University of Tennessee at Knoxville. The award is given to an active member of Alpha Phi Chapter unless, in the opinion of the selection committee composed of members of the faculty in chemical engineering at the university, no member of the Fraternity is reasonably eligible to receive the award in any given year. It then may be given to a non-member of the Fraternity.

Edmund E. Dunlap Fund

The Edmund E. Dunlap Fund is derived from the estate of Edmund E. Dunlap, Iota 1922, and his wife, Marcile W. Dunlap. The proceeds from the estate are used for the benefit of students enrolled in the areas of chemistry and chemical engineering at The Rose-Hulman Institute of Technology in Terre Haute, Ind.

Vincent A. Sedlak Memorial Fund

The Vincent A. Sedlak Memorial Fund was established from a donation from the estate of Vincent A. Sedlak, Alpha Pi 1946. This fund provides grants to members of Alpha Chi Sigma for the purpose of advancing the professional branch of the Fraternity. Specifically, these funds support activities that promote establishing or growing professional chapters, encouraging the transition of professional groups to professional chapters or enabling newly established professional chapters to begin or expand their professional activities.

Alpha Chi Sigma Scholar Award

Alpha Chi Sigma Scholar Award

At the Supreme Council meeting at Madison, Wisc., in July 1913, Alpha Chi Sigma initiated a scholarship recognition program "To emphasize the belief that to encourage scholarship is one way to strive for the advancement of chemistry."

The 1914 and 1915 award winners were selected on the basis of average grades in all subjects in the sophomore and junior years to any student majoring in chemistry at an institution where the Fraternity had a chapter. The council had great difficulty in arriving at equivalent values for grades at the various institutions. Accordingly, in 1916 the Conclave changed the basis of the award to competitive examinations in the areas of general inorganic, analytical, historical and "contemporaneous" chemistry. Organic and physical chemistry were not covered since these were senior-level subjects in some institutions at that time.

During the nine years the award was given, the winners were:

1914	Henry R. Curme, Upsilon 1913
1915	Roy Federick Newton, Upsilon 1914
1916	Emil C. Lefevre, Kappa 1917
1917	Carl Iddings, Sigma 1916
1918	Dwight C. Bardwell, Sigma 1917
1919	Clara B. McMillan
1920	Ralph L. Shriner, Alpha Epsilon 1919
1921	Ludvig Reimers, Sigma 1920
1922	Ross Cummings

Alpha Chi Sigma Scholar Award

At the 7th Biennial Conclave, the award was terminated by action of the Grand Chapter when a survey revealed that few chapters saw "any considerable merit in the project." In opposing the termination of the award, Harry A. Curtis, Eta 1908, wrote, "The recipient of a medal will prize it no less because of the fact that the work was done for its own sake. Perhaps every great piece of work is done for the joy of the doing, but recognition of the merit of the work by others is no less welcome."

It was in this spirit that in 1978 the Supreme Council re-instituted the award. Today it consists of a gold scholarship key, a certificate and $2,500. The biography of the recipient also is featured in The HEXAGON.

Nominations for the award are solicited annually. Selection is made on the basis of outstanding scholarship for undergraduate students and on the basis of original chemical research for graduate students. The Alpha Chi Sigma Scholar is selected by the Scholar Award Committee.

Since its reinstitution, the award has been presented to:

1980	Eric T. Crickman, Beta Psi 1978
1981	Lorraine K. Schroeder, Beta Eta 1980
1982	R. Scott Wilson, Alpha Zeta 1978
1984	Wayne L. Wittenberg, Alpha 1974
1985	Mary B. Parker, Zeta 1981
1986	Kurt Rothenberger, Zeta 1981
1987	Matthew T. Clarke, Beta Eta 1985
1988	Dawn A. Groenke, Beta Nu 1986
1989	Robert M. Leasure, Alpha Kappa 1987
1990	Douglas P. Dee, Sigma 1987
1991	Joseph R. Jacobs, Jr., Alpha Sigma 1988
1992	Brian P. Hudson, Beta Nu 1990
1993	Loredana Soceneantu, Beta Mu 1991
1994 Dual Award	Donna Gray Hartzfeld, Beta Omega 1990 Christopher Todd Scurlock, Beta Omega 1990
1995	Jay E. Harris, Rho 1994
1996	Eric Schmidt, Beta Theta 1991
1997	Carla Jo Harper, Beta Theta 1991
1998	Jessica Robinson, Beta Theta 1994
1999	Dorion Liston, Gamma Eta 1995
2000	Jaime Stearns, Upsilon 1998
2001	Matthew Schiffler, Alpha Kappa 1999
2002	Andrea Dale Marcum, Gamma Eta 1999
2003	Michael Leader, Beta Chi 2000
2004	Matthew Lohse, Alpha Sigma 2000
2005	Kathleen Phipps, Gamma Beta 2001
2006	Brian J. Walker, Tau 2003
2007	Thomas Teets, Gamma 2004
2008	Natalie Anderson, Alpha Sigma 2006
2009	Anastasia Berrier, Gamma Upsilon 2007
2010	Nicholas Bencivenga, Mu 2008
2011	Nicole Lorenz, Alpha Sigma 2008
2012	Jacob Wagner, Gamma 2009
2013	Amy Pochodylo, Alpha Upsilon 2011
2014	Jenna Silverman, Gamma Nu 2012
2015	Eric Alexy, Gamma Xi 2011
2016	Andrew Dixon, Beta Tau 2012
2017	Anthony Tabet, Beta 2013
2018	Justin Pratt, Delta Delta 2012
2019	Angela Chen, Alpha Beta 2017
2020	Jenna Manske, Alpha Beta 2017
2021	Jill Belluomini, Delta Nu 2018
2022	Daniel Tinney, Alpha Kappa 2011
2023	Anna Chiara Russo, Alpha Beta 2021
2024	Artin Asadipooya, Alpha Gamma 2022

Recognition and Citations

25th and 50th Anniversary Recognition Pins

Upon their 25th and 50th anniversaries of their initiations, active members of Alpha Chi Sigma are awarded special recognition pins. The 25th anniversary pin is black with blue lettering, and the 50th anniversary pin is blue with gold lettering.

Recognition Citations and Certificates of Appreciation

Apart from the structured awards that a member may receive from the Fraternity, there are special recognition citations and certificates that can be awarded to individual members or chapters for a variety of contributions.

District Counselor Citations

These citations are given by a District Counselor and are signed by the District Counselor. These citations can be awarded at any time but are given most often at Grand Chapter Conclaves and other large gatherings.

Supreme Council Citations

These citations are given by a Supreme Council officer in much the same fashion as the District Counselor citations. These citations are signed by the Supreme Council member giving the citation and do not require a proposition of the Supreme Council. These citations can be awareded at any time but are given most often at Grand Chapter Conclaves.

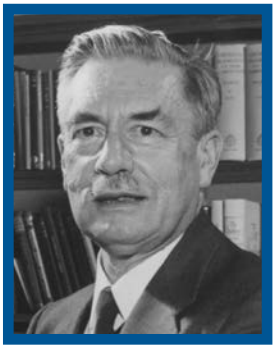
Certificates of Appreciation

A Certificate of Appreciation is more prestigious than either of the citations and is awarded by the Supreme Council to recognize an outstanding accomplishment. These certificates are signed by all members of the Supreme Council and the Grand Recorder and require a proposition of the Supreme Council to be issued. These certificates can be awarded at any time but are given most often at Grand Chapter Conclaves.

Alpha Chi Sigma Nobel Laureates

The Nobel Prize is arguably the most prestigious international award. It has been awarded yearly since 1901 for achievements in chemistry, physics, physiology or medicine, literature and peace. The award is named for Alfred Nobel, the inventor of dynamite who also built up companies and laboratories in more than 20 countries before his death in 1896. His last will and testament of 1895 provided for the establishment of the Nobel Prize. Several members of Alpha Chi Sigma have been awarded this illustrious honor.

The Nobel Prize in Chemistry {Full Prize} - 1936



Petrus J.W. Debye
Tau 1941
1884-1966
"For his contributions to our knowledge of molecular structure through his investigations on dipole moments and on the diffraction of X-rays and electrons in gases."

The Nobel Prize in Chemistry {One-Half Prize} - 1954

Linus C. Pauling
Sigma 1940
1901-1994

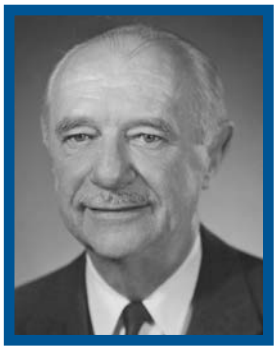
"For his research into the nature of the chemical bond and its application to the elucidation of the structure of complex substances."

The Nobel Prize in Physiology or Medicine {One-Half Prize} - 1943

Edward Adelbert Doisy
Zeta 1940
1893-1986

"For his discovery of the chemical nature of vitamin K."

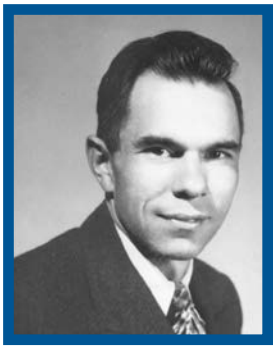
The Nobel Prize in Chemistry {One-Half Prize} - 1955



Vincent du Vigneaud
Zeta 1930
1901-1978

"For his work on biochemically important sulphur compounds, especially for the first synthesis of a polypeptide hormone."

The Nobel Prize in Chemistry {One-Half Prize} - 1951



Glenn T. Seaborg
Beta Gamma 1935
1912-1999

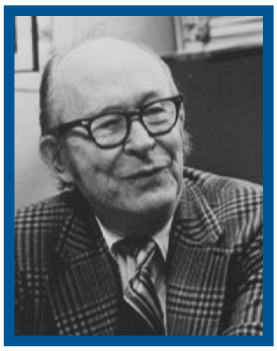
"For their discoveries in the chemistry of the transuranium elements."

The Nobel Prize in Physiology or Medicine {One-Fourth Prize} - 1958

Edward L. Tatum
Alpha 1930
1909-1975

"For their discovery that genes act by regulating definite chemical events."

The Nobel Prize in Chemistry {Full Prize} - 1960



Willard F. Libby
Sigma 1941
1908-1980

"For his method to use carbon-14 for age determination in archaeology, geology, geophysics, and other branches of science."

The Nobel Peace Prize {Full Prize} - 1962

Linus C. Pauling
Sigma 1940
1901-1994

"For his contributions to an international ban on nuclear weapons testing."

The Nobel Prize in Physiology or Medicine {One-Third Prize} - 1968

Robert W. Holley
Zeta 1940
1922-1993

"For their interpretation of the genetic code and its function in protein synthesis."

The Nobel Prize in Chemistry {Full Prize} - 1968

Lars Onsager
Chi 1949
1903-1976

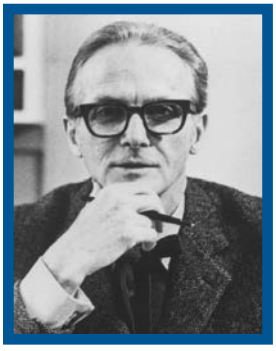
"For the discovery of the reciprocal relations bearing his name, which are fundamental for the thermodynamics of irreversible processes."

The Nobel Prize in Chemistry {Full Prize} - 1974

Paul John Flory
Tau 1949
1910-1985

"For his fundamental achievements, both theoretical and experimental, in the physical chemistry of the macromolecules."

The Nobel Prize in Chemistry {Full Prize} - 1976



William N. Lipscomb
Alpha Gamma 1939
1919-2011

"For his studies on the structure of boranes illuminating problems of chemical bonding."

The Nobel Prize in Chemistry {One-Half Prize} - 1979

Herbert C. Brown
Beta Nu 1960
1912-2004

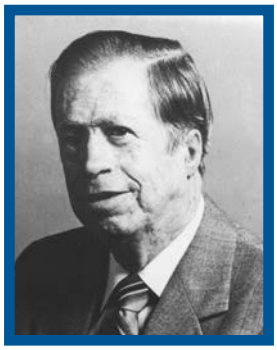
"For their development of the use of boron- and phosphorus-containing compounds, respectively, into important reagents in organic synthesis."

The Nobel Prize in Chemistry {Full Prize} - 1990

Elias J. Corey
Zeta 1952
1928-

"For his development of the theory and methodology of organic synthesis."

The Nobel Prize in Chemistry {Full Prize} - 1984



Robert B. Merrifield
Beta Gamma 1944
1921-2006

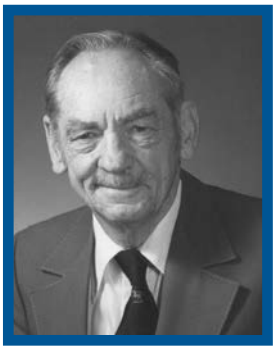
"For his development of methodology for chemical synthesis on a solid matrix."

The Nobel Prize in Chemistry {Full Prize} - 1992

Rudolph A. Marcus
Zeta 1965
1923-

"For his contributions to the theory of electron transfer reactions in chemical systems."

The Nobel Prize in Physiology or Medicine {One-Third Prize} - 1988



George H. Hitchings
Omicron 1929
1905-1998

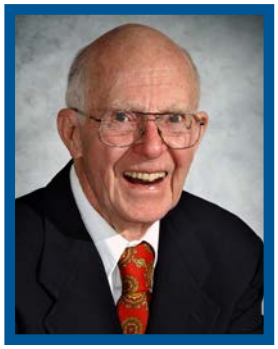
"For their discoveries of important principles for drug treatment."

The Nobel Prize in Chemistry {One-Third Prize} - 2000

Alan G. MacDiarmid
Alpha 1951
1927-2007

"For the discovery and development of conductive polymers."

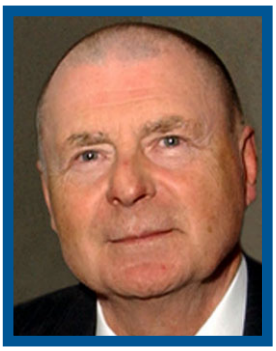
The Nobel Prize in Physics {One-Quarter Prize} - 2002



Raymond Davis, Jr.
Alpha Rho 1935
1914-2006

"For pioneering contributions to astrophysics, in particular for the detection of cosmic neutrinos."

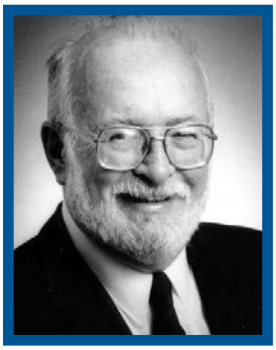
The Nobel Prize in Chemistry {One-Third Prize} - 2010



Richard F. Heck
Beta Gamma 1950
1931- 2015

"For palladium – catalyzed cross couplings in organic synthesis."

The Nobel Prize in Physiology or Medicine {One-Half Prize} - 2003



Paul C. Lauterbur
Gamma 1949
1929-2007

"For their discoveries concerning magnetic resonance imaging."

The Nobel Prize in Chemistry {One-Third Prize} - 2022

Carolyn Bertozzi
Sigma 2001
1966-

"For the development of click chemistry and bioorthogonal chemistry."

Alpha Chi Sigma Hall of Fame

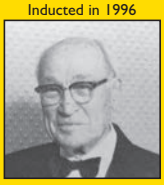
The Alpha Chi Sigma Hall of Fame was established in 1982 to recognize outstanding members of the Fraternity and to publicize their contributions to the science and profession of chemistry. Nominations to the Hall of Fame may be made by any member of the Fraternity. Selections are made by the Supreme Council. The original Hall of Fame consisted of seven members, and for awhile new inductees were added every year. Currently, the Supreme Council inducts up to two new members each biennium with the presentations being made at Conclave. The costs of administering the Hall of Fame are borne by the Alpha Chi Sigma Educational Foundation.

Inducted in 1989

Roger Adams
Omicron 1912

Roger Adams was educated at Harvard University and taught there briefly before moving to the University of Illinois. During World War I, when American laboratories had their supplies of German chemicals cut off, Adams had the "preps" lab at the university manufacture large amounts of specialized organic chemicals to supply U.S. needs. This activity led him to initiate organic syntheses and later organic reactions. Adams had an extraordinary talent for attracting and training students (184 doctorate students and 50, postdoctorate students) to whom he was respectfully known as "The Chief." His honors and awards include the National Medal of Science, the American Chemical Society's Priestly Medal andmembership in the National Academy of Science. He was president of the American Chemical Societyin 1935 and president of the American Association for the Advancement of Science in 1950.

Inducted in 1996



Arnold O. Beckman
Zeta 1921

Arnold O. Beckman was the first to apply electronics to direct chemistry measurement and is known globally as the inventor of the pH meter. He also developed the ultraviolet spectrophotometer, which revolutionized a number of chemical analyses. In 1987, Beckman was inducted into the National Inventors Hall of Fame. In 1988, he was presented with the National Medal of Technology by President Ronald Reagan. And in 1989, President George H.W. Bush presented him with the National Medal of Science. In addition to being an inventor and entrepreneur, Beckman also was a philanthropist. The Arnold and Mabel Beckman Foundation supports five Beckman Institutes and Centers at major universities, a vigorous Young Investigators program and a variety of other research efforts.

Inducted in 2024

Carolyn Bertozzi
Sigma 2001

Carolyn Bertozzi Brother Carolyn Bertozzi is the Anne T. and Robert M. Bass Professor of Chemistry and Professor of Chemical & Systems Biology and Radiology at Stanford University, the Baker Family Director at Sarafan ChEM-H, and an Investigator of the Howard Hughes Medical Institute. She completed her undergraduate degree in Chemistry from Harvard University in 1988 and her Ph.D. in Chemistry from UC Berkeley in 1993. After completing postdoctoral work at UCSF in the field of cellular immunology, she joined the UC Berkeley faculty in 1996. In June 2015, she joined the faculty at Stanford University as an Institute Scholar at Sarafan ChEM-H.

Dr. Bertozzi's research interests span the disciplines of chemistry and biology with an emphasis on studies of cell surface glycosylation pertinent to disease states. Her lab focuses on profiling changes in cell surface glycosylation associated with cancer, inflammation and bacterial infection, and exploiting this information for development of diagnostic and therapeutic approaches, most recently in the area of immuno-oncology. In addition to her outstanding research, she is known for emphasizing the importance of inclusivity in science. She has often spoken about her personal challenges as a woman and lesbian entering the field at a time when opportunities for under-represented groups were emerging. She is also recognized as a great mentor and collaborator to many.

Dr. Bertozzi has been recognized with many honors and awards for both her research and teaching accomplishments. She is an elected member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the German Academy of Sciences Leopoldina. Some awards of note include the 2024 Priestley Medal, 2022 Nobel Prize in Chemistry, Lemelson-MIT award for inventors, Whistler Award, Ernst Schering Prize, MacArthur Foundation Fellowship, the ACS Award in Pure Chemistry, Tetrahedron Young Investigator Award, and Irving Sigal Young Investigator Award of the Protein Society. Her efforts in undergraduate education have earned her the UC Berkeley Distinguished Teaching Award and the Donald Sterling Noyce Prize for Excellence in Undergraduate Teaching.

Inducted in 2008

R. Byron Bird
Alpha Rho 1942

Dr. R. Byron Bird earned his bachelor's degree in chemical engineering from the University of Illinois and his doctorate degree from the University of Wisconsin.

Dr. Bird's postdoctoral work was at Instituut voor Theoretische Fysica, Universiteit van Amsterdam, after which he joined the faculty at the University of Wisconsin. Dr. Bird's interests include transport phenomena, polymer fluid dynamics, polymer kinetic theory and rheology. He is co-author of Transport Phenomena. Since the textbook's publication, the subject of transport phenomena has become a standard course in chemical engineering curricula in the United States and abroad. Dr. Bird was a Fulbright Lecturer in the Netherlands and Japan and is a recipient of the National Medal of Science and the Society of Engineering Science's A.C. Eringen Medal for outstanding achievements in Engineering Science.

Inducted in 2000

Robert C. Brown
Beta Nu 1960

Herbert C. Brown received his doctorate degree from the University of Chicago. Dr. Brown's research in boranes and organoboranes is well known, as is his work in non-classical ions, on a quantitative theory of aromatic substitution and on steric effects. This work has been recognized by various awards and prizes, including election to the National Academy of Sciences in 1957, the American Chemical Socitey Award for Creative Research in synthetic organic chemistry in 1960, the National Medal of Science in 1969, the Nobel Prize in Chemistry in 1979, the Priestley Medal in 1981, the American Institue of Chemists' Gold Medal in 1985 and the Herbert C. Brown Award for Creative Research in Synthetic Methods in 1998 (the first recipient).

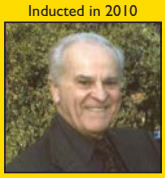
Inducted in 1982

Wallace H. Carothers
Zeta 1926

Wallace H. Carothers received his doctorate degree under the direction of Roger Adams, Omicron 1912, at the University of Illinois. After that, Dr. Carothers was a chemistry instructor at the University of Illinois in 1924 and at Harvard University from 1924 to 1927.

He also was director of organic chemistry in the Central Research Laboratory of E.I. DuPont de Nemours and Company from 1927 to 1937. Dr. Carothers is considered a pioneer in both the theory and applications of polymer chemistry. Dr. Carothers and his associates laid the foundations for the synthetic fiber (nylon) and elastomer (neoprene) industries in the United States.

Inducted in 2010



Gregory R. Choppin
Beta Iota 1973

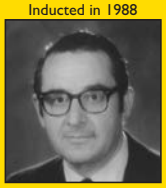
Gregory R. Choppin received a bachelor's degree in chemistry from Loyola University and a doctorate degree from the University of Texas. From 1953 to 1956, Dr. Choppin was a postdoctoral research associate at the Lawrence Berkeley Laboratory where he worked with Glenn T. Seaborg and his team on new elements. During that time, he co-discovered Element 101, Mendelevium. In 1956, he joined the Department of Chemistry at Florida State University. He served as chair of the department from 1968 to 1977 and again from 1993 to 1994. Dr. Choppin received numerous awards that recognized his contributions to chemical research, including the Alexander Von Humbolt U.S. Senior Scientist Award, the American Chemical Society Award for Nuclear Chemistry, the Seaborg Award in Separation Science, the Southern Chemist Award of the American Chemical Society, the Gold Medal of the Florida Academy of Sciences, a P residential Citation for Outstanding Service to Nuclear Science and Technology, the American Institute of Chemists' Award and the Becquerel Medal by The Royal Society of Chemistry.

Inducted in 2000

James B. Conant
Omicron 1912

James B. Conant received his doctorate degree from Harvard University and later became the president of Harvard University. A founding member of Omicron Chapter at Harvard, Dr. Conant was an early contributor to physical organic chemistry. He was elected to the National Academy of the Sciences in 1929. He served in various governmental positions during and following World War II, including the National Defense Research Committee, the National Science Board and the Atomic Energy Committee. He also served on the cabinet-level committee overseeing the Manhattan Project. In his lifetime, Conant was granted 52 honorary] doctorate degrees and several awards, including the Presidential Medal of Freedom and the Priestley Medal in 1944.

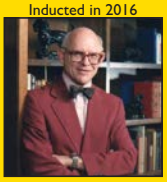
Inducted in 1988



Elias J. Corey
Zeta 1952

Elias J. Corey received his doctorate degree from the Massachusetts Institute of Technology. After graduation, he continued at MIT as a member of a program on synthetic penicillins. In 1950, he joined the University of Illinois as a chemistry instructor. In 1959, he accepted a professorship at Harvard University. His interests in chemistry covered metal complexes, synthesis and enzyme chemistry. He pioneered the method of retrosynthetic analysis and was the first to achieve the chemical synthesis of prostaglandins. He received the 1990 Nobel Prize in Chemistry for his development of the theory and methodology of organic synthesis for Creative Research in Synthetic Methods in 1998 (the first recipient).

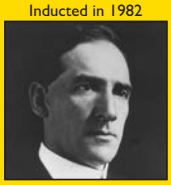
Inducted in 2016



Frank A. Cotton
Beta Eta 1978

Frank A. Cotton received an A.B. degree from Temple University in 1951 and a PhD in chemistry from Harvard University in 1955. Dr. Cotton joined the faculty of the Massachusetts Institute of Technology and in 1961, became the youngest person at MIT to achieve the rank of full professor. In 1972, he moved to Texas A&M University as a professor and played a key role in growing the chemistry department into a world renowned program. While at Texas A&M, Dr. Cotton was the holder of the W.T. Doherty-Welch Foundation Chair in Chemistry. He was a recipient of 30 honorary degrees from universities around the world and received prizes including the King Faisal Prize, the Robert A. Welch Award, the Wolf Prize, the National Medal of Science, the Priestley Medal, and the George Pimentel Award in Chemical Education. Dr. Cotton was a pioneer in the research of direct chemical bonding of pairs and clusters of atoms of elements known as transition metals. He discovered and analyzed many compounds that contain double or multiple metal-metal bonds, including the first known metal-metal quadruple bonds. Dr. Cotton's work was highly important in helping understand catalysts.

Inducted in 1982



Frederick G. Cottrell
Sigma 1917

Frederick G. Cottrell received his bachelor's degree from the University of California at Berkeley in 1896 and his doctorate degree from Leipzig, under the direction of Wilhelm Ostwald, in 1902. For many years, he worked for the U.S. Bureau of Mines, finally as its director. He is the inventor of the electrostatic "Cottrell" precipitator for removing particulate matter from flue gases. He used the royalties from this invention to form the Research Corporation for Science Advancement, which continues to fund imaginative scientific projects. Cottrell said, "[I am] willing to risk, or even sacrifice on occasion, possible legitimate profits...if thereby a more important public service can be rendered."

Inducted in 1982

Farrington Daniels
Beta 1908

Farrington Daniels received his bachelor's degree from the University of Minnesota in 1910 and his doctorate degree from Harvard University in 1912, under the direction of Theodore William Richards. Dr. Daniels served as a member of the faculty of the University of Wisconsin from 1920 to 1972 where he succeeded Alpha Chi Sigma founder J. Howard Mathews as chairman of the Department of Chemistry in 1952. He also served as president of the American Chemical Society in 1953 and received the ACS's Priestley Medal. Dr. Daniels was a renowned pioneer in gas-phase kinetics and solar and nuclear energy. He also authored the standard physical chemistry text, popularly known as Alberty and Daniels.

Inducted in 1982

Petrus J.W. Debye
Tau 1941

Peter J.W. Debye received his doctorate degree from the University of Munich under the direction of Arnold Sommerfield. After serving on the faculties of the universities of Zurich, Utrecht, Gottingen, Leipzig and Berlin, he joined the faculty of the Department of Chemistry at Cornell University in 1940 as chairman. During his long career, he made fundamental contributions to physical chemistry in many areas, including X-ray scattering, dipole moments, light scattering and its application to macromolecules, electrolytic solutions (Debye-Huckel theory), heat capacities of solids and magnetization at low temperatures (principle of adiabatic demagnetization). Dr. Debye was the 1936 Nobel Laureate in Chemistry.

Inducted in 2004

Willard H. Dow
Alpha Beta 1917

Willard H. Dow earned his bachelor's degree from the University of Michigan in 1919. He succeeded his father, Herbert H. Dow, as president of the Dow Chemical Company in 1930. In his 19-year tenure as president of Dow Chemical, the company made chemical and industrial history, growing in a time of decline. He was a visionary when others might have been conservative, and he turned Dow Chemical into a $200 million corporation of diverse companies and nearly 600 different commercial products, most of which were unknown in 1930. He received many honors during his lifetime, including Columbia University's Chandler Medal in 1943, the Gold Medal of the American Institute of Chemists in 1944 and the Medal for the Advancement of Research from the American Society for Metals in 1948. He was inducted into the Plastics Hall of Fame in 1975.

Inducted in 2024

Slayton A. Evans
Rho 1986

Slayton A. Evans was born in Chicago, IL, in 1943 but spent his childhood in Meridian, Mississippi. His interest in chemistry began early, when he was given a chemistry set. The solution he concocted was so potent it shattered windows and blew a hole in the backyard of the family home. Undeterred—and encouraged to conduct future experiments at his grandmother's house rather than in the projects—Slayton dreamed of one day enlisting in the Air Force and becoming an astronaut, but his height disqualified him from flight training. Instead, he secured both academic and athletic scholarships to Tougaloo College, a historically Black liberal arts college in Jackson, MS.

In 1970, Dr. Evans started a postdoctoral position at Notre Dame studying stereochemistry and conformational analysis of small organic molecules. After a stint on faculty at Dartmouth, he then joined UNC Chapel Hill as in 1974, becoming the first Black chemist in the Department's history. There, he established a legacy of excellence in both mentoring and science. His scientific contributions focused on organophosphorus chemistry, especially for asymmetric synthesis and conformational analysis. His expertise was also highly sought after by national and international organizations; he served as a Fulbright scholar in France and established international collaborations in Mexico, Germany, Greece, and Russia. He served in advisory roles for the NSF, NIH, and as chair of the U.S. National Committee of the International Union of Pure and Applied Chemistry (IUPAC). For his scientific contributions, Prof. Evans was awarded the 1995 Special Creativity Award in Organophosphorus Chemistry from the NSF. He was also deeply committed to recruiting and championing minority students. He strived to make complex subjects accessible to undergraduates and relished one-on-one mentoring relationships with undergraduate and graduate students alike. For his prodigious efforts in education and promoting diversity, Prof. Evans was honored with the UNC Chancellor's Award for Excellence in Undergraduate Education, the UNC Tanner Award for Teaching Excellence, and the ACS Award for Encouraging Disadvantaged Students into Careers in the Chemical Sciences.

Inducted in 2002

Paul J. Flory
Tau 1949

Paul J. Flory received degrees from Manchester College and The Ohio State University. Following an active industrial career with DuPont, ESSO Labs and Goodyear Tire & Rubber, Flory joined the faculty of the Department of Chemistry at Cornell University. He later spent a brief time as the executive director of research at the Mellon Institute before going on to Stanford University. Flory's work in polymer chemistry, including polymerization mechanisms, configurational statistics and physical and thermodynamic properties of high polymers, earned him numerous honors, including the American Chemical Society's Debye Award in 1969, the Gibbs Medal in 1973, the Priestley Medal in 1974, the National Medal of Science and the Nobel Prize in Chemistry in 1974.

Inducted in 2020

Dr. H. Scott Fogler
Zeta 1960

Dr. H. Scott Fogler's work is focused on problems in upstream research with focus on asphaltene and paraffin deposition. He received his BS from the University of Illinois, and his MS and PhD from the University of Colorado. In 1965, he joined the faculty at the University of Michigan, where he served as Associate Dean of Engineering from 1981-1984 and Chair of the Department of Chemical Engineering from 1985 – 1990. He received the AIChE Warren K. Lewis award in 1996 for his contributions to chemical engineering education and served for 2 years on President Obama's commission to study of the Keystone Pipeline. He has authored several books, including Elements of Chemical Reaction Engineering and Essentials of Chemical Reaction Engineering, which have been used by more than 70% of all chemical engineering programs in the US and have also been used widely around the world.

Inducted in 2022

Reynold Clayton Fuson
Sigma 1920

Reynold Clayton Fuson was born in Wakefield, Illinois on June 1, 1895. He studied education at Central Normal College in Danville, Indiana. Reynold then attended the University of Montana, where he received a Bachelor's degree in chemistry. This was followed by a Master's degree from the University of California, Berkeley, and a Ph.D. from the University of Minnesota. Dr. Fuson then moved to Harvard University to carry out postdoctoral work in the laboratory of E.P. Kohler. In 1927, he joined the Department of Chemistry at the University of Illinois, where he served as a distinguished teacher and researcher until retiring in 1963. Following his retirement from the University of Illinois, Fuson spent 14 years at the University of Nevada as a distinguished visiting professor and then as a professor emeritus. During his long career Brother Fuson published 285 scientific articles on a wide variety of topics and wrote or co-wrote five textbooks. His accomplished career included recognition as a member of National Academy of Sciences, receiving of the Nichols Medal, the Manufacturing Chemists' Association Award for College Teaching, and the John R. Kuebler Award of Alpha Chi Sigma in 1964.

Inducted in 2002

Mary L. Good
Beta Phi 1976

Mary L. Good received degrees from the Arkansas State Teachers College and the University of Arkansas. Her first career was in academe, beginning at the Louisiana State University in Baton Rouge and later at the New Orleans campus of LSU. Her research included inorganic and radiation chemistry. Good then moved to Universal Oil Products as director of research and rose to the position of senior vice president of technology. In 1993, her career took another turn when she was appointed under secretary for technology in the U.S. Department of Commerce. Then she returned to academe, serving as dean of the Donaghey College of Information Science and Systems Engineering at the University of Arkansas-Little Rock. Good also served as chair of the board of directors and later as president of the American Chemical Society. Her service and professional accomplishments were recognized by several awards, including the Priestley Medal in 1977 and the Parsons Award of the American Chemical Society in 1991.

Inducted in 2012

Harry B. Gray
Upsilon 1958

After completing his graduate work at Northwestern University and postdoctoral research at the University of Copenhagen, **Harry B. Gray** joined the chemistry faculty at Columbia University, where in the early 1960s he developed ligand field theory to interpret the electronic structures and substitution reactions of metal complexes. After moving to the California Institute of Technology in 1966, he began work in biological inorganic chemistry and solar photochemistry, including the development of inorganic systems for energy storage. Gray has published more than 800 research papers and 18 books. He has received numerous American and international awards. He currently is the Arnold O. Beckman Professor of Chemistry and the founding director of the Beckman Institute at Caltech.

Inducted in 2018

M. Frederick Hawthorne
Beta Delta 1946

M. Frederick Hawthorne attended the Missouri School of Mines and Metallurgy, Rolla, Missouri (now Missouri University of Science and Technology) as a chemical engineering student. While there, he joined the Beta Delta Chapter of Alpha Chi Sigma in 1946. He later transferred to Pomona College and received a B.A. in chemistry. Brother Hawthorne then moved to the University of California, Los Angeles to seek a PhD in organic chemistry. While there he worked under Donald Cram, who later shared the 1987 Nobel Prize in Chemistry with Jean-Marie Lehn and Charles J. Pedersen "for their development and use of molecules with structure-specific interactions of high selectivity." He then moved to Iowa State University, where he conducted postdoctoral research in physical- organic chemistry for a period of sixteen months. Hawthorne is the author or co-author of more than 560 research papers, 30 patents and 10 book chapters that reflect the joint efforts of approximately 200 Ph.D. students and postdoctoral associates and 11 Ph.D. coworkers at Rohm and Haas, Redstone.

Inducted in 1984

Joel H. Hildebrand
Sigma 1913

Joel H. Hildebrand received his bachelor's and doctorate degrees from the University of Pennsylvania. After spending a year as a postdoctoral fellow with J.H. van 't Hoff and Walther Nernst in Berlin, Dr. Hildebrand returned to the University of Pennsylvania where he taught from 1907 to 1913. In 1913, he joined the faculty at the University of California at Berkeley. Dr. Hildebrand taught there until past the age of 70. He considered his lifelong work on the behavior of liquids and nonelectrolyte solutions his most important contribution to chemistry. Dr. Hildebrand was the recipient of numerous awards, including having a chemistry building named for him while he was still living.

Inducted in 2002

Darleane C. Hoffman
Sigma 1988

Darleane C. Hoffman received her bachelor's and master's degrees from Iowa State University. She briefly joined the staff of the Oak Ridge National Laboratory before moving to the Los Alamos Laboratory, where she spent nearly 30 years, rising to the position of division leader. Then she moved to the Lawrence Berkeley Laboratory, where she was named a senior scientist and a group leader of the Heavy Element Nuclear & Radiochemistry Group in the Nuclear Science Division. At the same time, Hoffman joined the faculty of the Department of Chemistry at the University of California at Berkeley. From 1991 to 1996, she served as the director of the Seaborg Institute for Transactinium Science. In 1994, she was named a professor of the graduate school at UC-Berkeley. For her work in nuclear and radiochemistry, Hoffman received the American Chemical Society Award in Nuclear Chemistry in 1983, the Garvan-Olin Medal in 1990, the U.S. Medal of Science in 1997 and the Priestley Medal in 2000.

Inducted in 2000

Charles James
Mu 1911

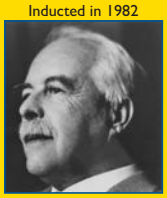
Charles James was educated at the Institute of Chemistry at University College in London where he was mentored by Sir William Ramsey and John Norman Collie. James started teaching at the New Hampshire College in 1907 and was head of the Chemistry Department from 1912 until his death in 1928. He is a founding member of Mu Chapter. James' main research interest was rare earth chemistry and fractional crystallization for separation. Through his research, he separated lutetium from what was thought to be ytterbium and provided highly purified rare-earth samples for research throughout the world. Mu Chapter describes him this way: "His creed in life is well represented by the Three Objects of Alpha Chi Sigma; he was a true member."

Inducted in 2012

Paul K. Kuroda
Alpha Sigma 1996

Paul K. Kuroda received his bachelor's and doctorate degrees from the Imperial University of Tokyo. His first paper was published in 1935, and he became the youngest faculty member at the Imperial University of Tokyo in 1944. In 1949, he sailed to America. His postdoctoral studies at the University of Minnesota were in analytical chemistry, but he returned to the study of natural and artificial radioactivity after joining the faculty at the University of Arkansas in 1952. At the University of Arkansas he trained 64 doctorate students and several postdoctoral associates and befriended many undergraduate students. He officially retired from the University of Arkansas in 1987, but he remained active in research. He was the author or co-author of almost 400 publications, and he was the Honor Initiate at the 43rd Biennial Conclave in 1996.

Inducted in 1982



Gilbert N. Lewis
Sigma 1913

Gilbert N. Lewis received his doctorate degree at Harvard University under the direction of Theodore William Richards. From 1905 to 1912, Lewis was a professor of chemistry at the Massachusetts Institute of Technology. From 1912 to 1941, he served at the University of California at Berkeley as dean of the College of Chemistry and chairman of the Department of Chemistry. Lewis is noted for his work on chemical bonding (electron pair bond, octet rule, Lewis acids and bases) as well as his work with deuterium, the theory of color and paramagnetism. He also is the author of the classic text Thermodynamics and the Free Energy of Chemical Substances, written in collaboration with Merle Randall, Delta 1907.

Inducted in 1998

Warren K. Lewis
Alpha Zeta 1925

Through his coordination of chemistry, physics and engineering into an independent discipline, **Warren K. Lewis** has been called the Father of Modern Chemical Engineering. He identified and quantified unit operations and was involved in much research on distillation, evaporation and petroleum cracking. Lewis was known for his aggressive teaching and demand of straight-thinking. Lewis received several honors throughout his lifetime, including the Priestley Medal in 1947, the first American Chemical Society Award in Industrial and Engineering Chemistry in 1956 and the American Institute of Chemical Engineers' Founders Award in 1955.

Inducted in 2018

Willard Frank Libby
Sigma 1941

Willard Frank Libby attended the University of California, Berkeley from 1927 to 1933, earning his B.Sc. (1931) and Ph.D. (1933) degrees. He was subsequently appointed Instructor in the Department of Chemistry at California University, Berkeley, eventually earning the rank of Associate Professor. In 1941, he was awarded a Guggenheim Memorial Foundation Fellowship in 1941 and moved to Princeton University. From 1945 to 1954, Libby was Professor of Chemistry in the Department of Chemistry and Institute for Nuclear Studies (now the Enrico Fermi Institute) at University of Chicago. Libby was appointed in 1954 as a member of the U.S. Atomic Energy Commission by President Eisenhower. He is most well known for his work on natural carbon-14 (radiocarbon) and its use in dating archaeological artifacts. For this work he was awarded the Nobel Prize in Chemistry in 1960 "for his method to use carbon-14 for age determination in archaeology, geology, geophysics, and other branches of science."

Inducted in 2008

Edwin N. Lightfoot
Tau 1944

Edwin N. Lightfoot earned his bachelor's and doctorate degrees in chemical engineering from Cornell University. He joined the faculty of the University of Wisconsin in 1953. Dr. Lightfoot's interests are in mass-transport reaction modeling, biological mass-transfer processes and separations processes. He is co-author of Transport Phenomena, a classic textbook used worldwide by chemical engineering students and educators. Dr. Lightfoot has received numerous awards, including the National Medal of Science and the Society of Biology Engineering James E. Bailey Award for outstanding contributions to the field of biological engineering.

Inducted in 2014

William N. Lipscomb, Jr.
Alpha Gamma 1939

William N. Lipscomb, Jr., was a graduate of the University of Kentucky and Caltech. Together with his students, he is noted for achieving a quantum-mechanical understanding of the three-center two-electron bond, studies of boron hydrides and carboranes, the first accurate calculation of the ethane barrier and contributions to Hartree–Fock self-consistent field (SCF) theory. The mineral lipscombite was named after Lipscomb, whose group determined the structure. Lipscomb was the 1976 Nobel Laureate in Chemistry for his theoretical chemistry results. Fellow Alpha Chi Sigma Brother and Nobel Laureate Linus Pauling was Lipscomb's dissertation advisor. And two of Lipscomb's students are Nobel Laureates, who in a way continued Lipscomb's work.

Inducted in 2014

Rudolph A. Marcus
Zeta 1965

Rudolph A. Marcus received his bachelor's degree in 1943 and a doctorate degree in 1946 in experimental research from McGill University. He was a member of the faculties of the Polytechnic Institute of Brooklyn from 1951 to 1964 and the University of Illinois from 1964 to 1978. Then he joined the Caltech faculty as the Noyes Professor in 1978 and became the Kirkwood-Noyes Professor in 2013. Dr. Marcus has conducted research on almost every aspect of chemical reaction rate theory. A trademark of his research has been a strong interaction between theory and experiment. Dr. Marcus received the Nobel Prize in Chemistry in 1992, the Wolf Prize in Chemistry in 1985, the U.S. National Medal of Science in 1989 and various honorary doctorates and professorships and other awards.

Inducted in 1988

Carl S. Marvel
Zeta 1918

Carl S. Marvel received his doctorate degree from the University of Illinois in 1920 under the instruction of William A. Noyes, Sr., and Roger Adams. He served on the faculties at the University of Illinois from 1920 to 1961 and at the University of Arizona from 1961 to 1978. "Speed" Marvel was one of the pioneers of synthetic polymer chemistry. His research in the 1930s laid the groundwork for much of today's polymer technology. He also played a key role in developing synthetic rubbers during World War II, and in his later years he developed important heat stable polymers. Marvel Hall at the American Chemical Society headquarters is a tribute to his many years of service to the ACS, including its presidency in 1945.

Inducted in 1986

Thomas Midgley, Jr.
Alpha Delta 1936

Thomas Midgley, Jr., received his education at Cornell University and then achieved fame as an industrial chemist. His discoveries include dichlorodiflouromethane (Freon) as a stable, non-toxic, non-flammable replacement for ammonia in refrigerant cycles and tetraethyl lead as an octane booster for gasoline. Midgley discovered iron selenide, one of the first known catalysts for cracking hydrocarbons to yield aromatic compounds. His work earned the Nichol Medal, the Perkin Medal, the Priestley Medal and the Gibbs Medal. He also was president of the American Chemical Society.

Inducted in 2022

Donna Nelson
Beta Nu 1981

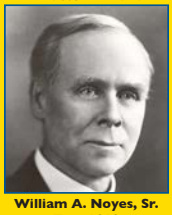
Donna Nelson Donna Nelson was born in Eufaula, Oklahoma in the Muscogee Creek Nation. She earned a B.S. in chemistry at the University of Oklahoma. She then moved to the University of Texas at Austin, where she carried out her Ph.D. work with Michael Dewar. This was followed by postdoctoral work at Purdue University with Chemistry Nobel Laureate Herbert C. Brown. After joining the faculty at the University of Oklahoma, Nelson served as a faculty fellow in the University of Oklahoma Provost's Office from 1989 to 1990. Dr. Nelson was the first woman faculty fellow and the first assistant professor to enter the position. In 2016, she served as president of the American Chemical Society. Her research interests include the development of a new technique for gathering mechanistic information on addition reactions of alkenes which helped to determine mechanisms of important addition reactions of alkenes, such as hydroboration, oxymercuration, bromination, the Wacker process, and the Wilkinson's catalyst reaction. And the use of NMR to examine the effects of substituents upon single-walled carbon nanotube (SWCNT) reactions. In addition to her scientific accomplishments, Brother Nelson has had a significant impact upon improving Science Education and understanding the lack of diversity in science and engineering. She has authored or co-authored more than 200 research articles and has received myriad honors and awards, including being named a fellow of both the American Chemical Society and the Royal Society of Chemistry.

Inducted in 1982

James F. Norris
Alpha Zeta 1920

James F. Norris received his doctorate degree from The Johns Hopkins University in 1895 under the direction of Ira Remsen. He was a faculty member at the Massachusetts Institute of Technology for 30 years, and for half of that time he served as director of the research laboratory in organic chemistry. Dr. Norris' research interests centered on the reactivity of atoms and groups in organic chemistry. He was president of the American Chemical Society for two years. "Sunny Jim" was a prolific author of textbooks, which he wrote without consultation to reference works other than tables of physical constants, believing that nothing should be included in a general text that a chemist does not remember as useful information.

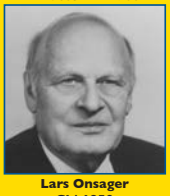
Inducted in 2010



William A. Noyes, Sr.
Zeta 1912

William A. Noyes, Sr. received his doctorate degree from The Johns Hopkins University in 1882. In 1885, he began developing the chemical program at the new Rose Polytechnic Institute. He left Rose in 1903 to become the first chief chemist at the U.S. National Bureau of Standards where he worked on atomic weight determination. Dr. Noyes arrived at the University of Illinois in 1907 and served as department head until his retirement in 1926. He was the architect of the chemistry program at Illinois, attracting chemists such as Roger Adams and Carl S. Marvel. Dr. Norris also was involved closely with chemical literature, serving as editor of the Journal of the American Chemical Society for 15 years and the first editor of Chemical Abstracts, among other publications. He won many awards, including the Nichols Medal and the Priestley Medal. He served as president of the American Chemical Society in 1920.

Inducted in 1983



Lars Onsager
Chi 1950

Lars Onsager graduated from the Norwegian Technical Institute in 1925, studied at the Swiss Federal Institute of Technology in Zurich and received his doctorate degree in theoretical chemistry at Yale University in 1933. He received numerous awards and honors for his outstanding contributions to understanding irreversible thermodynamics, electrolytic solutions, dielectric properties of liquids, the structure of ice, thermal diffusion in gases and the surfaces of solids. Among these awards, Dr. Onsager received the Nobel Prize in Chemistry in 1968 and was the Presidential Award in Science, in addition to other science medals and honorary degrees.

Inducted in 2002

Donald F. Othmer
Theta 1924

Donald F. Othmer received degrees in chemical engineering from the University of Nebraska and the University if Michigan. Although he worked briefly for Eastman Kodak – during which time his research led to more than 40 patents and the design of the Othmer Still for studying properties of distilling mixtures – he spent most of his career at the Polytechnic University in Brooklyn, N.Y. There he carried out research in phase equilibria, thermodynamics, heat transfer and desalination while being perhaps the preeminent consultant in chemical engineering. He is known most widely, however, for his editorship of the Kirk-Othmer Encyclopedia of Chemical Technology and Philanthropy. Othmer's personal fortune, the result of shrewd investments, supported the Chemical Heritage Foundation (the Othmer Gold Medal of the CHF is named for him) and the International Chemistry Olympiad, as well as other organizations and activities.

Inducted in 2006

Charles L. Parsons
Mu 1911

Charles L. Parsons received his bachelor's degree from Cornell University in 1888. Upon leaving Cornell, he became assistant chemist in the New Hampshire Experiment Station at Hanover and taught chemistry at Hanover in Durham, N.H. In 1911, Dr. Parsons was appointed chief mineral chemist of the Bureau of Mines in Washington, D.C. During that time he obtained funds for establishing the National Radium Institute and had full charge of building the radium plant and developing methods for radium extraction. During World War I, through his efforts the U.S. was made independent of foreign countries for materials for explosives. He served as secretary of the American Chemical Society from 1907 to 1947, during which time the membership increased from 3,000 to more than 43,000 members. In 1919, Parsons was elected the vice president of the International Union of Pure and Applied Chemistry and acted as America's representative at the conference held in Rome in 1920. He received the Priestly Medal in 1932. In 1952, the American Chemical Society created the Charles Lathrop Parsons Award to recognize outstanding public service by a member of the American Chemical Society.

Inducted in 1996

Linus C. Pauling
Sigma 1940

Linus C. Pauling, the only person to be awarded two unshared Nobel Prizes, probably is best known for his advocacy of Vitamin C as a cure for a wide range of ailments. Jumping to Oregon State University without finishing high school, Pauling's studies took him to Europe to work with Niels Bohr and Erwin Schrodinger. Pauling's first Nobel Prize in Chemistry came in 1954 for his discoveries on the nature of chemical bonds. His second Nobel Prize (for Peace) came in 1962 for his contributions to an international ban on nuclear weapons testing. Pauling joined Albert Einstein and other prominent scientists to create the Emergency Committee of Atomic Scientists.

Inducted in 1987

John H. Perry
Xi 1915

John H. Perry received a bachelor's degree in chemical engineering from the University of Maine in 1917. After serving in the Army during World War I, he returned to academia, receiving a master's degree in chemical engineering from Northwestern University under the tutelage of Harry A. Curtis. Perry then went on to receive a doctorate degree in chemical engineering from the Massachusetts Institute of Technology. Dr. Perry is well known for his development of improved catalysts for sulfuric acid production. While working for DuPont, he was commissioned by McGraw-Hill to develop a Chemical Engineers' Handbook. The first edition was published in 1934. He continued the editorship over the next two editions of what became known as Perry's Chemical Engineers' Handbook, the definitive reference book for chemical engineers. When John Perry passed away in 1953, his son, Robert H. Perry, took over the editor's responsibilities. John Perry also developed and edited the Chemical Business Handbook.

Inducted in 1990

George C. Pimentel
Beta Gamma 1942

George C. Pimentel earned his doctorate degree at the University of California at Berkeley, under Kenneth Pitzer, Sigma 1940. Pimentel remained at UC Berkeley and joined the faculty. During his 40 years there, he made significant advances in IR spectroscopy techniques, including discovering chemical lasers. Dr. Pimentel headed the NAS/NRC project, which produced Opportunities in Chemistry, popularly known as The Pimentel Report, and he edited the National Science Foundation's CHEM Study textbook used in high schools worldwide. Dr. Pimentel was a member of the National Academy of Science, an associate director of the National Science Foundation for three years and president of the American Chemical Society in 1986. He also received the National Medal of Science and the Priestly Medal.

Inducted in 1994

Kenneth S. Pitzer
Sigma 1940

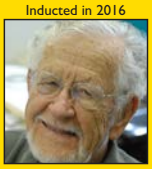
Kenneth S. Pitzer received his first doctorate degree from the University of California at Berkeley in 1937 and became an instructor there. He quickly rose to professor then dean. After a term as director of the Atomic Energy Commission, he went on to become president of Stanford University then Rice University before returning to UC-Berkeley. Dr. Pitzer was awarded the Priestly Medal, the National Medal of Science, the Gold Medal of the American Institute of Chemists, the Welch Award and a number of other prestigious awards.

Inducted in 2020

Dr. Charles Norwood Reilley
Rho 1953

Dr. Charles Norwood Reilley helped lead the renaissance in analytical chemistry post-WWII. He earned his bachelor's degree in chemistry from The University of North Carolina in 1947, after which he joined the faculty at Queens College in Charlotte, NC. In 1949, he undertook graduate work at Princeton University, where he received an M.A in 1951 and a PhD in 1952. He then returned to The University of North Carolina, where he would remain throughout his career. In 1977, he was elected to the National Academy of Sciences. Dr. Reilley's work included describing the nature of the "chelate effect" and the application of nuclear magnetic resonance spectrometry to these complexes, as well as being one of the first to use computers to apply pattern recognition techniques to interpret mass and infrared spectra data to understand their structure. This application of computers to chemical analysis provided a springboard for others in the field.

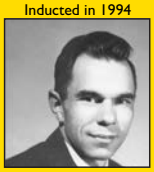
Inducted in 2016



Dr. John D. Roberts
Beta Gamma 1939

Dr. John D. Roberts received an A.B. degree in 1941 and a PhD in 1944 from UCLA. Dr. Roberts began his academic career in 1945 as an instructor in chemistry at UCLA. From 1945 to 1946, he held a National Research Council Fellowship and was an instructor at Harvard.He joined the staff of the Massachusetts Institute of Technology in 1946 as an instructor and was promoted to Assistant Professor in 1947 and to Associate Professor in 1950. He is credited with bringing the first female graduate student to Caltech when he moved from MIT. Dr. Roberts has twice been a John Simon Guggenheim Fellow. He was Robert N. Noyce Visiting Professor of Science at Grinnell College in 2001. Dr. Roberts currently serves on the Board of Directors of Organic Syntheses, Inc. and University Science Books. He has been a consultant to the E.I. DuPont Company since 1950. Dr. Roberts' research has been concerned with the mechanisms of organic reactions, chemistry of smallring compounds, and application of nuclear magnetic resonance (NRM) spectroscopy, especially of F-19, C-13 and N-15, to organic, bioorganic and biochemistry. For more information about Dr. Roberts' career and awards, visit the following link: https://en.wikipedia.org/wiki/John_D._Roberts.

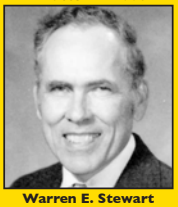
Inducted in 1994



Glenn T. Seaborg
Beta Gamma 1935

For whom element 106 – Seaborgium – is named, **Glenn T. Seaborg** is responsible for the most significant change to the Periodic Table since its inception in the 19th century. He is credited for discovering a number of the transuranic elements and received the 1951 Nobel Prize in Chemistry for this discovery. He also was part of the top secret Manhattan Project and was a frequent advisor to several United States presidents. His first new discovery came in 1940 when he successfully transmuted uranium into plutonium. In 1944, he formulated the actinide concept of heavy elements based on atomic structure.

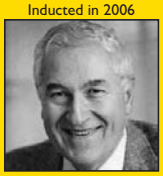
Inducted in 2008



Warren E. Stewart
Alpha 1945

Warren E. Stewart received his bachelor's and master's degrees from the University of Wisconsin and his doctorate degree from the Massachusetts Institute of Technology. Dr. Stewart began his career at Sinclair Research Laboratories, after which he joined the Chemical Engineering Department at the University of Wisconsin. He is well known as one of the authors of Transport Pheonmena, a textbook that is cited as "changing the direction of chemical engineering teaching everywhere in the world." Dr. Stewart received numerous awards in his field and for excellence in teaching.

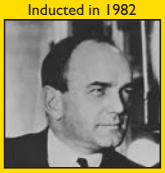
Inducted in 2006



Irving Shain
Alpha 1953

Irving Shain began his academic career at the University of Wisconsin as an instructor where he made important contributions to the field of electrochemistry. His consummate achievement is a paper co-authored with Richard S. Nicholson, which was named by the Journal of Analytical Chemistry as one of the 10 most cited papers from 1945 to 1999. He is best known as the person who "invented" cyclic voltammetry, one of the most commonly used electrochemical techniques and the best tool for studying the mechanism of redox reactions. Dr. Shain also served as chemistry department chair, vice chancellor for academic affairs and chancellor at the University of Wisconsin and as vice president and provost at the University of Washington.

Inducted in 1982



Frank C. Whitmore
Omicron 1920

Frank C. Whitmore was educated at Harvard University, obtaining a doctorate degree in 1914 under the direction of Charles Loring Jackson and Elmer P. Kohler. After serving on the faculty of Northwestern University, he became dean of the School of Chemistry and Physics at Pennsylvania State University in 1929, a position he held until his death. Whitmore was president of the American Chemical Society in 1938 and was a member of the National Academy of Sciences. He was an expert in organomercury chemistry and was author of Organic Compounds of Mercury. He was renowned for his research on the electronic theory of mechanisms of organic molecular rearrangements.

Inducted in 2004

Bassam Z.
Shakhashiri
Zeta 1970

Bassam Z. Shakhashiri received his bachelor's degree from Boston University and his master's and doctorate degrees from the University of Maryland. Dr. Shakhashiri founded the Institute for Chemical Education in 1983 and served as assistant director of the National Science Foundation for Science and Engineering Education from 1984 to 1990. Among his many awards and honors are the American Chemical Society's George C. Pimentel Award in Chemical Education in 1986, the Manufacturing Chemists Association's Catalyst Award in 1979, the American Association for the Advancement of Science Award for Public Understanding of Science and Technology in 2002 and a collection of teaching awards and honorary degrees. Dr. Shakhashiri perhaps is best known for his chemical demonstration shows and in particular for his annual demonstration "Once Upon a Christmas Cheery in the Lab of Shakhashiri," which began in 1969.

Inducted in 1985

Hobart H. Willard
Alpha Beta 1916

Hobart H. Willard received his doctorate degree at Harvard University after receiving his bachelor's and master's degrees from the University of Michigan. Willard returned to Michigan where his research in analytical chemistry broke ground into fundamentally new gravimetric and volumetric methods. Dr. Willard's texts Willard, Merritt and Dean and Willard and Diehl are well known to all analytical chemists. Among his analytical innovations are the introduction of perchlorate chemistry and cerium (IV) chemistry. He was renowned as a tough taskmaster in the classroom. His awards include the Fischer Award in 1951 and the Anachem Award in 1953.

{Section V}
Alchemy

Alchemy and Alpha Chi Sigma

The following is largely an adaptation of a series of articles authorized by the 1934 Biennial Conclave, which established a committee "to make a systematic study of the historical background of alchemy as pertaining to Alpha Chi Sigma." The original articles, cited within the body of other discussions of alchemy, have appeared in *The HEXAGON* over the years.

In Pursuit of Science

by Max G. Gergel, Beta Eta 1977

Twilight had changed into night;
Now the room was filled with shadows.
Shadow-men threw stygian mantles
Over fluted flasks and beakers
Softly whispered "leave oh mortal,
Night time is the time for spirits,
Cease your dull and endless labor."

In the flask a thousand faces
Peered from out the ebullition
Gazing sternly, disappearing
Into steam, with popping noises.
Forced to climb a great glass stairway
Seethed and foamed the frantic liquid
Heated by the bunsen burner.

Then I saw that sitting near me
Gazing mute at flask and cauldron
Was an Ancient, ragged, filthy
With the grime of laboratory;
Running nervous fingers gently
Through the tangled mass of whiteness,
From which poked a great red hawknose.

Flames leaped higher from the burners.
Turned from penciled blue to yellow.
To the sound of spinning stirrer.
There was added now a rasping
As my visitor spake softly,
Partly to the bubbling liquid,
Partly to its wondering master.

"Sir," he spoke like frenzied metal,
Tortured by a tearing toothed file,
"Do you practice here, spegyrics?
Are you waiting for the midnight?
Let me watch your machinations.
On the wall I see alembics.
Have you made a transformation?"

Waiting not to hear my answer
Rose the stranger, tall and stately.
Hurried over to the fire,
Sprinkled on the flames a powder.
Puff, the room was filled with vapor,
Sulfurous, and through the dense cloud
Glowed and roared a mighty furnace!

"Zosimus, I am." He shouted,
"Work, oh slave, this pair of bellows;
We shall wrest from base quicksilver
Virgin Gold." Now like a demon,
Danced the man, before his fire
Sprinkling Lapis Philsophorum
As he called it, from a packet.

Now from out the flaming furnace
Roaring streams of yellow metal
Lighted up the mad alchemist
With a molten, dazzling brilliance
But the wind unloosed a window
Blew in gusts of fragrant night air
Woke me from my semi-sleeping.

Searching on the floor before me,
Bright with rays of silv'ry moonlight,
Soon I spied the little packet
Sure this was not simple dreaming.
But the night was velvet quiet,
Only crickets, brightly singing.
Now the time has come for leaving.

Zosimus, I sat there musing.
Zosimus, the Arab chemist
Who had spent his life attempting
To transform base things to gold.
Never more will I be happy
Until I have learned the secret.
Far into the night I labor.

Alchemy

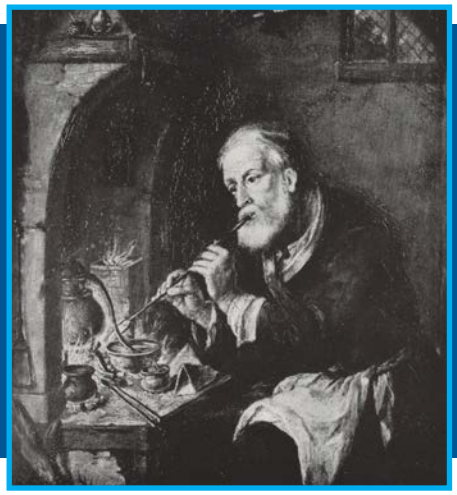
By Harry A. Curtis, Eta 1908
Reprinted from *The HEXAGON*, May 1943, vol. 33, no. 8

The fraternal maestro hasn't been with us for some time on these pages and we welcome him with pleasure as he delves into a subject of much importance to all of us… Years pass swiftly and each succeeding crop of collegiate Alpha Chi Sigmas, although living largely in the present, maintains a constant interest in alchemy, and it is a matter of common knowledge, that one of the men who has had much to do with the flavor of the potent fraternal brew fermented by this organization is Harry A. Curtis, a past G.M.A. and author of the History of Alpha Chi Sigma. His career has been long and fruitful, in the fraternity and out of it. He is now dean of the College of Engineering, University of Missouri, Columbia, Mo. We'll see him in'44 at the Eighteenth Biennial Conclave in St. Louis. – The Editors.

Note: The writer is indebted to John Read's "Prelude to Chemistry" for the inspiration to write this article and for most of the material therein.

The commonly held idea of alchemy is that it was a foolish attempt on the part of certain pseudo-chemists to transmute lead into gold, or to find a magic medicine which would make man immortal, or to discover a universal solvent, or to reach some other equally fanciful goal. The dictionaries and encyclopedias give some ground for this generally held idea.

Such a view of alchemy is an exceedingly superficial one. The basis of alchemy, from first to last, was a system of philosophy which hoped or claimed to penetrate the mystery of life and to understand and control the formation of inanimate substances. It was linked with religious mysticism and ceremonies seeking to purify and perfect the soul of man. In all centuries there were amongst its devotees men of profoundly religious minds. The natural philosophy of alchemy taught that the processes of nature tend toward perfection. "Nature strives toward perfection," said Aristotle, voicing a belief much older than Greek philosophy. In the bowels of the earth, nature, through very long periods of time, is perfecting the metals, transmuting those which are base and corrupt into those which are noble and pure. Man may by art, the art of alchemy, accomplish in a short period what nature accomplishes in a very long period. Only the pure in heart, only those of noble soul, may hope to penetrate the mysteries of nature. Alchemy was the Divine Art. In China, it grew out of the Taoist religion, in India it was mingled with Hindu religious mysticism, in Egypt it was a craft of the priesthood, and in its later development in Europe a number of those in the high ranks of the church were adepts of the Divine Art. In his most exalted moods even the great accomplishment of the transmutation of metals seemed relatively unimportant to the alchemist who, in religious ecstasy, had seen the very angels of heaven descending to the earth and rising again to glory.



The Alchemist
Painting by Christian Dietrich
Reproduction by Fisher Scientific Co.

Of course, alchemy in all centuries shared in the mysticism, the superstitions, the credulity of its intellectual environment. And amongst the followers of alchemy were quacks and greedy individuals. There were men who were not so much interested in transmuting metals as in counterfeiting them. There were scores who pretended to have discovered the Philosopher's Stone. In the end these men brought alchemy into disrepute, but the doctrine of the transmutation of metals did not wholly die out. Today transmutation is an accomplished feat, but not one out of which greedy men may make fortunes.

There have been many arguments as to the origin of alchemy. If the broader view of alchemy, such as suggested above, be adopted then alchemy is seen to be rooted in those speculations regarding matter and natural processes which are as old as written records, probably much older; and it had not one but many origins. The idea that the manifold forms of matter originate through combinations of a few basic kinds can be traced back to the beginning of written records. The male-female scheme of many living species was carried over to the inanimate world in the early speculations of the Chinese, the Hindus and several other peoples. The sun became the symbol of maleness and the moon of femaleness. Out of this idea probably came the idea of opposites which appear in early concepts of matter, opposites such as wet and dry, warm and cold, etc. The Greek natural philosophers of the period 600 B.C. to 300 B.C. borrowed these earlier ideas. Plato speaks of a "prima materia" upon which were impressed various properties, thus giving rise to many forms of matter. Aristotle's scheme may be represented diagrammatically as illustrated upon the following page.

Transmutation in this scheme would run as follows: If fire be combined with water, air is formed. The water with its properties of wet and cold, has become air with the properties of wet and hot. The Greeks of this period were not experimenters but the Chinese of the period were trying to concoct medicines which would insure longevity. Medicines in which gold, the perfect metal, was included were held to be particularly efficacious.

The history of alchemy in China is not yet unraveled. The oldest book in the world devoted entirely to alchemy is Wei Po Yang's treatise of 142 A.D. Writing in the fourth century A.D., Ko Hung speaks of three kinds of alchemy, namely: (1) the production of a gold containing medicine which would assure longevity; (2) the production of "red cinnabar" by which gold might be made; and (3) the actual preparation of gold. It will be noted that these three objectives of alchemy correspond closely to the three aims of alchemy in western Europe a dozen centuries later, namely preparation of a great medicine, curative for both man and metals, the preparation of an agent which would accomplish transmutation, sometimes called the "Powder of Projection," and the actual preparation of gold and silver, i.e., the "Great Work."

It has been suggested, but not proved, that the Arabs, amongst whom alchemy flourished in the centuries following the fall of Alexandria, did not get all their start in alchemy from Graeco-Egyptian culture of the Alexandrian period, but also received alchemical doctrines and 1ore from Chinese sources. The Arabs, however, gave the name "alchemy" to the art of preparing gold, and the word alchemy-al chemi-is thought to mean the art of Egypt, the word "chemi" being one of the early names for Egypt, referring perhaps to the black country which was the Egypt of the Nile's black floodlands. The Egyptians were skilled workers in metals, enamels, coloring processes, etc. The art of coloring or alloying base metals so that they resemble gold may well have been an Egyptian art, one quite likely to be grafted onto that alchemy which was rooted in the natural philosophy and mysticism of earlier centuries.

From whatever sources the Arabs picked up alchemy, and certainly part of it came from Egypt, they promoted it with zeal and were instrumental in passing it on to Western Europe in later centuries. In this Arabic period of alchemy, one Jabir (or Geber) was the outstanding adept. He lived in the late ninth century, A.D., and left many a treatise in Arabic. These became known to European alchemists in their Latin translations some five hundred years later. So great was his renown in the alchemy of later centuries that scores of treatises written in those later centuries bore Jabir's illustrious name as author. Thus it happens that the greatest book which bears his name, the "Summa Perfectionis" was, according to modern scholars, written in the early fourteenth century nearly five hundred years after Jabir's death. While this "Sum of Perfection" is not an Arabic contribution to alchemy, the Arab adepts did make many contributions both to the real technique of the laboratory and to the hocus-pocus alchemy.

With the revival of learning in Europe, in the twelfth century, the Arabic treatises on alchemy, along with such things as Aristotle's works in Arabic translations, were translated into Latin and so became available to western civilization. The work of the translators of the twelfth century and of the scholastics of the thirteenth century laid the foundation for an alchemy which was to last through the seventeenth century, during which time the followers of the art included men of every degree of learning and ignorance, every degree of honesty from the highest to the lowest. Kings and princes dabbled in the laboratories, or employed adepts to dabble for them. Wealthy men maintained elaborate establishments for alchemical studies and employed dozens of workers. Churchmen mingled prayer with their dabbling. Alchemists of poetical turn expressed the "wild joy of gold-making" in poetical outbursts. Alchemists who were amateur musicians set their enthusiasms to music. Alchemy developed a jargon all its own, it became pictorial with birds, dragons, green lions, angels, the sun, the moon, geometrical designs and symbols of all sorts in profusion. Anagrams, ciphers, astrological symbols, hieroglyphs abound in alchemical writings. Noted alchemists of the past and few innocent bystanders became the unwitting authors of unintelligible treatises. If one takes the records at face value, one of the most revered, and certainly one of the most prolific writers of all times was one Hermes Trismegistus-Hermes the Thrice Great. The "Sons of Hermes," as the alchemists of the fifteenth and sixteenth century often called themselves, claimed no less than 36,000 original treatises from their patron's pen. The most noted of these is the famous Emerald Tablet on which Hermes Trismegistus gave final instructions to his followers. Many fanciful tales as to the origin of the Emerald Tablet were told by these later day alchemists. One legend had it that the tablet, of emerald as the name indicates, engraved in Phoenician characters, was discovered by Alexander the Great in the tomb of Hermes in Egypt. In another legend Sarah, the wife of Abraham, found the tablet in the hands of the dead Hermes in a cave near Hebron. If these tales seem fantastic, just remember the gold tablets which our own countryman, Joseph Smith, dug up on a farm near Palmyra, New York in the year 1827. In fact Joseph did much better than Sarah, for he discovered several tablets of gold, writ in "Reformed Egyptian" and their translation by Joseph made quite a book. On the famous Emerald Tablet was only a brief message, but, in the eyes of the medieval alchemists, a very marvelous message it was. Read it on the following page.

1. What is below is like that which is above, and what is above is like that which is below, to accomplish the miracles of one thing.
2. And as all things were produced by the one word of one Being, so all things were produced from this one thing by adaptation.
3. Its father is the sun, its mother the moon; the wind carries it in its belly, its nurse is the earth.
4. It is the father of perfection throughout the world.
5. The power is vigorous if it be changed into earth.
6. Separate the earth from the fire, the subtle from the gross, acting prudently and with judgment.
7. Ascend with the greatest sagacity from the earth to heaven, and then again descend to the earth, and unite together the powers of things superior and things inferior. Thus you will obtain the glory of the whole world, and obscurity will fly far away from you.
8. This has more fortitude than fortitude itself; because it conquers every subtle thing and can penetrate every solid.
9. Thus was the world formed.
10. Hence proceed wonders, which are here established.
11. Therefore, I am called Hermes Trismegistus, having three parts of the philosophy of the whole world.
12. That which I had to say concerning the operation of the sun is completed.

And who was this Hermes Trismegistus, so revered by his sons in later centuries? Modern scholars believe that he is to be identified with the Egyptian god Thoth, god of healing, god of learning.

As mentioned above, alchemy first came to Western Europe in the form of Arabic texts which were translated into Latin in the twelfth century. These texts included not only treatises written by Arabic authors but also Arabic versions of earlier works written originally in Greek, which came into Muslim hands after the fall of Alexandria.

In the thirteenth century a number of European writers discussed alchemy. In his "De Alchimia" Albertus Magnus says "The metals are similar in their essence, and differ only in their form," which remark is an echo of Plato's teaching fifteen hundred years earlier. Roger Bacon who wrote of alchemy. Both these gentlemen, if we may believe the record, continued to write alchemical works long after their death. In later centuries they were much honored by alchemists and both the works which they wrote and those which were written in their names were quoted frequently.

This practice of resurrecting authors long dead was satirized by Ben Johnson in "The Alchemist" by the following lines:

"Will you believe antiquity? records?
I'll show you a book, where Moses and his sister,
And Solomon have written of the art;
Aye, and a treatise penned by Adam-
O'the Philosopher's Stone, and in High Dutch-
Which proves it was the primitive tongue."

Another of the important early European books on alchemy was the "Pretiosa Margarita Novella" written in 1330. It became, later, one of the first printed books on alchemy, published at Venice in 1546, with permission of Pope Paul III and the Venetian Senate. What the book of 1330 may have been, no one knows, but the edition of 1546 is a typical alchemical treatise of the later period. The alchemical operations are represented allegorically by woodcuts. The earth, air, fire and water of the early natural philosophers have by this time become respectively a bear, a bird, an angel and a dragon. In this book gold is a crowned king. Gold in alchemical writings is, however, represented in sixty-odd ways.

During the fifteenth and sixteenth and on into the seventeenth century a prodigious number of alchemical books were produced. Alchemy's system of symbols, emblems, and cryptic expressions became more and more elaborate, its language less and less intelligible, its claims more and more extravagant. Alchemists deliberately wrote a jargon which could, supposedly, be understood only by the initiate. As the author of the book "The Hunting of the Green Lyon" says: "all haile to the noble companie of true Students of holy Alchemie whose noble practice doth them teach to vaile their secrets with mistie speach."

Let us take a little sample of this "mistie speach" and see what may be made of it.

"If you would operate by means of our bodies, take a fierce gray wolf, which, though on account of its name it be subject to the sway of warlike Mars, is by birth the offspring of ancient Saturn, and is found in the valleys and mountains of the world, where he roams about savage with hunger. Cast to him the body of the King, and when he has devoured it, burn him entirely to ashes in a great fire. By this process the King will be liberated; and when it has been performed thrice the Lion has overcome the wolf, who will find nothing more to devour in him. Thus our body has been rendered fit for the first stage of our work."

If, as he declared again and again, the alchemist was in honor bound to keep his knowledge of the Divine Art secret from the casual reader, it may be admitted that the above sample of his writings should have been fairly successful. Now let us see what the adept in alchemy would discover in the above.

The gray wolf is antimony, Mars is, of course, iron and Saturn is lead. Antimony is derived from lead, or so the record reads. Antimony does not attack iron but, like the hungry wolf, devours, i.e. amalgamates with, other metals. The king is gold. Let the antimony devour, i.e. alloy with the gold and then heat the alloy in a hot fire. The gold will thereby be recovered. By repeating this operation thrice the gold will be completely purified and will then be fit for use in further stage of the work. The sample of "mistie speach" is, therefore, a rather simple description of a commonly used method of purifying gold.

The reader of alchemical treatises, if he is to understand even the part which is understandable, must know that a black cow means either blackness or putrefying matter, an ascending white dove means a white sublimate, a toad means earthiness, and so on endlessly. One of the numerous difficulties in understanding what the alchemists meant in their statements, if anything, lies in the fact that many terms had both an exoteric and an esoteric meaning. For example, the red king, exoterically speaking, was gold, but it was also the code for sophic sulphur, i.e. the essence of sulphur, the seed of gold. The white queen was, in exoteric alchemy, silver, but in esoteric alchemy sophic mercury, i.e. the quintessence of metals. The winged lion was mercury the metal, but it was also sophic salt, the salt of the philosophers. With a red king, a white queen, and a winged lion, i.e., sophic sulphur, sophic mercury, and sophic salt the adept could accomplish wonders, and tell about them in terms of dragons, birds, fish, crows, eagles, snakes, and a whole menagerie of other animals.

By no means all of the text of alchemical books is devoted to writing of the kind discussed above. Occasionally an alchemist broke down and described a chemical operation in straightforward language. Working in laboratories for two or three centuries as they did, it is not surprising that the alchemists discovered a vast amount of factual chemistry. On the theoretical side, practically no progress was made, the philosophic basis of alchemy remaining surprisingly constant from first to last.

Those who carried out chemical operations for practical purposes, i.e. the chemical technologists, the folks who manufactured glass, enamels, cosmetics, alcoholic beverages, and scores of other such products in the centuries when alchemy flourished, paid no attention to winged lions or white queens or red kings, but went about their business. Some of these were believers in the philosophy of alchemy but did not allow those beliefs to divert them from practical matters. Some of them even wrote books which were highly useful, such as the "De Re Metallica" of Agricola, published in 1556, which was an excellent treatise on the mining methods and metallurgical processes of the time. The best translation of this book is the one by Herbert and Lou Henry Hoover.tion to winged lions or white queens or red kings, but went about their business. Some of these were believers in the philosophy of alchemy but did not allow those beliefs to divert them from practical matters. Some of them even wrote books which were highly useful, such as the "De Re Metallica" of Agricola, published in 1556, which was an excellent treatise on the mining methods and metallurgical processes of the time. The best translation of this book is the one by Herbert and Lou Henry Hoover.

Another book which was free from the hocus-pocus of alchemy was Brunschwick's "Buch zu Distillieren," published in 1512. It described, with numerous woodcuts, the various pieces of apparatus used by the alchemists in carrying out one of their most used operations, namely, distillation. In passing it may be noted that the various stills described by Brunschwick were much used in preparing medicines, in course of which some quite unusual things were distilled, such as insects, toads, horsehair, herbs, blood, urine, etc.

In the first half of the sixteenth century, Paracelsus gave alchemy a new interest by declaring that the business of the alchemist should be to prepare new and useful medicines rather than to seek for a means of multiplying gold. The story of this remarkable man belongs more to the history of medicine than to that of alchemy, but from this day on the physicians of the time dabbled in alchemy. The preparation of a magic medicine had always been one of the goals of alchemy, but the whole art of preparing medicines lacked any sort of scientific basis. Paracelsus, however, was talking about real chemicals as medicines. His followers proceeded to administer to suffering humanity every chemical in the alchemists' laboratories, with the result that the University of Paris finally forbade its licensees to use chemical medicines.

So far as the number of publications of alchemical treatises is concerned, the seventeenth topped all others but the heyday of alchemy was really passing. The publication of Robert Boyle's "Sceptical Chimist" in 1661 marks the first clean break with old traditions. Alchemy was not yet gone. More than a hundred years were yet to pass before the work of Scheele, Priestley, Lavoisier, Cavendish, Black, Davy, Dalton and scores of other real chemists laid the foundations of modern chemistry.

The Elixir of Life

By W.W. Benton, Alpha Lambda 1925
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The Elixir of Life (also called Elixir Vitae, Grand Elixir or just The Elixir) was conceived by the alchemists as a material to impart immortality to the taker or to cure him of disease or to bring him youth.

The wise men of China about the time of the birth of Christ were attempting to become a hsien (immortal). The hsien were able to change their form to animals, to make themselves young or old as they desired, to go through fire and water without harm, or to make long journeys at the twinkling of an eye. According to the beliefs of their religion to become a hsien was attainable by achieving complete immobility of their body. Gradually it became apparent that this ideal was impossible of attainment and a concept grew that it was possible to concoct a liquid which if properly brewed made a hsien of those who partook of it.

The conditions under which the Elixir was made were quite rigorous. Among them can be listed silence, "fasting, bathing, shampooing, avoidance of dirt of any kind, the shunning of cruel, ignorant, bereaved, or married people."[1] All plans had to be hidden from skeptical people. The mountains seemed to fulfill these requirements best and we find most alchemists hiding away there. "Lu Sheng wished Ch'in Shih Huang Ti not to let
others know where he lived, then he can obtain this medicine of
immortality. …"

Once the location had been picked, the alchemist's workshop required certain furnishings, the most important of which was the platform. It was formed from earth "which was not salty" and was yellow and hard. The floor was of the same earth. The platform was of three tiers of dimensions one foot two inches high by five feet five inches wide, one foot high by four feet five inches wide, and eight inches high by three feet five inches wide respectively from top to bottom. (Chinese foot is about 10 inches.) An old sword was implanted into the platform with its hilt extending above the top tier. Under the platform two pounds of cinnabar were buried. (The value of a Chinese pound is not known.) One foot from the platform on the south was buried one pound of cinnabar with some hair and vinegar, on the north one pound of plaster, on the east one pound of cast iron and on the west one pound of silver. Upon the platform was placed the oven to be used. Ovens varied so with their use or maker that a detailed description will not be given here. Their purpose was to contain the reaction vessel and the fire of rice husks.[2]

So sure were the writers of the old alchemical, religious literature of China of the success of the Elixir that there is a book called the "Complete Biographies of the Immortals" (Lieh Hsien Ch'uan) from which the following story of the success of one Wei Po-Yang is taken:[3]

Wei Po-Yang entered the mountains to make efficacious medicines. With him were three disciplines, two of whom he thought were lacking in complete faith. When the medicine was made, he tested them. He said, "The gold medicine is made but it ought first to be tested on the dog. If no harm comes to the dog, we may then take it ourselves; but if the dog dies of it, we ought not to take it." (Now Po-Yang had brought a white dog along with him to the mountain. If the number of treatments of the medicine had not been sufficient or if harmonious compounding had not reached the required standard, it would contain a little poison and would cause temporary death.) Po-Yang fed the medicine to the dog, and the dog died an instantaneous death. Whereupon he said, "The medicine is not yet done. The dog has died of it. Doesn't this show that the divine light has not been obtained? If we take it ourselves, I am afraid that we shall go the same way as the dog. What is to be done?" The disciples asked, "Would you take it yourself, Sir?" To this Po-Yang replied, "I have abandoned the worldly route and forsaken my home to come here. I should be ashamed to return if I could not attain the hsien. So, to live without taking the medicine would be just the same as to die of the medicine. I must take it." With these final words he put the medicine into his mouth and died instantly. On seeing this, one of the disciples said, "Our teacher was no common person. He must have done that with especial intention." The disciple also took the medicine and died. The other two disciples said to one another, "The purpose of making medicine is to attempt at attaining longevity. Now the taking of this medicine has caused deaths. It would be better not to take this medicine and so be able to live a few decades longer." They left the mountain together without taking the medicine, intending to get burial supplies for their teacher and fellow disciple. After the departure of the two disciples, Po-Yang revived. He placed some of the well-concocted medicine in the mouth of the disciple and the mouth of the dog. In a few moments they both revived. He took the disciple, whose name was Yü, and the dog, and went the way of the immortals. By a woodcutter whom they met, he sent a letter of thanks to the two disciples. The two disciples were filled with regret when they read the letter.

One wonders if the elixir of Po-Yang was that of a later alchemist, Ko Hung, whose medicine seems to be somewhat poisonous. The directions for its manufacturer are:[4]

> *After cooking thirty days, a mixture of Chin I (Gold Fluid) and quicksilver is placed in a yellow earthen jar, which is then sealed with Six-One Mud and strongly heated for sixty hours. Thereupon the medicine is obtained. The swallowing of a pea-size quantity of the medicine is enough to make a hsien out of any person.*

Among the Chinese scholars the idea of the Philosopher's Stone came after the idea of the Elixir Vitae. The purpose of the Stone was not to gain wealth but to obtain transmuted gold to form dishes for it was believed that eating from this gold was a cure for disease and an aid to long life.

In Europe the concept of the Philosopher's Stone preceded the Elixir. It was believed that metals were made of mercury and sulfur. As Albertus Magnus explained it in "de Alchemia":[5]

> *It is to be noted that metals differ among themselves only in their accidental form, not in their essential, and that a spoliation of the accidents in metals is therefore possible. Hence it is possible by art to constitute a new substance, because all classes of metals are generated in the earth from Sulfur and Quicksilver combined, or are generated because of fetid earth…. Just so it is among the metals which are corrupted either from corrupt Sulfur or from fetid earth. Hence that is the difference of all metals which differ among themselves. When clean red Sulfur encounters Quicksilver in the earth, thence gold is generated in a short or in a long time by the assiduity or decoction of nature subservient to it. When indeed clean and white Sulfur encounters Quicksilver in clean earth, thence silver is generated which differs from gold in this, that the Sulfur in gold was red and silver it was white. When red, corrupt and combustible Sulfur encounters Quicksilver in the earth, thence tin is generated, and is such that it creaks between the teeth and has rapid liquefaction because the Quicksilver was not well commixed with the sulfur. When indeed white, corrupt, and combustible Sulfur encounters Quicksilver in fetid earth, thence iron is generated. When black and corrupt Sulfur encounters Quicksilver, thence lead is generated, concerning which Aristotle says that lead is leprous gold."*

The Philosopher's Stone was able to remove the impurities from the less pure metals and thus produce gold.

Since, reasoned the old alchemists, if the Stone could purify metals, so could it also remove dross matter from man and bring him to the purity of youth. As Theophrastus Paracelsus says in the Fifth Book of the Archidoxies,[6]

The Philosopher's Stone purges the whole body of man, and cleanses it from all impurities by the introduction of new and more youthful forces which it joins to the nature of man.

The European alchemists really seemed to give great powers to the Elixir. There is the story of Thomas Aquinas who "constructed a bronze statute which Magnus animated with his elixir of life. This statue was very useful as a domestic servant but was very noisy and talkative."[7]

Nowadays scientists smile at the idea of the Philosopher's Stone for with their "atom smashers" they are able to obtain the transmutation of metals. The search for the Elixir of Life seems futile but the gradually assembling knowledge of hormones, vitamins and specific medicines has allowed the scientists to bring a more youthful existence to many. We are approaching the advantages the alchemists wished to accomplish but from a different direction. Instead of throwing together many impure materials in various mixtures while burning incense, we try to work with substances as pure as possible. We study their properties and build up a mass of quantitative facts from which we can predict the action of our substances both chemically and medicinally.

In this yeare of Christ One thousand nine
Hundred thirte and eighte
This Warke was begun, Honor to God in
Heaven.[8]

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The Philosopher's Stone

By Harold P. Gaw, Alpha Alpha 1925
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I wonder how many of us think of the Philosopher's Stone as something which only the early alchemists sought? Perhaps, in considering our present-day living and what the future may hold in store for us, modern research is but a search for the Philosopher's Stone in another guise. What of the X-ray studies that are being made? How about the huge cyclotrons which are being developed and used in delving farther and farther into the things which go to make up our everyday life? Go back over the past twenty years, and consider the many things which we take for granted now. A large number are the product of long and tedious research on the part of many professions. What does the future hold for us? Who knows? Scientific men are constantly probing into the unknown. Why are they? It is not partially because of curiosity, which our alchemical ancestors also had, and a desire to make our lives and those of future generations richer and happier? Thus, are we not consciously or unconsciously searching for some such stone as the early alchemists did, but with a different viewpoint and vastly superior facilities?

Weary of the Search
Painting by Elihu Vedder
Reproduction by Fisher Scientific Co.

One reads much of the different types of alchemist of the early days, and of the many people deceived by fabrications, and yet not more than eight years ago we encountered a fabulous scheme which found many people willing to contribute money. In 1930, Franz Tausend,[1] in Germany, obtained more than one hundred thousand dollars by asserting he could make gold by transmutation from lead. His victims included many prominent men. When finally arrested, he insisted on being given a chance to prove the transmutation of lead into gold. After being carefully searched, he was permitted to perform his experiment before a very distinguished group of men, and, much to their amazement, produced a tenth of a gram of gold from 1.67 grams of lead. The fraud was discovered the following day-Tausend had "palmed" the gold in a cigarette!

The beginnings of the Philosopher's Stone is not definitely known. There is evidence of origin in Alexandria[2, 5] during the early centuries of the Christian era. The idea was also present in China,[2] where it may have been conceived at a much earlier date. A deeply religious atmosphere permeates many of the writings upon the subject. As one alchemist states:

> In the first place, let every devout and God-fearing chemist and student of this art consider that this arcanum should be regarded not only as a truly great but as a most holy art. Therefore, if any man desire to reach this great and unspeakable mystery, he must remember that it is obtained not by the might of man, but by the grace of God, and that not our will or desire, but only the mercy of the Most High can be bestowed upon us. For this reason, you must first of all cleanse your heart, lift it up to Him alone, and ask of Him this gift of true, earnest, and undoubting prayer. He alone can given and bestow it.

Transmutation was a process for giving perfection, and this giving perfection was the constant aim of the alchemists. They thought that by altering the properties of the metal, its nature became altered and transmuted, just as they might produce steel from iron or bronze from copper or tin. Various methods of altering the properties of a substance were employed, and among these a very important operation was purification, by which they hoped to remove the imperfect qualities of the base metals. Repeated calcination was one of the methods of purifying or perfecting silver from lead. In this assumption the alchemists had certain practical evidences to support their views on the transmutation of metals. Galena can be considered an example. It is brittle, as found in nature, and yet upon calcination, sulphur fumes are driven off, and one obtains a malleable and workable product. Was not this mineral transmuted into lead? Go one step further, and take an argentiferous lead ore. Upon calcination of an argentiferous ore the alchemist produced lead, and by repeated calcinations a fairly good alloy of silver was produced, which became purer the more times it was calcined. In light of their philosophy, the alchemists had some justifications in believing that they had transmuted lead into silver.

It is interesting to note some of the Chinese writings[2] on alchemical subjects. One of the best known is the Ts'an T'ing Ch'i of Wei Po-Yang, dating from the second century A.D., and which is in reality a treatise on the preparation of the pill of immortality. Po-Yang states that men of art, by feeding on gold, attain longevity, and that pills made of the huan-tan, or Returned Medicine, are extremely efficacious, although their size is so small that they occupy only the point of a knife or the edge of a spatula. In his work, Po-Yang wished to test the faith of three disciples. Together with his white dog, they went into the mountains to perform the experiment. The gold medicine was prepared and fed to the dog, with the result that the animal died. Po-Yang observed, "Doesn't this show that the Divine Light has not been obtained? If we take it ourselves I am afraid we shall go the same way as the dog. What is to be done?" To the disciples' question, "Would you take it yourself, sir?" he replied, "I have abandoned the worldly route and forsaken my home to come here. I should be ashamed to return if I could not attain the hsien (immortal), so to live without taking the medicine would be just the same as to die of the medicine. I must take it." he took the medicine and seemingly died at once. His faithful disciple, Yü, did likewise. The other disciples became frightened and left to get burial supplies for their departed colleagues. Po-Yang shortly revived, since the medicine caused only temporary death. The disciple, Yü, and the dog likewise revived, and they went their way.

What was the Philosopher's Stone? Was it a material thing, or a mysterious process, or a combination of various mystical and religious procedures? Most of the writings of the alchemists are intentionally vague, because many of them wished their knowledge and secrets to remain their own. Salmon's Bibliotheque des Philosophes defines the Philosopher's Stone as "The Universal medicine for all imperfect metals, which fixes that which is volatile, purifies that which they have impure, and gives a color and a lustre more brilliant than nature."

In the Great Work, Grand Magistery, or Work of the Sages, yielding the Red Stone, which is what the true alchemist sought, full perfection was reached in all respects. Nature and art combined to attain this end. A less complete series led to the Simple Magistery, or Little Work, which was regarded as a White Stone, and transmuted the base only as far as silver. The operations in the preparation of the Philosopher's Stone were usually known as the Processes of the Great Work. The Great Work was often symbolized by the Sun Tree, and the Little Work by the Moon Tree. The perfect Philosopher's Stone was described as a heavy, glittering red powder, which, when heated on a plate to a red heat, melted without producing smoke. One part of this elixir to one-hundred parts of pure silver was supposed to produce gold. To a certain extent, the quest for the Philosopher's Stone was bound up with the search for the so-called Alkahest, an imagined universal solvent, which, according to Paracelsus and van Helmont, had the power of converting all bodies into their liquid primary matter. This word[2] was coined from the German "Allgeist," or "all-spirit." Liquefaction by means of this solvent was held to be gentle and non-corrosive in nature.

The discovery of mercury some three hundred years B.C. was an important event to the alchemists because of its striking properties and its power of amalgamating with many other metals. The use of mercury in attempting to transmute metals originated because of its practical use as a solvent and the false theoretical assumptions in regard to it. Greek alchemists thought that altering the color of a metal changed its properties, but not its nature, just as a skin might be dyed in color, yet it would still remain a skin. According to Plato, elements could change into each other. This likely arose from the fact that matter can exist in the solid, liquid, or gaseous state. The alchemists[4] assumed that material of the stone had fire, air, water, and earth as the four angles in its virtues; three angles in its substance, consisting of mercury, sulphur, and salt; two angles in its matter, the fixed and the volatile; and one angle in its radical principle, the prima materia. The sum of these angles is ten, and that number in the cabola was held to express the material of the Philosopher's Stone.

There were many types of alchemists who made use of the art for different purposes. There were a few of mystical or religious character whose true object was the guidance of mankind to salvation. There were the philosophical alchemists steeped in the doctrines of Aristotle and who sought, by the transmutation of baser metals into gold, to prove their great thesis-the unity of all things. We find also the mercenary alchemists whose only hope was to find in the Philosopher's Stone the key to a store of unlimited riches. But there was a large number of these early investigators possessing scientific character, and whose desire was to discover the properties and combinations of metals as well as the best method for their manipulation. In a measure, alchemy ended its days in failure and fraud, largely because charlatans and fools were attracted to it by mercenary objects. In another sense, the heritage of the alchemists is a vastly rich one, and in their blind gropings for a new way to make gold they paved the way for the modern science of chemistry. Barnad Treviason uttered with his last breath the confession which spelled the doom of alchemy: "To make gold, one must start with gold."

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Alchemy and Symbols

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Marvin E. Glidewell was born on a farm near Plainfield, Indiana, and attended elementary schools in Greencastle and Indianapolis, Indiana. High school was divided between Technical of Indianapolis, and Amo (Indiana) High School; graduation from the latter. Death of his mother, and family reverses in 1930 made a college education only a hope instead of a reality. Four years were spent out of school working part time, with finally a full time job at a drug store in Indianapolis. Entering Indiana University in 1936, he was initiated by Epsilon January 8, 1939. May, 1939 he became the chapter V.M.A. Support has been derived from N.Y.A. activities. Glidewell expects to make biochemistry his life work… His interests in alchemical symbols was abetted by the generous use of symbols in decorative features about the chemistry building at Indiana University. His manuscript was checked for authenticity by R. K. Carleton, Omicron 1922, and New England District Counselor, who had access to the library of Tenney Davis, Omicron 1913. –The Editors.

This is the sixth of a series of articles on the historical background of alchemy.
Suggestions for further articles of this kind should be directed to the Grand Master of Ceremonies.

To many persons the word Alchemy may be little or no meaning, but nevertheless, it has played a vital and tremendous role in the development of science of the twentieth century. History pictures the alchemists as bearded old men who lived in filth and squalor and who engaged in mysterious activities outside the comprehension of ordinary mortals. So intense were their efforts to find the Philosopher's Stone, that they lived and died tending the fires in their dirty, smoke-flilled, smelly shacks. So eager were they that food and sleep were often forgotten in the excitement of some experiment.

At most, the origin of Chemistry and Alchemy is obscure. Many and varied explanations have been put forth, but one of the most reasonable appears to be that ancient Egypt served as the starting point from which gradually spread the knowledge of scientific and artistic accomplishment which became known as "the Black Art." It is generally recognized that ancient Egypt was known as "Khem," and this black art practiced by the learned men of Egypt became known through Islam as the Black Art al Khem, meaning doubtless the Black Art from Khem. Ultimately, the mysteries of these achievements spread to the western world as Alkhemy and finally as the present form, alchemy, which consisted of a crude chemistry, philosophy, religion, astrology, occultism, physics, magic and mythology. Alchemy then, may be looked upon as the foundation upon which is built our modern scientific knowledge.

Only a few metals were known to the alchemists. They were, namely, gold, silver, iron, mercury, tin, copper and lead. Since they knew only seven planets and seven gods, they named these seven metals after these seven gods of the planets. These metals then, were known as the "Seven Metals of the Ancients." Gold, the noble metal, was named after Sol, the golden sun whose symbol was the perfect sphere; silver was named after Luna the moon, because of its white lustre, and represented by the crescent; iron, the hard metal of war, was named after Mars and given the symbol of Mars' shield and spear; mercury or quicksilver, because of its mobility, was named after Mercury or Hermes, the messenger of the gods, and given the symbol of Mercury, which was the Caduceus (twined serpents on a staff); tin was named after Jupiter, the god of lightning. Copper, found on the shores of Cyprus, was named after Venus, because it was thought that Venus rose up all bright and shining from the sea shores of Cyprus, and since Venus was a vain maiden her symbol was the hand mirror. Lead was named after Saturn (Kronos) the dull, slow-moving god, often pictured as an old man carrying a scythe or hour-glass and whose symbol was the scythe.

The seven metals were each assigned a day in the week; thus, Sunday was gold (Sol), Monday was silver (Luna), Tuesday was iron (Mars), Wednesday was mercury, Thursday was tin (Jupiter), Friday was copper (Venus), and Saturday was lead (Saturn).

In a similar manner, Astronomy and Astrology played a very important part in the art of Alchemy. The seven metals then had not only the symbols of the planets, but also the symbols of the Zodiac as given in the following table:

Gold	☉	sun (Sol) father god	sun and Leo the Lion
Silver	☽	moon (Luna) mother god; the crescent fertility	Cancer the Crag and Luna; rain cup
Iron	♂	Mars (war god)	spear and shield; Scorpio the Scorpion and Aries the Ram
Mercury	☿	quicksilver	Virgo the Virgin; Gemini the Twins
Tin	♃	Jupiter (lightning god)	Pisces the Fishes and Sagittarius the Archer
Copper	♀	Venus (goddess of beauty)	Taurus the Bull and Libra the Scales
Lead	♄	Saturn (slow god of time)	Capricornus the Goat; Aquarius the Water-carrier

The Zodiac table was also translated into alchemical use as the table below shows. By this method the signs would be understood only to the philosophers who knew that the signs of the Zodiac had at least two different meanings. By the use of such signs, involving more than one definite meaning, the alchemists were enabled to keep their art a mystery and a secret. In pursuing the secret art of transmutation, the work must be carried out under the proper astrological signs as shown below:

Chemical Process	
1.	Calcination
2.	Congelation
3.	Fixation
4.	Solution
5.	Digestion
6.	Distillation
7.	Sublimation
8.	Separation
9.	Ceration
10.	Fermentation
11.	Multiplication
12.	Projection

Zodiac Sign	
♈	Aries the Ram
♉	Taurus the Bull
♊	Gemini the Twins
♋	Cancer the Crab
♌	Leo the Lion
♍	Virgo the Virgin
♎	Libra the Scales
♏	Scorpio the Scorpion
♐	Sagittarius the Archer
♑	Capricornus the Goat
♒	Aquarius the Water-carrier
♓	Pisces the Fishes

Calcination meant to oxidize, congelation meant to solidify or crystallize, fixation meant to make stable, and solution, digestion, distillation, sublimation and separation are self-explanatory. Ceration meant to bring the material to a soft, wax-like, or fluid state, fermentation meant the rarefaction of a dense body by the interspersion of air in its pores, multiplication meant transmutation or gold making, and projection meant that by the use of the Philosopher's Stone at this point in the work, base metals could be changed into gold. The "stone" could be multiplied by dissolving it in mercury.

Not only did these ancients use peculiar signs, but they also employed pictures and colors in their art. The colors had a great significance to the alchemists. Gold was represented by a red king, silver by a white queen, a white sublimate by an ascending dove, antimony by a grey wolf, black or purifying matter by a black cow, earthly matter by a toad, sulphur by a wingless lion, mercury by a winged lion, and a fire was represented by a salamander. Certain actions also had their significant meanings. For example, to cut off the black crow's head meant to continue the heating until the black color changed to white. When the mixture was black it was called black raven; as it turned white, it became known as virgin's milk or the bone of the whale. Winged and wingless serpents or dragons symbolized the volatile and fixed principles (mercury and sulphur) respectively; the three serpents, the three principles (mercury, sulphur and salt); a serpent nailed to a cross, the fixation of the volatile. Flamel likened the great stench of dragons to that of sophic sulphur and sophic mercury. Sophic sulphur was made by dissolving gold in Aqua Regia, evaporating and oxidizing the crystals. The resultant finely-divided metal was sophic sulphur. Sophic mercury was silver dissolved in nitric acid, evaporated and oxidized. The resultant powder was the final product.

Sophic mercury was volatile and white in character, while sophic sulphur was fixed and red in color. The alchemists thought the former to be silver while the latter was considered to be gold, because of the great importance they attached to the colors of the respective materials. The Great Work referred to the making of gold and Little Work to the making of silver. The pictures of the alchemists, done in oil colors were merely paintings to the uninformed. Here are some of the interpretations of the paintings. The Iris, for example meant the rainbow colors of the Great Work; the Vine the symbol of fruitfulness; lunary herb, the potent signature herb of Luna; Moly, a magic herb with black root and white flowers, given to Ulysses by Hermes as a counter charm against the spells of Circe. (Moly was hard for mortal man to dig, but with the gods all things are possible.) Harvest (wheat and corn) referred to the "vital principle"; the rose, Ben Johnson's flower of the sun, the perfect ruby which he calls elixir; the golden apples of Hesperides or the golden bough had reference to the symbol of the gold-making power of "the Stone." The mulberry ministers represented the mysterious transmuting powers of the silk worm; myrtle, the symbol of immortality; the olive is sacred to Minerva, goddess of wisdom; saffron, the powers of dyeing and tingeing and it also meant the Philosopher's Stone. Runaway Daphne symbolizes the laurel, because Daphne ran from Apollo and was changed into a laurel. Apollo (Phoebus) and Daphne sometimes represent fixed and volatile principles, and sometimes masculine and feminine principles.

The three-headed serpent signified the "Stone," which is supposed to be composed of spirit, soul, and body, proceeding from a common source. It is single in essence, but triple in form. The Ram, Crab, Scales, and the Goat represented the four seasons. Saturn biting the hand of an infant is suggestive of the mythological story of the use of infants' blood for the mineral spirits of the metals. The Bible story of King Herod is supposed to have had some influence on this idea. The Gnostic symbol of Egypt, consisting of the snake seizing hold of its own tail, which led Kekulé, in 1865, to formulate the theory of the benzene ring, represented the eternal cycle, the symbol of eternity and regeneration. Numbers were also assigned to the Seven Metals of the Ancients, thus: Lead was given the number 1, Tin 2, Iron 3, Gold 4, Copper 5; Mercury 6; and Silver 7. The statement is attributed to Rhazes that "the 'Stone' is triangular in essence and square in quality."

While the search for the Philosopher's Stone was not the only objective pursued by the alchemists, it constituted without doubt a major objective. The "Stone" was, of course, never found. Many valuable concomitant discoveries, however, did result from the search engaged in by countless men of that period. Among these might be mentioned the accidental discovery of the element phosphorus, by the alchemist Brandt in the seventeenth century. When he observed the phosphorescent property of the substance, Brandt was certain he had found the "Stone." The sequence of the process concerned with seeking the Philosopher's Stone was:

1. Purification of the primitive materials
2. Preparation of the proximate materials
3. Treatment in the Philosopher's Egg or Hermetic Vase with the attendant color changes
4. Increasing the potency of the resulting stone (multiplication)
5. Transmutation (in the operation of projection)

It was further stated that in the Sacrament of the Altar were concealed the most profound secrets of spiritual alchemy; that the perfection of the Great Work was the birth of the Philosopher's Stone in the Sacred Nativity; that its sublimation was the Divine Life and Passion; that the black state represented death on Calvary; and that the perfection of the red state corresponded to the resurrection of Easter and the Divine Life thereafter.

Following are two unrelated examples of writings attributed to the alchemists. Doubts exist concerning the exact origin of these writings but nevertheless they serve to show the kind of writing engaged in by the early workers in science of that period.[1]

'Twas brillig, and the slithy tovs
Did gyre and gimble in the wabe
All mimsy were the borogoves,
And the mome raths outgrabe.[2]

The second represents the writing of a somewhat later period and is more easily read, although perhaps no more readily comprehended. The mysticism and religious influences are quite evident in these quotations.

We have an Heaven yncorruptible of the Quintessence,
Ornate with Elements, Signes, Planetts, and Starrs bright,
Which moisteth our Erthe by the Suttile influence;
And owt thereof of a Secrete Sulphure hid from sight,
It fetteth by virtue of his attractive might;
Like as the Bee fetcheth Hony of the Flowre.[3]

Philalethes in an exuberant mood let loose the following deluge of synonyms of mercury: "Mercury is our doorkeeper, our balm, our honey, oil, urine, may-dew, mother, egg, secret furnace, oven, true fire, venomous Dragon, Theriac, ardent wine, Green Lion, Bird of Hermes, Goose of Hermogenes, two-edged sword in the hand of the Cherub that guards the Tree of Life, etc., etc.; it is our true, secret vessel, and the Garden of the Sages, in which our Sun rises and sets. It is our… " and he inverts a second nomenclatory cornucopia upon the head of the unfortunate neophyte.[4]

"Owing perhaps to their abhorrence of Greek paganism, the Arabs were sparing in their use of the considerable variety of Greek symbols, and it was not until alchemy had become established in Western Europe that its practitioners developed the comprehensive code which permeates medieval alchemical writings. In designing symbols for the elements and principals, simple geometrical figures were introduced. Gradually, an imposing array of hieroglyphics came into use; but unfortunately, and probably of set purpose, there was no uniformity in their application, as will be evident from a glance at a list given in Basil Valentine's 'Last Will and Testament.' Gold, for example, was represented at one time or another, in more than sixty different ways. To add to the confusion, anagrams, acrostics, and other enigmas were introduced, and various secret alphabets and ciphers came to be used by alchemists; in some of these, letters and numerals were represented by alchemical and astrological signs. An additional barrier was erected in the shape of an extensive structure of pictorial symbolism and allegorical expression. Ideas, processes, even pieces of apparatus, were represented by birds, animals, mythological figures, geometrical designs, and other emblems born of a riotous, extravagant, and superstitious imagination."[5]

While the alchemist was very much of a mystic in his thinking and in his writing, nevertheless, he was fully cognizant of the religious phase of life and looked to the All-Protecting Spirit, or as we know it today, the Almighty, for protection and for a blessing. That this is true, is borne out by the observation that in any picture of an alchemist's den or laboratory one always will note a stuffed fish or one carved from wood hanging from the ceiling of the laboratory. The interpretation[6] for this lies in the fact that the Greek word for fish is "Ichthus," in the Greek spelled ΙΧΘΥΣ. Each letter of this word then spells a word of the following statement, "Jesus Christ, of God the Son, Savior," spelled according to the Greek as follows, Ιησουζ Χριστοζ Θεου Υιοζ Σωτηρ.

Francis Bacon wrote in De Augmentis Scientiorum: "Alchemy may be compared to the man who told his sons that he had left for them gold buried somewhere in his vineyard; where they by digging found no gold, but by turning up the mould, about the roots of the vines, procured a plentiful vintage. So the search and endeavours to make gold have brought many useful inventions and instructive experiments to light."

"Pray, read, toil – and thou shalt find" was the guiding motto of the adepts; and, at its best, alchemy was a prayerful search after truth.

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Alchemical Symbols and Processes

By Timothy O. Deschaines, Ph.D., Mu 2002
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Many see the symbols used by alchemists as a mere precursor to the modern use of atomic symbols and chemical notation. But that view allows a serious misrepresentation. Where modern symbols and notation are meant to be used and understood universally, the alchemists sought the opposite. To frame their work in ways they could understand, but that an outsider would be at a loss to comprehend, each alchemist devised their own symbols, alphabets, and symbolism to keep the uninitiated from understanding, or even worse, stealing their work. What resulted was a wealth of symbols, and very colorful descriptions to explain what to modern chemists might be seen as research notes. Modern philosophers have also been enamored by the symbolism of the alchemists to describe personal transformation; one in particular was Carl Jung.

The danger in using secret symbols was that an alchemist might not be able to read their own work if they forgot the meaning of the various symbols, or what process the colorful description depicted. There are collections of vast numbers of manuscripts, with translations of the symbols and symbolism, so we can begin to understand the work of the alchemists. Every culture that practiced alchemy would give rise to their own symbols, from the early Arabs and Egyptians[1], to the Indian and Chinese alchemists, to the more commonly recognized European alchemists[2,3,4,5]. A caveat – the symbols and symbolism shown here are but a small sampling of the wide variety employed by uncounted alchemists.

From the time when the idea of the four elements was first put forth we see a structure starting, a hierarchy of alchemical symbols. It starts with the four elements, Earth, Air, Fire, and Water. To that we add the 7 metals, Gold, Silver, Iron, Mercury, Tin, Copper, and Lead. And then there are the 12 processes aligned with the 12 positions of the zodiac, and then we add on the rest of the substances, processes, equipment, time, etc. The progression is from the greater number, to the smaller number, until one reaches the last piece, perfection.

The Zodiac

Aries	♈	Calcination
Taurus	♉	Congelation
Gemini	♊	Fixation
Cancer	♋	Solution
Leo	♌	Digestion
Virgo	♍	Distillation
Libra	♎	Sublimation
Scorpio	♏	Separation
Sagittarius	♐	Ceration
Capricorn	♑	Fermentation
Aquarius	♒	Multiplication
Pisces	♓	Projection

More Processes

Amalgamation		To Boil	
To Solve		To Rot	
To Take		To Compose	
To Precipitate		To Filter	
To Sublimate		Distill	
To Pulverize		To Purify	

Substances and Equipment

Essence		Universal Seed	
Amalgam		Aqua Vitae	
Aqua Regia		Aqua Fortis (nitric acid)	
Distilled Vinegar		Oil of Vitriol	
Antimony		Zinc	
Platinum		Nickel	
Steel		Brass	
Alum		Sulphur	
Nitre		Tartar	
Sal Ammoniac		Magnesia	
Quicklime		Stone	
Salt		Oil	
Sand		Urine	
Manure		Crucible	
Water Bath		Retort	

Weights and Measures

Pound		Ounce	
Dram		Scruple	
Pinch		Pint	

Time Symbols

Hour		Week	
Month		Year	
Day		Night	
Summer		Autumn	
Winter		Spring	

Beyond the symbols we come to the more elaborate symbolism, which can relate several parts of a process, including the color change and species involved. These commonly would incorporate animals, showing the relationship between the quest of the alchemist and the perception of nature as something both base, and yet having aspects of the divine. The range of animals used was wide and varied, as the alchemists tended to use animals not only for their color but also aspects that seemed to mirror the work being done with the forces of nature the animal represented.

Birds represent a powerful subset of the animal figures, with different birds representing quite varied roles[6,7]. The Black Crow represents blackening, death, rotting, or putrefaction. The color of the bird fits in well with the blackening of decay, but we also see the crow or raven being put into its traditional role as going after carrion and picking at dead things. This is the beginning of the loss of the physical and the move towards the spiritual. In opposition to black, we have white, in the symbol of the White Swan. There is movement towards spirit, light, but it is not complete. The swan swims on top of water always on the surface not above or below. This is the next step in our process, but not the ending, we have to move beyond the surface. From the opposites of black and white we enter into the world of color, all color at once in fact. Here we encounter the Peacock, with a tail that shows the full range of the spectrum. Now we are entering into the spiritual realm and seeing the shifting of energies and patterns. The next bird has a powerful message to convey, even though the bird itself seems not so dramatic. Our next image is the Pelican, piercing its breast with its beak and feeding its young on its own blood. This image is of self-sacrifice, to give of oneself to grow create a future. Also a pelican was a name given to an important laboratory tool, used for distillation, the impure starts at the bottom, is moved up into the head and then through the beak into the young, and in the process has been distilled down to the purer essence[8]. The last image is that of Phoenix, the ultimate symbol of transformation, from death is rebirth, also seen as death of the physical and emergence of a new spiritual being. Also this is a powerful circular symbolism, life, death, and rebirth.

Other animals included the Green Lion. The fierceness of the lion was used in the symbol, and the green color of the crystals used. The lion represents the power of nature. From a chemical standpoint the Green Lion is from iron sulfate crystals heated to release oil of vitriol (sulfuric acid), a fierce acid indeed. Another acids may have been aqua fortis (nitric acid) made from nitre (salt-peter – potassium nitrate) and the iron sulfate and would have kept the green color. When this acid was mixed with the acid of common salt (hydrochloric acid) would produce aqua regia, and even more aggressive acid. The

common image of the green lion devouring the sun shows the power of the lion, and also represents the ability of aqua regia to react and dissolve the most noble metal, gold, represented by the sun. Another interpretation is that the Green Lion represents plants, green nature, and their ability to capture the sun and grow.

The Gray Wolf plays a dramatic role in the works of Basil Valentine. He depicts the gray wolf as coming upon an old king that has died, the wolf consumes the king, then the wolf is captured and put over a fire, from the wolf emerges a new, young king. The role of the hungry wolf is played by stibnite, from which antimony can be derived. The king represents gold, in the elderly form the king is old, corrupt, and the new king that emerges is young and pure. Antimony will form alloys with gold, silver, tin, copper, and lead leaving behind other impurities. Then by heating the alloy, the antimony can be reacted with oxygen to form antimony oxide and leave behind the pure metal it had been alloyed with.

The image of the Snake or Serpent has had symbolic power far before alchemists enlisted it in their symbolism, representing death, rebirth, and a connection to the underworld. The Ouroboros, the snake eating its tale was the beginning and the end, life and death joined through rebirth, a linking of the beginning, the physical, with the end, the spiritual, through the path of transformation. In this role the snake and the phoenix share symbolism. There are other ways the symbol of the snake appears. As a three headed serpent it symbolizes the three aspects, spirit, soul and body that make up the philosopher's stone – mercury, sulphur, and salt, and all the parts, like the snake, come up from the earth. A snake could represent fixed properties, where a winged snake could represent volatile properties, and then the snake nailed to a cross would represent the fixation of the volatile qualities.

Other animals used were the Toad, White Eagle, Unicorn, and the Dragon. The Toad was also a symbol of rotting and putrefaction. It was wet, slimy, could be found in areas like a swamp where the smell of rot and decay permeated. The Toad represented more of a wet pathway, whereas the Black Crow was more symbolic of a dry pathway. The White Eagle also is part of the distinction of a wet pathway versus a dry pathway. The White Swan was part of the wet pathway, being on the surface of what decayed, the White Eagle would be that part which rose above the surface, the dry pathway. Again this can symbolize the release of the spiritual up from the physical. The symbol of the White Unicorn might appear after the Peacock, as something pure as a result of the transition through the realm of the ever-moving color of the spiritual. Also the unicorn could only be tamed by the touch of a woman, so we see the introduction of female added to the male energy, bringing about balance of the two opposites, male and female, physical and spiritual, death and rebirth. The Dragon could fill the roll of Snake or Serpent, as dragons are often seen as a kind of large Serpent. The Dragon though would appear at the beginning and the end of the alchemical processes or journey. The Dragon would appear at the beginning, as part of the black stage of rot and decay, like the Toad or Black Crow, and then the Dragon would reappear at the end, in a role like that of the Ouroboros, and when the Dragon bit its own tail it showed the bringing together of the two realms, physical and spiritual, base and pure.

Many other symbols were used, more animals, people, mythic creations; this is but a sampling of the menagerie drawn upon to symbolize the many steps and processes of Alchemy.

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Some Interesting Facts Conerning Hermes Trismegistus

By Ralph K. Carleton, Omicron 1922
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This is the fourth of a series of articles on the historical background of alchemy as pertaining to Alpha Chi Sigma. This completes these contributions in the present volume and the series will be completed in The HEXAGON of 1930-40… The author was initiated by Omicron April 8, 1922. He obtained an S.B. in 1919 from Boston University, an M.A. in 1922 from Harvard University, and a Ph.D. from George Peabody College in 1932. He has been assistant professor of chemistry at Rhode Island State College from 1931 to date. His hobbies are biographical data research and travel. He is a member of the American Chemical Society, A.A.A.S., American Association of University Professors, Sigma Xi, and a fellow of the American Institute of Chemists… The article entitled "Development of American Chemistry" in the last edition of the Pledge Manual of Alpha Chi Sigma was contributed by Brother Carleton.-The Editors.

To anyone interested in alchemy and its implications, the name of Hermes Trismegistus is most intriguing. However, when one sets out to track down definite information about the life and activities of this man, one is doomed to bitter disappointment. Much as been written about Hermes, but practically all of it is based upon legend. While he was not a true chemist as will be subsequently emphasized, the passing years have constantly placed more and more importance on his interest in that science, until today he is always thought of as a chemist. More nearly correctly, it should be said that he was a cosmologist, to whom chemistry was only one part of science as a whole.

There is little or no information as to the date of his birth or even where he was born. But it is known that he lived a long, long time ago, before the beginning of the Christian era. By some authorities, he is supposed to have been an Egyptian priest who lived about 2000 B.C. This seems to be borne out in the accompanying picture. He is supposed to have been the inventor of all useful arts and was elevated to the rank of a god. His relationship with alchemy was so close that "Hermetic Art" came to be a synonym for it. His mystical hymn was often recited and quoted by the adepts, as an authoritative statement that unity of all exists. If Hermes Trismegistus is taken to be the representative of a whole succession of Egyptian priest-metallurgists, instead of a single individual discoverer, the claim on his behalf may be accorded a large measure of validity; The Egyptian origin of alchemy is referred to Hermes Trismegistus, or Hermes the Thrice-Great, the alleged father of the "Hermetic Art," and the patron of its practitioners, the self-styled "Sons of Hermes." Hermes is sometimes regarded as the Greek equivalent of the Ibis-headed moon-god, Thoth, who was the Egyptian god of healing, of intelligence, and of letters. Hermes was supposed to have written some 36,000 alchemical articles. Of these the best known is the so-called Emerald Table of Hermes, which writing serves to give us about all the information available concerning this man. Sometimes Hermes is pictured as a new-born babe. Sometimes he is regarded as the god of fertility, and also as a patron of music. The sacred number "4" was assigned to him. As the messenger of the gods, Hermes wore winged boots and carried a caduceus, or herald's staff, which is shown as a winged wand entwined by two serpents. (The caduceus is the most familiar form of talismanic serpent usually associated with Hermes or Mercury).

The Precepts of Hermes comprised the Emerald Table of Hermes,1 or the Smargadine Table. According to the legend, the original emerald slab upon which the precepts were said to have been inscribed in Phoenician characters, was found in the tomb of Hermes by Alexander the Great. Another legend tells that the table was found by a woman named Zara in a cave near Hebron. There are still other legends-and the origin of the table is covered with obscurity. There is little doubt, however, that the table is certainly as old as the Christian era. The Precepts consisted of a series of pronouncements inscribed upon the emerald stone, and in the light of modern science, it is most interesting to consider them.

1. I speak not fictitious things, but that which is certain and true.
2. What is below is like that which is above, and what is above is like that which is below, to accomplish the miracles of one thing.
3. And as all things were produced by the one word of one Being, so all things were produced from this one thing by adaptation.
4. Its father is the sun, its mother the moon; the wind carries it in its belly, its nurse is the earth.
5. It is the father of perfection throughout the world.
6. The power is vigorous if it be changed into earth.
7. Separate the earth from the fire, the subtle from the gross, acting prudently and with judgment.
8. Ascend with the greatest sagacity from the earth to heaven, and then again descend to the earth, and unite together the powers of things superior and things inferior. Thus you will obtain the glory of the whole world, and obscurity will fly far away from you.
9. This has more fortitude than fortitude itself; because it conquers every subtle thing and can penetrate every solid.
10. Thus was the world formed.
11. Hence proceed wonders, which are here established.
12. Therefore, I am called Hermes Trismegistus, having three parts of the philosophy of the whole world.
13. That which I had to say concerning the operation of the sun is completed.

These oracular pronouncements were held in superstitious veneration by the medieval alchemists, who appear to have regarded them as the alchemical creed, or profession of faith in the Divine Art. The words were found to be engraved upon the laboratory walls and interspersed throughout the writings of these assiduous searchers after magic stones. The sentences were held to embody either the fundamentals of alchemy or the secret of transmutation. The Table appears by have carried veiled directions for preparing the Philosopher's Stone.

The second and third precepts reflect that all forms of matter have a common origin, a common soul, or essence, which alone is permanent; the outward form, or body, is merely the temporary abode of the imperishable soul; substances are produced by evolutionary processes, and are capable of undergoing transmutation. The fourth precept, the Sun and Moon, gold and silver, or sulphur and mercury, are pictured as the sources of the Stone. The eighth precept is suggestive of the kerotakis, or the later Vase of Hermes, in which the Stone-"the father of perfection throughout the world"-was held to be prepared. As will be readily noted, the entire writing is filled with mysticism and alchemical implications.

Nevertheless, homage is continually paid this legendary figure of science every time one speaks of a vessel being hermetically sealed. The name Hermes Trismegistus, is in itself significant of the capabilities of the man in that it typifies the Three Times Great, prince, poet, and philosopher. "And this is that Hermes which after the flood was the first finder-out and setter-forth of all arts and disciplines both liberal and mechanical."

Continuously throughout the whole field of alchemical literature, evidence arises which indicates that the writings of Hermes have been used over and over again. In the eighth century Jabir ibn Hayyan, who is probably the true Arabic author of the Latin treatises ascribed to Geber in his Kitab Ustuque al-Uss or Book of the Firm Foundation, quotes from the Table on the authority of Balinas, that is, on the authority of Apollonius of Tyana, as follows-"Balinas mentions the engraving on the table in the hand of Hermes, which says: 'Truth, Certainly. That in which there is no doubt. That which is above is from that which is below, and that which is below is from that which is above, working the miracles of one thing. As all things were from One. Its father is the Sun and its Mother the Moon. The Earth carried it in her belly, and the Wind nourished it in her belly, as Earth which shall become Fire. Feed the Earth with that which is subtle, with the greatest power. It ascends from the earth to the heaven and becomes ruler over that which is above and that which is below. And I have already explained the meaning of the whole of this in two of these books of mine."

The Emerald Table appears to have been first printed at Nuremberg in 1541 in a Latin version by an unknown translator, and was accompanied by the commentary of a certain Hortulanus who offered no suggestion as to the source of the original and none as to the language from which the translation was made.2 Nothing is known of Hortulanus, for his suggested identity with John Garland (1202-1253) has not been established. Yet it seems certain that the alchemists of the thirteenth century were acquainted with the Latin version upon which Hortulanus wrote his commentary, for Albertus Magnus (1193-1280) quotes from Hermes in language which forms a portion of it.

The religious and philosophical writings which bear the name of Hermes Trismegistus are probably the work of the school which flourished at Alexandria in the third century of our era. Those who have studied them have considered the alchemical writings which bear the same name to be "spurious," that is, they have judged them not to be the work of this Hermetic School-and it has been assumed in consequence that they belong to a later date. If the Emerald Table was known to Apollonius of Tyana, then it was certainly known three centuries before the Alexandrian School, and may perhaps have pertained to the earlier Hermetic tradition from which the later cult acquired its name and, perhaps, its leading ideas. It may even be that the Emerald Table has something of the great antiquity which legend ascribes to it.

Even in the most usual Latin version, a Greek word for it is found, and it seems likely that it was derived from a Greek original. At the same time, it should be noted that in another Latin version the same word is lacking. This should not seem alarming, however. The third version, which appears to be derived from a different original, raises the interesting question whether two versions existed in the Greek. If so, from what original were they derived? If not, in what other language then was this other version?-and was it earlier or later than the Greek? A reference to a Phoenician original conforms to old tradition and may be evidence for the authenticity of Kriegsmann's version,3 but it may also be only a device for making a forgery more plausible. Proof that Kriegsmann's version is a fabrication involves all the difficulty of proving a negative, and is not to be hoped for. Probable proof that it is genuine would be supplied by the discovery of the same version, in which case, of course, the credit might not be to Kriegsmann for translating the Table out of the Phoenician into the Latin.

As implied early in this article, the Table appears to contain no chemistry. It asserts the essential unity of the world, and perhaps refers to spiritual things, intending a monistic metaphysics. Perhaps on the other hand, it asserts the fundamental unity of matter, as Hortulanus understood it and as modern physics is coming to believe. It also describes a process of purification or strengthening, perhaps the preparation of Medicine by sublimation and distillation. Hortulanus found alchemical doctrine in it, and later commentators found even more than he. The many discussions which have been written upon it, the alchemy which has been elicited from it-perhaps indeed the alchemy which has been read into it-have made this work of Hermes one of the most valued documents in the history of primitive chemistry.

Endnotes

1. The Emerald Table of Hermes Trismegistus, Tenney L. Davis, J. Chem. Ed. 3, No. 8, 863-875, 1926.
2. The page reproduced in this article is from the Nuremberg edition of 1545, Alchemiae Gebri Arabis philosophic solertissimi Libri, cum Relinquis, the Table, p. 294, and the Commentary of Hortulanus, p. 295. The same is also printed in French translation in Le Miroir d'Alquimie of Jean de Mehun, Paris, 1613, the Table, p. 35, and the Commentary, p. 38: also Dr. Allendy, La Table D'Emeraude D'Hermes Trismegistos avec les commentaires d'Hortulain, Paris, 1921.
3. Neue Alchymistische Bibliothek für den Naturkundiger unsers Jahrhunderts ausgesucht und herausgegeben von S., Frankfurt and Leipzip, 1772, contains, vol. 1, preface, a German translation of this same version and states also that the original was in the Phoenician language. It has the same expression about the word of one God, but it reverses the phrasing in the sentence, "Its father is the Sun, its Mother is the Moon," etc. The last sentence makes reference, not to the "Chemic art," but to dem allerhochsten Werke (der Scheidekunst).

Geber: His Life and Works

By Harold P. Gaw, Alpha Alpha 1925
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While nearly all chemists realize that present day chemistry had its origin in the alchemy of the Middle Ages and earlier centuries, only the few who have made the subject a special study have any real appreciation of the character and accomplishments of our ancient predecessors. The heritage of Alpha Chi Sigma is associated with alchemical allusions and atmosphere; but eberit is doubtful whether most undergraduates fully appreciate their significance because of lack of knowledge of the men in question and their work. At the 1934 Conclave, a committee was authorized "to make a systematic study of the historical background of alchemy as pertaining to Alpha Chi Sigma and prepare articles for publication." This committee has a number of articles in preparation, and in this issue of The HEXAGON is presented the first of them by the Grand Master of Ceremonies. It is hoped that the series will lead to a finer appreciation of the ritualistic work of the fraternity.-Charles. D. Lowry, Jr., Chairman, Committee on Alchemy.

Credit Note: The author desires to express his appreciation of the courtesy of E. P. Dutton & Co., New York City for their liberal permission to draw upon their publication, The Works of Geber, Englished by Richard Russel, 1678, and edited in 1928 by E. J. Holmyard, M.A., D.Litt., New Science School, Clifton College, Bristol, for use in the "Hexagon." Illustrations accompanying this article, direct quotations, and information upon which remarks are based are attributed directly to this publication.-H. P. G.

It seems rather well established that Geber's real name is Abu Musa Jabir ibn Hayyan. He lived in the 7th century A.D. and probably was born in 721 or 722 at Tus, which is near the present Meshed. He was the son of a druggist of the famous South Arabian tribe of Al-Azd. His father was greatly interested in politics and supported the Abbasid family, who were trying to overthrow the reigning caliph. While on secret political work for the Abbasid family, he was captured by agents of the caliph and was beheaded. It is not known just how old Jabir was when his father was killed. It seems fairly definite that in his youth he studied with a man named Harbi and then, as a young man, attached himself to the religious leader, Ja'far al-Sadiq. It is likely that at this time he turned toward the study of alchemy, along with mysticism and other occult matters.

In 803 A.D. the caliph expelled the Barmecides, who were his ministers, but of whom he had lately become suspicious. Jabir was a friend of these ministers and of necessity shared their downfall. He fled to Kufa, where it seems likely that he remained in seclusion for the remainder of his life, the date of his death not being recorded. Excavations in Kufa about 1000 A.D. led to the discovery of his laboratory.

His writings are far different from those which we are used to at the present time. They present interesting reading, although of a difficult nature, because of terminology and general vagueness. At the same time, his reference to minerals and his familiarity with various methods of purification and extraction show him to have had considerable knowledge. In common with other alchemists and writers, he seemed afraid that others might learn his secrets. As a result of this fear he does not describe his methods clearly, and is constantly repeating. He divided his works into five books on the following subjects:

1. Of the Investigation or Search of Perfection.
2. Of the Sum of Perfection, or of The Perfect Magistery, The First Book.
3. Of the Sum of Perfection, or of The Perfect Magistery, The Second Book.
4. Of the Invention of Verity, or Perfection.
5. Of Furnaces, etc., With a Recapitulation of the Authour's Experiments.

Probably his most outstanding attribute is his insistence on thoroughness. This permeates all of his writings, and probably accounts for some of the repetition. His writings show that he fully understood the necessity of experimenting, more so than many of the other early chemists.

Aristotle's philosophy of all substances being composed of four "elements": viz, fire, air, water, and earth, was universally accepted by the scientists of Islam. Geber accepted his theory of the constitution of metals, but seems to have regarded it as too indefinite to explain observed facts or to offer practical methods for transmutation. He modified it, and his theory survived, with some alterations and additions, until the beginning of modern chemistry in the 18th century. He believed the dry or smoky exhalation was converted into sulphur, and the watery one into mercury, and by subsequent combinations metals were formed. The existence of various metals was attributed to the lack of purity at times of the sulphur and mercury, and to their combining in different proportions. If perfectly pure, and combined in the most complete natural equilibrium, then the product is the most perfect of all metals, gold. But defects in purity, different combining powers, and lack of skill on the part of the chemist result in the formation of silver, lead, tin, iron, or copper. And this is alchemy.

Geber's definition of the "Thing" which perfects in minerals is quite interesting, and follows: "The timing which perfects in minerals, is the substance of argentvive and sulphur proportionally commixt. By long and temperate decoction in the bowels of clean, inspissate and fixed earth (with conservation of its radical humidity not corrupting) and brought to a solid fusible substance with due ignition and rendered malleable." He states further, "By the definition of this nature perfecting we may more come to the knowledge of the thing corrupting, and this is that which is to be understood in a contrary sence; viz., the pure substance of sulphur and argentvive without due proportion, commixt or not sufficiently decocted in the bowels of unclean not rightly inspissate nor fixed earth, having a combustible and corrupting humidity and being of a rare and porous substance, or having fusion without due ignition, or no fusion and not sufficiently malleable."

Tin is prepared1 in the following manner: "Jupiter is manifoldly prepared,1 yet best in this manner: Put it in an apt vessel in a furnace of calcination, and under it make fire sufficient for good fusion of the body; stirring the liquefied body with an iron spatula full of holes, and drawing off the scum that riseth, and again stirring the body, in that heat of fire equally induring, until on the superficies be gathered together a good quantity of that scum or powder; which take off, and again continue stirring until I the whole body be scum or powder; which take off, and again continue stirring until the whole body be reduced to powder. This powder sift, and replace it again in the furnace, adding fire, not exceeding the fire of its fusion, and stir it often. Keep it in this fire of calcination for a day natural, or thereabouts, until its whole accidental and superfluous humidity be abolished, with its combustible and corrupting sulphur. For the fire elevates and consumes every fugitive and inflammable substance; then often well wash it with the aforesaid, viz. with common-salt cleansed, and allom, and with purified and harsh vinegar, and dry it at the sun, or in the air; and then again grind, and wash, and dry: and do this time after time until by the acuity of the salts, alloms, and vinegar, its whole humidity, blackness, and uncleaness, shall be consumed, corroded, and done away. This being done, add glass beaten to powder, to these aforesaid, and when you shall have impasted the whole together, then with sufficient fire make it flow in a crubile with an hole in its bottom, set within another, and the pure and clean body will descend, the whole earthly and feculent substance remaining above with the glass, and salts, or alloms; for in that body descended and reduced, is an equal and perfect proportion of clean argentvive and white sulphur not burning; because fire and the corrosives have divided the whole humidity, and fugitive, and inflammable, and corrupting substance and blackness; and through that discensory, by the pasting with salts, alloms, and glass, the whole feculent earthy substance is separated, the pure substance with its proportion remaining. Afterward calcine this pure reduced body again, with pure and clean salarmoniac, until it be in weight actual, or thereabout, when it shall be well and perfectly calcined, then grind the whole well and long upon a porphiry-stone, and place it in the open air, in a cold and humid place; or in glass vessels, in a furnace of solution, or in horse-dung, until the whole be dissolved; augmenting the salt if need be. This water we ought to honour, for it is what we seek for the white."

The preparation of Saturn must be done in the following manner: "Lead is thus prepared, set in a like furnace of calcination, stir it, while in flux, as you did the Tin, until it be converted to a most fine power: sift this, and again set it in the fire of its calcination, as aforesaid, until its fugitive and inflammable substance be abolished. Afterwards take out your red calx, which imbibe and grind often, with common salt cleansed, and atrament purified, and very harsh vinegar. For the red you must use these, as you did for the white, with common salt, famenous allom, and vinegar: so as of tin is said, your matter must be often imbibed, dryed, and ground, until by benefit of the aforesaid, this said uncleanness be totally removed; then mix glass with these aforesaid, and as you did with the tin cause the pure body to descend, that descending it may be reduced. Again, calcine it with pure salarmoniac (as of Jupiter is said) and most subtily grind and dissolve it by the way aforesaid. For that is the water of argentvive and sulphur proportionally made, which we use in composition of the red elixir."

"Venus or copper, is this way prepared: Make a lay of common salt well cleansed in a crucible, and upon that put a piece of copper plate, and over that a lay of salt, and then more of the plate; and so continually, until the vessel be full: which being covered and firmly luted, place in a furnace of calcination, for one day natural; then take it out and separate and scrape off what shall be calcined; and again calcine the plates with new salt, as before, repeating the calcination of often, as until all the plates shall be consumed, and corroded by the benefit of the salt and fire: for the sale corrodes the superfluous humidity and combustible sulphureity, and the fire elevates the fugitive and inflammable substance with due proportion. Grind this calcined matter to a most subtile powder, and wash it with vinegar; until the water come from it free from blackness. Another time imbibe it with new salt and vinegar, and grind, and after contrition (or grinding) put it in a calcining furnace, in an open vessel and let it stand there three days natural; then take it out and grind it very well and subtily, and well and long wash it with vinegar, until it shall be cleansed and purged from all uncleanness. This being done, dry it well in the sun, then add to it half its weight of salarmoniac, well and long grinding, until it be an impalpable substance. Then expose it to the open air, or set it in horse-dung to be dissolved, until whatsoever is there subtile shall be dissolved; anew adding clean salarmoniac, if need shall be, until the whole be made water. Honour this water, which we name the water of fixed sulphur, with which the Elixir is tinged to infinity."

"Mars or iron, is best prepared thus: Let it be calcined as Venus, with common salt cleansed, and let it be washed with pure vinegar; being washed, dry it in the sun, and when dryed, grind and imbibe it with new salt and vinegar, and then put it in the same furnace, as of Venus is said, for three days. Honour this solution, viz. the water of fixed sulphur, wonderfully augmenting the colour of the Elixir."

"Perfect Bodies need not preparation, in relation to their further perfection, being perfect; but that they may be more subtiliated, and attenuated, we adhibit this preparation to them: R Sol or gold beaten into thin plates, and with them and common salt very well prepared, make lay upon lay in a vessel of calcination, which set into a furnace and calcine well for three days, until the whole be subtily calcined; then take it out, grind it well wash it with vinegar, and dry it in the sun, afterward grind it well with half its weight of cleansed salarmoniac; then set it to be dissolved, until the whole (by the benefit of common salt and armoniac) be dissolved into a most clear water. This is the precious ferment for the Red Elixir, and the true body made spiritual."

"Luna or silver, is subtiliated and attenuated and reduced to spirituality, in manner as above is said of Sol. Therefore in all and every part of the work, do the same in its subtiliation, as you did with the gold. And this water of Luna dissolved, is the ferment for the white Elixir, made spiritual."

In common with other early alchemists, Geber was constantly searching for the elixir of life and the philosophers' stone. I marvel at their advancement because of the amgibuousness of directions and constant repetition. The preparation of the metals given before seems to be a necessary procedure in order to obtain the required technique for the preparation of the greater elixir. To quote Geber, "It is a medicine requiring a long space of time." The preparation and cleansing of many common every-day chemicals is described. He worked with calcination, sublimation, descension, solution, distillation, coagulation, fixation, and inceration.

Impediments to this work according to Geber are generally two-natural impotency and defect of necessary expense. Natural impotency includes physical defects of the worker, such as blindness, loss of limbs, or various diseases. Likewise, the worker's soul must be in his work. The chief qualifications of the artificer seem to be wit and desire, natural ingenuity, search, learning, diligence, and last but not least, an ability to keep his money. A lengthy description of the reasons of men denying the art is given. Chief among these may be cited the following:

1. The proportion of things mixable being unknown, how can we know both the mixture and to what form it is to be mixed?
2. Although you should know the proportion of elements, yet the way of mixing them together you know not.
3. Although you should duly know this, yet in the action of mixtion you understand not how to equalize the agent heat by mediation of which the thing is so perfected.
4. This science hath been so long sought by wise men that if it were possible to attain it in any way, they would be a thousand times before now have been masters of it.

His refutation is interesting and may be listed under the following:

1. Therefore, they not seeing any to posses this science, conceive an error in their minds and thence judge that none have found it.
2. That the defect in us, that we cannot compound or make an ox or a goat, is not from the part of the mixtion but through defect of infusion of the soul.
3. Likewise, also, we alter not metals but nature, for whom, according to art, we prepare that matter, or she by herself acts, not we, yet we are her administrators.
4. Although preparation be made not in an instant, yet that hinders not, but that the form or perfection may be given in an instant to the matter prepared; for preparation is not perfection, but a disposing to receive the form.
5. Using the preparation and destruction of gold as an example, he states, "Because it hath a strong composition, it must needs have a more difficult resolution and, therefore, is difficulty destroyed. Hence, they think the construction or making of it impossible because they know not its artificial destruction, according to the course of nature. Perhaps they have by tryal proved it to be of a strong composition, but of how strong a composition have not tried."

With due acknowledgment of the superstitions, fears, doubts, and the like which existed in Geber's time, we cannot help but admit that he was patient, thorough, and believed he was correct. I bring this to a close with a quotation of a verse from his pen feeling a keener respect, and a little more understanding of the alchemists:

"My wealth let sons and brethren part,
Some things they cannot share-
My work well done, my noble heart,
These are mine own to wear."

Paracelsus

By Harry A. Curtis, Eta 1908
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This is the fifth of a series of articles on the historical background of alchemy as pertaining to Alpha Chi Sigma. Two more subjects are scheduled for this volume of The HEXAGON, completing the series… It has been some time since Brother Curtis lent his hand to this many pages in The HEXAGON. Author of the History of Alpha Chi Sigma, a past G.M.A., and long the fraternity historian, Brother Harry exemplifies that type of member who labored mightily for the organization through many years, and still gives it his time in the midst of a busy life. He is now dean of the College of Engineering, University of Missouri. There is no need to review his long line of accomplishments in the field of chemical engineering. As for his accomplishments in the fraternity-when one thinks of Harry A. Curtis, one thinks of Alpha Chi Sigma-The Editors.

The story of Theophrastus von Hohenheim, who was later styled Philippus Aureolus Theophrastus Bombastus von Hohenheim and who is usually mentioned by the self-adopted title "Paracelsus," is a strange one. Accounts of the man and his work are confused and inconsistent. His enemies have pictured him a vain and pompous quack who picked up a little medical knowledge and a great deal of trickery in the course of an evil life, and who finally came to a bad end. His devoted followers have proclaimed him an enthusiastic searcher for truth, a great teacher, a pioneer who blazed a new trail in chemistry and in medicine, an honest man unjustly driven from the faculty of the University of Basel by the persecutions of an ignorant and prejudiced group of medical men.

It is probable that Paracelsus was neither the vicious charlatan described by those who hated him so violently, nor the high-principled reformer sung by his followers. Whatever may be said of his personal qualities, or of the methods he used, the outstanding fact is that he did turn the thinking of those about him into new channels.

The biographical data regarding the personal life of Paracelsus are meager. His father was a physician of no distinction. His mother was, prior to her marriage, superintendent of the hospital at Einsiedeln, in the canton of Schwyx, a German-speaking part of Switzerland. Presumably Paracelsus was born somewhere in the neighborhood of Einsiedeln. The date of his birth is not certain, but was sometime in the period 1490-1493.

He was born in stirring times. Within a year or two of this date Columbus set out on his great voyage across the Atlantic. In literature, sculpture, painting, and in the practical arts men were venturing into new fields. Paracelsus was destined to pioneer in chemistry and in medicine.

Of the early youth of Paracelsus little is known. Presumably his parents, both being linked with the medical profession, gave the boy some instruction in medical lore. At the age of sixteen he entered the University of Basel. The tradition-steeped environment of the university evidently was not satisfying to the restless and questing mind of Paracelsus. Two years later the youth was with one Trithemius, abbot of Sponheim, dabbling in alchemical research. Thence he went to the mining district of Tirol where he became absorbed not only in learning at first hand the mining and metallurgical operations carried out there, but also in studying the occupational diseases of the men engaged in the industry. Here, perhaps, was crystallized the idea around which so much of Paracelsus' later activities centered; namely, that the way to knowledge is not through academic halls, but through direct observations of actual situations, through study of men and manners of living in many places. Gradually the impatience with traditional methods, which had driven him from the university, changed to outspoken scorn of the narrow and authoritative teachings of his day. Why cling to the mistaken ideas of the past when the opportunities to learn the truth lay at hand? In later years Paracelsus was to say, "Whence have I all my secrets, out of what writers and authors? Ask rather how the beasts have learned their arts. If nature can instruct irrational animals, can it not much more men?"

Nature was henceforth to be his teacher. For a dozen or more years after leaving the Tirol district, Paracelsus led a wandering life, picking up information at its source, and gradually acquiring a reputation as it physician.

In 1526 or 1527 he was appointed physician for the city of Basel and lecturer in medicine at the university. Possibly neither the town nor the university realized the manner of man they were admitting to their smug and peaceful circle. They were not long left in ignorance. Paracelsus attacked the medical teaching of the university and the medical profession with violence and ridicule and coarse invective. Before the astonished eyes of his fellow townsmen he publicly burned the revered writings of Galan and Avicenna, just as his fiery contemporary, Martin Luther, had burned a papal bull at Wittenburg five years earlier. He poured out his abusive lectures not in the Latin of academic circles, but in the colloquial German of his fellow citizens.

At first his hearers were carried away by his enthusiasm and vigor of attack, but reaction was soon coming. Violence is a begetter of violence. The medical profession was strongly entrenched and powerful. It moved to an attack on Paracelsus which was as bitter and abusive and, temporarily at least, more effective than that which Paracelsus was directing against the ignorance and absurdities of the profession. Within two years, Paracelsus fled the town, the direct cause being a dispute with the Canon Cornelius von Lichtenfels and local judges over a medial fee. He now resumed once more his wanderings. For another decade but little of his life is known save as revealed by his publications which appeared from time to time. The first of these was printed in Augsburg in 1529 and about a dozen others followed during the remaining years of Paracelsus' life.

In 1541 Bishop Ernst invited Paracelsus to settle at Salzburg under his protection. This invitation Paracelsus accepted, but was not to enjoy for long the security offered, for he died at Salzburg within the year. He was buried in the churchyard of St. Sebastian, but in 1752 his remains were moved to the porch of the church and a marble to his memory erected there.

Such are the facts, some of them none too well established, of the birth, life and death of Paracelsus. His portrait was painted by his contemporary, Tintoretto. A reproduction of this painting has been used as a frontispiece in some editions of Browning's poem, "Paracelsus." In the Royal Arts Gallery at Brussels is another portrait of Paracelsus, presumably painted by Rubens some sixty years after Paracelsus' death. A copy of the latter painting appears in the Berzolheimer series (No. 41) and has been reproduced in Industrial and Engineering Chemistry (26-528-1934) and on the cover of *The HEXAGON* for February, 1939. The paintings by Tintoretto and Rubens bear no likeness to each other, which is in keeping with all the other contradictory evidence in regard to Paracelsus.

Historians have had difficulty in piecing together the story of the man, so tangled are facts and fiction in the extant records. Likewise it has been difficult to say which of the hundreds of manuscripts now bearing the name of Paracelsus were actually written by him. The authenticity of about a dozen of these manuscripts is certain, and a few more may have been written by Paracelsus. The others are by unknown authors who followed the practice, common for centuries, of signing to their writings the names of well-known persons.

In 1589-91, Johann Huser of Basel published what purported to be the collected writings of Paracelsus. Most of the papers in the Huser collection appeared after Paracelsus' death and are probably by other authors than Paracelsus. The writings which may be ascribed to Paracelsus with some certainty are curious mixtures of sound argument, fantastic nonsense, lofty ideals, boasting, superstition, and common sense.

As was natural, Paracelsus concerned himself from time to time with the theories of matter current in his day. It will be recalled that one of the early ideas was that all matter is composed of earth, air, fire and water. The early philosophers made it clear, however, that they had in mind the qualities of these things rather than the concepts which these words bring to our minds today. It was the coolness and moistness of water, the dryness and warmth of fire, etc., which to their way of thinking, gave matter its characteristic properties. Likewise, in a later period, we meet the mercury-sulphur idea, these terms again meaning what today we call properties, i.e., mercury and sulphur have certain qualities which they might, under suitable conditions, impart to other kinds of matter. Paracelsus apparently added a third primordial component, namely "salt."

Thus he says, "Know then that all the seven metals are born from a three-fold matter, namely, mercury, sulphur and salt, but with distinct and peculiar colorings… Mercury is the spirit, sulphur is the soul, and salt is the body… The soul, which indeed is sulphur, unites those who contraries, the body and the spirit, and changes them into one essence."

Being a physician, Paracelsus made a further association of ideas. He says, "The three principles… from which all things are born and generated are phlegma, fat and ash. The phlegma is mercury, the fat is sulphur, and the ash is salt. For that which smokes and evaporates over the fire is mercury; what flames and is burnt is sulphur; and all ash is salt."

It is a curious fact that the idea of a fundamental material-a "prima materia"-out of which all the various kinds of matter are formed has run through all of man's thinking about the physical world, from the days of the early natural philosophers to those of modern scientists. The natural philosophers of long ago postulated a primordial material, which took on a great many forms through acquiring "properties," i.e., the ashy quality, the air quality, moistness, dryness, the burning quality of sulphur, etc. Today we still think that there may be a "prima materia" but we are preoccupied for the moment with a few fundamental units of matter out of which the ninety-odd elements are formed.

The transmutation of one kind of matter into another, such as that of lead into gold, was manifestly a possibility natural to the old ideas as to the manner in which one kind of matter differs from another. Today the transmutation of one element into another is a known occurrence, one already under partial control by man. The transmutation of elements is as natural to our modern ideas of matter as it was to the early philosophers with their ideas of matter. The only difference is that we are today less confident as to the economic feasibility of the process.

Paracelsus was interested in the philosophical theories of matter, but he came eventually to scorn the "multipliers" of gold. The aim of chemistry should be, he said, the preparation of medicines.

The tangible contributions of Paracelsus to either chemistry or medicine are slight. He made no notable chemical discoveries, but his theories as to life processes and the relation of chemicals to health and disease, and his doctrine that the aim of chemistry should be the preparation of medicines were destined to become powerful influences in directing the course of chemical developments in succeeding decades. In fact, the preparation of new medicines has never since Paracelsus' day ceased to be one of the aims of chemistry, and we can well imagine the enthusiasm with which Paracelsus would have seized upon such chemicals as insulin and salvarsan and sulphanilamide and sulphapyridine. The period of iatrochemistry is evidently coming at long last.

In medicine, Paracelsus apparently used several new chemical remedies, including opium and certain metallic salts. Whatever of good or ill may have resulted therefrom is of little importance compared with the service which Paracelsus rendered in his assault on the traditional and often absurd medical practices of his day. He may himself have been all that his enemies claimed, and when he died it may have seemed that the little tempest he had raised would soon be forgotten. We cannot be sure that medicine might not have shaken off the fetters of tradition had Paracelsus never publicly ridiculed the teachings of Galen and all the older medical lore of his day. The fact remains, however, that a new era in medicine and in chemistry did begin in Paracelsus' day. Looking back in history, the first steps in a reform always appear the natural outcome of the social or economic or political influences of the time, and perhaps they are; but the first steps taken must have seemed strange and difficult ones to those who ventured at the time. If Paracelsus, as seems the case, was one of those who made the first hazardous and difficult beginnings of reform, chemistry and medicine do well to recognize his service.

Paracelsus: The Mystical Critic

By William S. Keezer, M.D., Epsilon 1941

The original of this paper was prepared for a seminar in Philosophy and under the direction of Carlton W. Berends, Ph.D. The author acknowledges his help in finding the source material and his helpful criticism of this shortened version.

With the new access to truth and its dispersion by means of the printing press in 1436, there was a smoldering revolt against the adherence to the Arabic and Greek shibboleths. Paracelsus, one of the most amazing characters of his time, fanned the flames of this revolt. He publicly burned the "Cannon" of Avicenna and the works of Galen in front of the University of Basel. He often appeared as a mountebank, his language was unbridled and abusive, and his habits were as bad as his morals; but he was equal to the task thrust upon him by the age in which he lived. He has been variously described by some as a drunken quack of an alchemist, and by others as a prophet and genius. Dawson describes him in the following manner; "He stirred with impatience and rigor the weed-grown pool of the rigid authority of the schools, and advocated, in strident tones, personal opinion and independent judgment."

His chemical investigations were far superior to his medical, and to him this science owes much. But he applied his chemical knowledge to therapeutics, and to him we owe the introduction into medicine of many mineral drugs, such as calomel, and other compounds of mercury, zinc, sulphur, iron, and antimony; and his reputation was enhanced by his importation from the East of tincture of opium or laudanum as a "pain-reliever." Medicine was still a pseudo-science based on the teachings of Hippocrates of Cos, Avicenna, the Persian Prince of Physicians, and Galen of Pergamos, glider of pills and dissector of swine and apes. Superstition, mysticism, and false theories were the cornerstones of medicine's structure in the days of Paracelsus. In his system of medicine, he placed the magnet above all other remedies on his lists of infallible cures. He called it "A Monarch of Secrets… The Magnet contains mysterious healing virtues; it is impossible to dispense with it in the treatment of disease." He further went on to say that although its physical properties were known for a long time, he was the first to employ it medicinally. "The magnet, like the stars and other bodies of the universe is endowed with a subtle emanation, 'fluidum,' that has a favorable influence on the health and life of man. It assures cure for discharging sinuses of the limbs, for fistulae of the various parts of the body, for fluxes of the eye, ear, and nose, and for jaundice and dropsy. It stops hemorrhagic disturbances in women."

While no belief was as popular in his day as astrology, whether among the masses or among the intellectual, Paracelsus did not wholly believe in it. Even though he would not give an enema, bleed a patient, or prescribe a charm without consultation of the Zodiac, his criticism of astrology was very outspoken. In his Volumen Paramirum, as quoted by Pachter, Paracelsus states:

> The stars determine nothing, incline nothing, suggest nothing; we are as free from them as they are from us. The stars and all the firmament cannot affect our body, nor our color, beauty and gestures, not our virtues and vices… The course of Saturnus can neither prolong or shorten a man's life.

The Paracelsian concept of the world is centered around his basic concern with man's relation to God. "His basic motif is man as the beginning and center of all creation. In man all life culminates. He is the center of the world; everything is seen in terms of man."

In man, God and nature meet and since man is the image of God, he holds the highest rank in the cosmos. Through the principle of a hierarchical order of creation, ascending from matter to God, Paracelsus writes in all the contradictions of a paganizing mysticism of nature and a pious Christian faith. "Only a few men before him and hardly anyone after him have conceived an anthropocentric system so lofty and at the same time so rational. In it everything follows logically from one source; it is a system that elevates profession to vocation, trade to art, and science to wisdom."

Biography

Not far from the monastery of Our Lady of Einsiedeln in Switzerland, where the Sihl roars along its deep channel in the pine forests, a physician had settled down to practice. His name was Wilhelm Bombast von Hohenheim, and he was a man of Swabian lineage. He married a Swiss girl, and the region pleased him, as it was well suited for a medical practice. Past his house ran the pilgrim's way, which after crossing the St. Gothard, led northward through Schwyz to the famous Benedictine monastery. Year after year thousands of the faithful came to worship at the shrine of the Black Mother of God in Einsiedeln, and many of them found it necessary to consult the doctor after the hardships of the journey. Two years after Hohenheim's marriage, a son was born to him. This was in the year 1493, when Columbus returned from his first voyage to the New World. The boy was christened Philipp Theophrastus, or to give him his full Latinized appellation, Philippus Aureolus Theophrastus Bombastus von Hohenheim.

When he was ten years old, his father moved from Switzerland to Carinthia to practice at Villach. His mother was dead and father and son were alone in the world. There were mines in the neighborhood, and there was a school of mining at which, according to tradition, Wilhelm von Hohenheim taught. Here, also, were Count Fugger's smeltingworks, which opened a new world and a new side of nature to young Theophrastus. He had occasion to learn the practical arts of mining and smelting. He saw how the elements attracted and repelled one another combining to form new substances. He learned the fundamentals of chemical analysis, and came to recognize its eminent practical importance.

The years ran their course, and the time came for the young Hohenheim to go to a university where he could systematically study for the medical profession. He went to Italy where the new science was in its prime. Hohenheim, reached Ferrara, where his master was Leoniceno, a grey-haired humanist, who had translated the aphorisms of Hippocrates into elegant Latin, and who was one of the first to read classical authors with a critical mind. He also had been one of the first to describe the new "love-pestilence" -or syphilis-decades before Fracastoro.

Hohenheim studied after the manner of other students of his day, took his doctor's degree, and, following the fashion of the humanists, Latinized his name to Paracelsus.

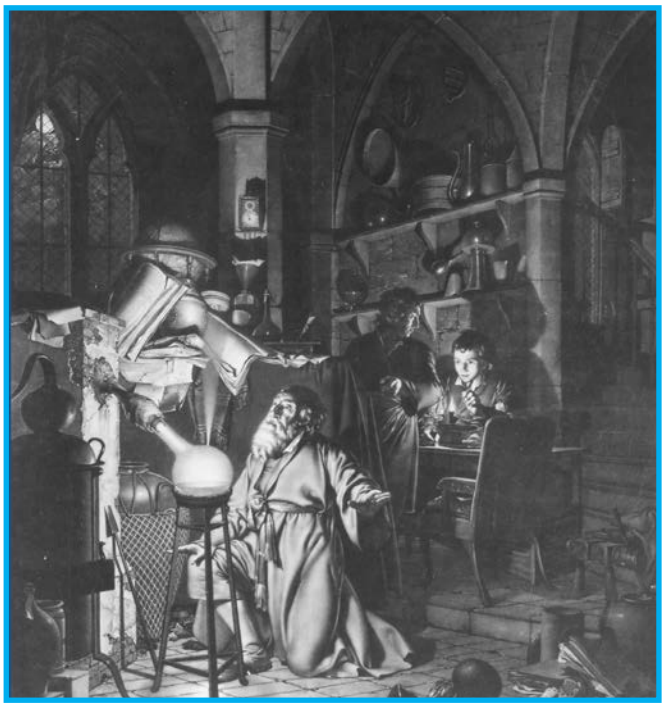
Away he went from the stuffy atmosphere of the classroom, into the free air and back to nature. There was where true art was to be found. It should not seek any one out, but must be eagerly and diligently pursued. He took a pilgrim's staff, fully realizing that no
one could become a geographical discoverer who remained seated by the fire. He stated:

> If a man wishes to become acquainted with many diseases, he must set forth on his travels. If he travels far, he will gather much experience, and will win much knowledge.

On his travels he learned not only about illnesses, but also about remedies. Peasants, old wives, handicrafts-men, the barbers, and the barber-surgeons-such people often had knowledge well worth acquiring.

Paracelsus set forth on this voyage of discovery through the world, which, with a few interruptions, was to last until his death, leading him through all the lands of Western Europe. He visited the mining districts, studied the healing springs and made long series of chemical experiments. He continued always to practice as a physician, helping and healing wherever he could. He had thrown away his doctoral biretta and wore an ordinary slouch hat, and disciples joined their fortunes with his, many of low degree. It was a motley company that moved from place to place.

As he traveled, it became more and more evident to him that the traditional art of healing was on a false path. Its theories were false and its therapeutic methods were false. He began to keep a record of his own observations and ideas. He wrote, as he thought, in German, his mother-tongue.



The Alchemist Discovering Phosphorus by Joseph Wright

By the time he was thirty, Paracelsus was a mature man, and he had seen and learned much. He paid a visit to his father at Villach, went thence to Salzburg, and lived there for a time. Perhaps his wanderings might have ended had it not been for the Peasant's War which had broken out. In such times there could be no question of a tranquil practice, so Paracelsus set forth once more, to the Black Forest, to Freiburg, to Strasburg. He was weary of journeying, and longed for some fixed establishment, where he could continue his studies and elaborate his experiences and write. He enrolled as a citizen of Strasburg in December of 1526, but there was to be no prolonged stay.

At Basel, less than a hundred miles up the Rhine, the famous book printer Frobenius was seriously ill. Because of an accident five years before, he had horrible pains in the right foot, and the doctors of the town dreaded gangrene, thus they had advised amputation. But the fame of the wandering physician had reached Basel. Frobenius, before deciding to undergo this formidable operation, wished to get Paracelsus' opinion. Paracelsus came to Basel, took over the treatment, and was able to cure the patient without the use of the knife. Frobenium was soon well enough to ride all the way to Frankfort. The office of town physician fell vacant at this time and it was natural that the municipal council should offer him the appointment, which carried with it the right to give lectures at the university. In the spring of 1527 he transferred to Basel and immediately sketched a programme of reform, had it printed as a pamphlet and distributed.

It proclaimed what was wrong with the medical profession and ended by saying, "Farewell, and come with a good will to study our attempt to reform medicine." This the faculty considered a declaration of war along with the fact that he did not go through the usual formalities connected with obtaining such a position. (This included presenting diplomas and registering.) The faculty forbade Paracelsus to use the lecture-theatre, and wanted even to forbid his practicing in the town. A battle began. Paracelsus applied to the town council, which had summoned him to Basel, and insisted upon his right to use the lecture-theatre. With no regard for the storm of opposition he was arousing, he began his teaching activities, including giving surgical lectures in German rather than Latin, and publicly burning the works of Galen and Avicenna in a students' bonfire on St. John's Day. With increasing wrath the faculty watched the behavior of this innovator who was disregarding the forms sanctified by use, who was teaching unprecedented doctrines, and who regarded his colleagues as little better than idiots. They would have to fight him tooth and nail if they wished to maintain their own positions. His stay in Basel lasted only ten months; in February 1528 he left the city to renew a migratory existence. His brief career as a university teacher was a momentous one, for he never lost the sense of injury and disillusionment in his future writings. For thirteen years he wandered, wrote, and was driven by poverty.

He was in Carinthia when Prince Ernest of Bavaria, a patron of the natural science, summoned him to Salzburg. He followed the call, but died, prematurely worn out, in September, 1541 at the age of forty-nine years. Legend has many causes for his death. His friends said that he was murdered by an assassin and his enemies said that he died in a drunken brawl. However, modern research has shown that both of these are probably false, since he suffered from childhood from rickets and three days before his death he dictated to a notary-public his last will and testament. The epitaph he composed for his gravestone reads:

Here lies buried Philipp Theophrastus: the famous doctor of medicine who cured wounds, leprosy, gout, dropsy and other incurable diseases of the body with wonderful knowledge and who gave his goods to be divided and distributed among the poor. In the year 1541 on the 24th day of September, he exchanged life for death. To the living peace, to the entombed eternal rest.

The Paracelsian View of Nature and Man's Image

His great aim was to break the bonds of ancient authority and accepted dogma and open the way for a science based on open-minded experience, experiment, and observation or, as Paracelsus would say, "On the Light of Nature." To our modern view, much of this would be occult or supernatural, since it deals with the influence of the stars upon the life and health of men, as well as with many other mystic and mysterious phenomena. For him, the phenomena of nature, whether seen or hidden, were the revelation of God and God's will. Though his natural philosophy was deeply rooted in the neo-Platonic philosophy of the Florentine Academy, Paracelsus was too much an original thinker to be a strict adherent to this or any other form of philosophy. One of the fundamental concepts of this neo-Platonic philosophy was the interrelation of all phenomena of the universe, in that every phenomenon has an influence on every other. As the earth was thought to be the center of the external universe; man being the microcosm with the external universe the macrocosm. Through their spirits and occult properties, all things in the external universe, sun, moon, stars, planets, animals, metals, and waters exerted definite influences upon man. The opposite was also thought to be true-that man through knowledge and wisdom would be able to exert an influence on the powers of nature in marvelous occult ways. Jacobi quotes Paracelsus as saying:

> The created world has been given to man in order that he may fulfill it. More than that: man's original and specific mission is to lead it to perfection; he has been placed in the world solely for this purpose.

The medieval hermetic alchemy of the transmutation of metals was not only a chemical process, but in addition, a spiritual and psychic process symbolic of the pattern that was followed by everything in creation. The four main pillars on which Paracelsus founded his science were: philosophy, the science of the material and elemental aspect of creation; astronomy, the science of the sidereal aspect of creation (these two in their interrelations and their essence are the prerequisites for penetrating the structure of men); alchemy, the science of the natural phenomena and their intermeanings; and virtue (proprietas) the fourth pillar, which gives the necessary support without which the other three pillars could never be solid.

This resolves itself in the hands of Paracelsus into a recognition of, and obedience to, the will of God and to his direction of the universe through the powers of nature and the teachings of Christ. No man can be a good physician unless his concept of the medical mission is based on love and ethics. He rejected the four Aristotelian elements of fire, air, earth, and water and substituted for them his three alchemical elements: Mercury, the principle of liquidity and volatility; Sulphur, the principle of combustibility; and Salt, that which is permanent and resists the action of fire.

Water was the matrix (womb) of the world and it became the matrix of man. God created man to give His spirit a dwelling place in the flesh. God made a body from the trinity of Mercury, Sulphur, and Salt, and after it was created, it was endowed with spirit of life. From this it call be seen that for Paracelsus, man has an animal body and a sidereal body that gives it life. Man, therefore, is an image of the macrocosm or the "great creature," but man is the microcosm. Paracelsus had the Aristotelian viewpoint about women, i.e., they are merely a vessel. Paracelsus states:

> Woman is like the field in which the child is sewn and planted. She is the material womb (matrix) of man like a tree bearing fruit. Man is like the fruit that this tree bears.

He goes further to say that good fruit comes only from good seed and that God left the planting of the seed to the decision of man and that this decision depends upon man's will. This free decision lies with both man and woman-it requires both to have the desire for the planting. From this it can be seen that Paracelsus did not follow the philosophy of the Franciscan Friar, William of Occam (1290-1350), who was a critical disciple of Aristotle. Rather he followed the school of Duns Scotus (1265-1308) another Franciscan who was much closer to Plato than to Aristotle. The Occamites believed in predestination, but as can be seen from the above, Paracelsus believed in Free Will.

> Man's wisdom is in no way subjugated, and is no one's slave; it has not renounced or surrendered its freedom. Therefore the stars must obey man and be subject to him, and not he to the stars. Even if he is a child of Saturn and Saturn has overshadowed his birth, he can still escape Saturn's influence, he can master Saturn and become a child of the sun.

From the above quotation it can be seen that Paracelsus did not agree whole-heartedly with the almost universal belief in the influence of the stars. This customary mythical interpretation, concerning the nature of the influence exerted by the heavenly bodies on man, was popular until the middle of the 1700's, Paracelsus and his writings to the contrary.

Paracelsian View of Disease

H. Ranzau (1676) makes the statement that the first cause of disease was the fall of the first man into sin and that the second cause was the influence of the stars (astrology). These statements may be accepted as representing the conventional and purely mystical view of the matter. Since the main interest of Paracelsus lay in medicine and since he rejected the ancient authorities on both the theory and practice of medicine, it does not seem out of place to discuss his theories on that subject. He made great effort to harmonize this with his philosophy of nature and the results of his experience and observation. To this question as to the causes of disease, Paracelsus distinguished five causes of disease or five principles. They might be called powers or realms. They were:

1. Ens Astri (the influence of the stars; astrology)
2. Ens Veneni (the influence of poisons)
3. Ens Naturale (the influence which exists in the nature of the individual, the microcosm)
4. Ens Spirituale (the influences acting not directly upon the body, but through the spirit)
5. Ens Dei (the influence of the will of God acting directly to produce illness by way of warning or punishment)

With respect to the first principle, we have already seen that he recognizes the influence of the stars without admitting their control on the destinies of man. In his discussion of the second influence, he points out that the body was given to us without poison, but that we must give the body food, and this food contains poison. In the body the food and poison must be separated. This separation is effected by the Archaeus (a directing force or spirit) which is situated in the stomach. As long as the Archaeus performs properly the body thrives; but should it become ill or incapacitated, the separation is incomplete and the body suffers.

The third influence or principle (Ens Naturale) is somewhat more complicated. Man, the microcosm, was for Paracelsus the epitome of the macrocosm, and in man the counterparts of all the external universe were to be found. Just as the external universe has its sun, moon, and planets, so the microcosm has its sun, moon, and planets. For example, the brain corresponds to the moon, the lungs correspond to Mercury, the liver to Jupiter, the kidneys to Venus, the gall to Mars, and the sun to the heart. Each of these, like the heavenly bodies, have their predestined and predetermined courses.

In regard to the fourth influence, present day thinking would consider it fantastic and fanciful, but remember that in Paracelsus' day witches and sorcerers were tortured and burned. To Paracelsus, however, this Ens Spirituale was neither the soul nor the devil nor any of the devil's effects. In short, these were the diseases of mental disarrangement. In the Ens Dei he recognizes the influence of a will of God upon the health of men, but rather than accept the theology of the time, he emphasizes the idea that God prefers to work through nature, rather than by a direct interference.

There are five causes of disease, so there must be, according to Paracelsus, five kinds of doctors. However, Paracelsus did not state how his five categories of doctors were supposed to fit the five kinds of diseases. Apparently, any "doctor" may treat any "power" of disease. The following is a list of the types of doctors as described by Paracelsus:

1. Naturales, who treated contraries with contraries.
2. Specific, who empirically used specific remedies.
3. Characterales, who treat "like with like."
4. Spiritales, who used chemical drugs in connection with mental disturbances.
5. "Christ and the Apostles," who intervened between man and God.

To quote Paracelsus:

> "The physician is a servant of nature,
> and God is the master of nature."

Paracelsian View of Death and Satan

Paracelsus was an active thinker and writer on theology, but until recently little notice has been taken of this. Two quotations are given below to point out his view on the devil and on death. In the preceding discussion man's relation to God and the Cosmos has been adequately covered.

> *God's enemy is the devil, Satan and Beelzebub, for the truth cannot be without adversaries. God is the supreme truth and the devil the supreme lie. Only the devil cannot appear before God, he cannot confront Him, and the sight of God is forbidden him. But man, who was created as God's vicar on earth, can be lead astray and assailed by the devil.*

> *A man's death is nothing but the end of his daily work, an expiration of air, the consummation of his own balsamic curative power, the extinction of the rational light of nature, and a great desperation of the three-body, soul, and spirit-a return to the womb.*

Conclusion

Paracelsus was a true child of the Reformation. He illustrates its independence, its self-confidence, its boldness of thought, as well as its confusion of old and new ideals, and its struggle to free itself from the bondage of tradition. During the last four centuries the name and fame of Paracelsus has been identified as the man who was Faust in legend and poetry. He has been surrounded with a legendary haze and has been believed to be inspired by God or by the devil! Many regard him as the most profound mind in German culture, while others dismiss him as a charlatan. It is recognized that he left a distinct imprint on medicine and chemistry, though there has been much difference of opinion as to whether that influence was beneficial or detrimental. Modern mystics have found in his writings a fertile source of the revelation of the occult, while scientists have found in his doctrines the necessary foundation for observation and experimentation of the modern scientific method. Evidently all of this cannot be true, and an attempt was made by this writer to discover and estimate his real personality and influence.

Paracelsus, with his humanistic outlook on man, felt man capable or transcending above the astrological influence of the stars by wisdom. This wisdom was acquired by the direct study of nature, whenever, and whenever possible. Above all, he did not study nature in the classroom or by consulting the ancient lore, but rather by going to nature itself, Paracelsus felt misunderstood, and he was quite bitter about the misunderstanding and opposition which was with him throughout his lifetime. Even during his last hour he did not forget his enemies. The Psalms which he ordained be sung at his burial read.

Blessed is the man
who walks not in the counsel of the wicked,
    nor stands in the way of sinners,
    nor sits in the seat of scoffers;
    but his delight is in the law of the Lord
    and on his law he meditates day and night.
O Lord my God, in thee do I take refuge;
save me from all my pursuers, and deliver me,
lest like a lion they rend men,
dragging me away, and none to rescue.
How long, O Lord? Wilt thou forget me forever?
How long wilt thou hide thy face from me?
How long must I bear pain in my soul,
and have sorrow in my heart all the day?
How long shall my enemy be exalted over me?

Paracelsus was a Utopian. He over-estimated the possibilities of his science. He strove to discover truths for which the science of his age had neither definition nor method of verification. He tried to grasp the whole before knowing the details. His concepts are poorly defined, and his language shows a struggle with words. Paracelsus belongs to the great men of history as one who explored the darkness and struggled with the truth before knowledge and language had ripened enough to formulate it.

"He will always be remembered for the introduction of many chemical remedies. But he did infinitely more in that he attacked the basic problems of the healing art, asking for the how and why. He was a scientist in search of a philosophy of medicine. He used the experiences of medicine and science as materials in order to create a synthesis. He wanted to understand the world in which he was living and man's part in it in health and disease. His approach to the problems was that of a vitalist and spiritualist."

In all of his studies, he never lost sight of the ultimate aim of science: to know the nature of Nature.

Cagliostro: Charlatan, Alchemist, and Impostor

By William S. Keezer, M.D., Epsilon 1941

The philosophers of the Eighteenth Century tried to prove that everything or almost everything in the world moved according to unchangeable and predictable physical laws. It was the last period in the history of Western Europe that human omniscience was thought to be an attainable goal. The people of Europe enjoyed an increasing prosperity, and Central Europe recovered steadily from the Thirty Years' War. Educated and imaginative men saw the world as a scene in which superficial pleasure was the goal. The Eighteenth Century was one of comedy, into which near its end, came grim revolution, both in France and America. It was into this century of comedy followed by grim reality, that the "Prince of Quacks" and perhaps the greatest charlatan of all times was born.

Count Alessandro Di Cagliostro, whose real name was Giuseppe Balsamo, lived from 1743 to 1795. He has been considered the greatest mystic and imposter of all times. This point of view was fostered by Thomas Carlyle, the Scottish historian. However, recent research has shown that Cagliostro was not quite the quack and scoundrel that previously he was presented as being. His father was of humble origin and died young, leaving Giuseppe's mother nearly destitute. He went to the seminary school, but he frequently ran away, and was usually found in unsavory surroundings. He was sent to a Benedictine Monastery School where he was put directly under the supervision of the Father Superior. It was from the apothecary attached to the monastery that he learned the principles of chemistry and medicine. He was much more interested in learning astonishing and surprising chemical combinations rather than gaining any useful factual knowledge. After a few years, he escaped from the monastery and returned to Palermo. He associated solely with rascals and vagabonds, spending many a night in jail. He robbed his uncle of a considerable sum of money when that kind man tried to assist him. It has been said that when he was only fourteen, he assisted in assassination of one of the wealthy canons of the local Roman Church.

As he grew older, he also grew bolder, and tired of these lesser excursions into crime. About the age of seventeen, he laid the foundations of his fortune, for in Palermo lived a goldsmith named Marano, who was very superstitious and believed whole heartedly in the effectiveness of magical occult powers. Cagliostro soon made his acquaintance and convinced him that he was a "real master of magic" and a true alchemist. He convinced the goldsmith that in a field near Palermo lay a large amount of buried treasure. Its exact location could only be found by the aid of magical incantations, for these occult mysteries, sixty ounces of pure gold would be needed. It was only with moderate difficulty that Cagliostro was able to convince the superstitious goldsmith to furnish this. They went to the field together at midnight and Cagliostro began his dreadful incantations. These disturbed poor Marano so badly that he fell prostrate upon his ground, and in this position he was attacked by the scoundrels collected by Cagliostro for the occasion. Cagliostro narrowly escaped capture by the local authorities and fled to Messina.

It was in Messina that Cagliostro adopted the title of "Count" and met with Althotas. This mysterious person was dressed as an oriental, with caftan and robes and was accompanied by an Albanian greyhound. Cagliostro and Althotas became friends immediately, and the "Count" took lessons from him in Alchemy and the cognate sciences. Althotas was a believer in the mutability of physical law rather than in magic. Magic, to Althotas, was a fixed science with laws both discoverable and reducible to reason. These two soon departed for Egypt, and while on shipboard Althotas told the "Count" of his past life. His early years were spend in Tunis on the Barbary Coast as a slave to a wealthy Moslem pirate. At the age of twelve he spoke Arabic fluently, and had studied Botany. His master died when he was sixteen and left him a large sum of gold, along with his freedom. Althotas then spent his time traveling and studying alchemy, chemistry and botany. The Greek, Althotas, has remained a mystery to this day and only scant evidence of his actual existence was available-that being in the memoir of the "Count" himself.

While in Egypt Cagliostro and Althotas visited the Pyramids and temples, studied hidden knowledge of practical occultism, and visited "secret" cave storehouses of human knowledge. From there they went to Arabia, Persia, and finally to Malta. It was there they curried the favor of the Grand-Master of the Maltese Order. Pinto was infatuated by alchemical experiments, and gave Cagliostro funds and letters of introduction to the great houses of Rome and Naples. In the Memoirs of Cagliostro the following account is given:

> It was in the island of Malta that I had the misfortune of losing my best friend and master, the wisest as well as the most learned of men, the venerable Althotas…
>
> The spot where I had parted for ever from the friend who had been as a father to me, soon became odious. I begged leave of the Grand-Master to quit the island in order to travel over Europe; he consented reluctantly…
>
> In the capital of the Christian World (Rome) I resolved upon keening the strictest incognito. One morning as I was shut up in my apartment, endeavoring to improve myself in the Italian language, my valet introduced to my presence the secretary of Cardinal Orsini, who requested me to wait on his Eminence. I repaired at once to his place and was received with the most flattering civility. The Cardinal often invited me to his table and procured me the acquaintance of several cardinals and Roman princes…

From this account it can be seen Cagliostro had no lack of dupes while in Rome. He was established as an "Empiric-physician," retailing specifics for all diseases of the flesh. Money flowed in and he lived in considerable luxury. It was at this time that he met the young and beautiful Lorenza Feliciani and married her. With her he traveled to Venice, Sardinia, and Spain; in each case Cagliostro's rogueries caused them to leave in haste. From Lisbon, they sailed to England (1771), and here he sold lovephiltres, elixirs of youth, mixtures for making ugly women beautiful, alchemistic powders, and the like, and derived large profits from his trade. It was the period of mystic enthusiasm in Europe! Princes, Bishops, and the nobility in general were keen to probe the secrets of nature, and alchemy and its allied sciences were the pursuits and hobbies of the wealthy.

After further travels on the continent; Paris, Brussels, Palermo, Malta, Naples, Marseilles, and Barcelona, he returned to London. It was during this second visit to London that he posed as the founder of a new system of Free-Masonry, known as the Egyptian Masonry, which abounded with magical and mystical references and rites. He was received in the best society and was adored by the ladies. The episode ended as always; he and his wife made a harassed tour of Holland, Italy, and Germany. In Germany he met the celebrated Rosicrucian, Count de Saint Germain. The interview was typically mysterious and ritualistic, again we have only Cagliostro's Memoirs to go on. Following this period the "Count" became more active in founding Egyptian Freemasonry and the usual group of "high-born" persons flocked to the couple's "lodges." He had also set himself up as a physician again, and was credited with a large number of miraculous cures. His methods were a species of "laying on of hands" and hypnotism. For the next years he acquired wealth and fame in Germany, Russia, and Holland. While he was in Strasburg, Germany, and as a close friend of Cardinal de Rohan, Cagliostro is said to have transmuted base metals into gold and found the elixir of life.

Returning to Paris in 1785, he was introduced to the Court of Louis XVI and evoked apparitions in mirrors before large audiences. His wife affected great privacy and appeared only before a very select company, and then in a diaphanous white costume. All of this added to his wealth, fame, and mystery! The Egyptian-Masonic rite was androgynal (admitting both men and women) and consisted of a mystical-sexual ceremony. The initiation took place at midnight, with the ladies clothed in thin white robes. Following various mystical oaths and harangues, they disrobed completely and were informed that the Egyptian Freemasonry taught material happiness and spiritual peace and pleasure. The entire ritual ended with reveling and dancing, and the presentation of a pair of garters to the men, for their favorite mistress, or a cockade to the ladies, to give to their favorite lover.

It was during this stay in Paris that Cagliostro, now calling himself the "Grand Copt," was implicated in the affair of the "Diamond Necklace." The central figures in this affair were Cardinal de Rohan, grand almoner of France and Archbishop of Strasburg; his mistress, an adventuress known as the Countess de La Motte; Queen Marie Antoinette; and Boehmer and Bassenge, a firm of Parisian jewelers. It was through his friendship with the Cardinal that Cagliostro was involved. The story was typical of the theatrical, so loved by the "Count"! The necklace had been ordered by Louis XV for his mistress, Madame du Barry, but the king died before its completion. The Cardinal was in disfavor at the French Court, but was duped by the Countess de La Motte into believing that, through her influence, he could secure the patronage of the Queen and became her paramour. The Countess arranged a series of midnight trysts between the Cardinal and Mademoiselle Olivia, a poor unfortunate who closely resembled Marie Antoinette. The meetings were in the garden of the Palace of Versailles and Rohan was easily convinced. He was persuaded that the Queen wanted the diamond necklace and would buy it, if he would provide the surety. The necklace was delivered, and the Countess de La Motte speedily broke it up. Matters went well till the first installment came due, and the jewelers complained to the police. The King had the Countess de La Motte, the Cardinal, Cagliostro, and his wife all arrested and sent to the Bastille.

It was Countess de La Motte who had charged Cagliostro with the robbery of the necklace and invented, for him, a terrible past; calling him an empiric alchemist, false prophet, and a Jew. Cagliostro easily proved his complete innocence, but, as was expected, provided the comedy to this drama. He provided the French public with one of the most romantic and fanciful of life stories in the history of autobiography. This account was undoubtedly a plagiarism of the life of the Chief of the Rosicrucian Brotherhood. Although proven innocent he was banished and went to London. While in London his downfall began; he was imprisoned in the Fleet Prison; a French newspaper printed a so-called exposure of his real life; and his reputation was lost. Leaving England, he traveled through Europe, but was unable to find rest. He finally went to Rome, and his wife accompanied him.

At first he did fairly well, living quietly and practicing medicine, but he made his final mistake-he attempted to form an Egyptian lodge under the very noses of the Roman Church. He was arrested on the 27th of September of 1789 and tried by the Holy Inquisition. His examination had taken a total of eighteen months and resulted in the death sentence. The Pope commuted it to perpetual imprisonment in the fortress prison of San Leo. His cell was a dried up cistern, where he languished for three years without fresh air, movement, or intercourse with his fellow-creatures. He died in March of 1795. Meanwhile, his wife had been confirmed in the Convent of St. Appolonia, where she
died in 1794.

It is no easy matter to get at the truth regarding Cagliostro or to form a true estimate of his character. He was vain, naturally pompous, fond of theatrical mystery, and of the popular side of the occult. He also was a "little mad" and loved cheap popularity. There is reason to believe that he had in some way and at some time in his life acquired a certain practical working knowledge of the occult. He also possessed certain elementary psychic powers of hypnotism and telepathy. On the whole, Cagliostro is a mystery, yet he was one of the most picturesque figures in Eighteenth Century Europe.

Count Cagliostro and Egyptian Masonry

By Webster N. Jones, Delta 1908
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Dr. Jones has been director of the College of Engineering, Carnegie Institute of Technology at Pittsburgh since 1932. Previous to that he was general superintendent of the Processing Division of the B. F. Goodrich Company. Also for some ten years Dr. Jones engaged in educational work and taught at Purdue, Harvard, Maine, Missouri, and Montana. While with Goodrich he was largely responsible for the development of a training school which prepared young men of talent for service in the Goodrich organization. He is active in the affairs of the American Chemical Society and the American Institute of Chemical Engineers of which he is now president… Brother Jones is a graduate of the University of Missouri where he received both his bachelor's and master's degrees. His graduate work was completed at Harvard where he was granted his Ph.D. He was initiated into Delta chapter in 1908 and appears upon the fraternity records as the twenty-first member of Delta and the one-hundred and ninety-seventh member in the fraternity… "Web" to his friends, and he bears the distinction of being one of the "Missouri boys" of whom Dr. Herman Schlundt, Delta 1906, was so genuinely proud.-The Editors.

Thousands of young Alpha Chi Sigma men have been as much impressed as I by the famed Cagliostro, mystic, philosopher, alchemist. His exploits attracted the attention of such great authors as Goethe and Carlyle. How many of us, however, know the real Cagliostro, the details of his life, the stir he made in his day, or the extent of his contribution? A glance into the past reveals to us a most curious figure in an era of great change, a man who was probably one of the most consummate frauds of all time.

In Palermo, Sicily, in 1743, a son was born to one Signor Pietro Balsamo and his wife, Felicita, keepers of a small shop. The child was christened Giueseppe, but as he grew he was nicknamed Beppo, and later Beppo Maldetto by the angry housewives in his neighborhood, from whom he filched continually. For early in his career, Beppo showed a strong inclination to follow the devious path toward scoundrelism, exploring the meanest byroads along the way. Although many other rascals have traveled this path, his footprints have been preserved to be marveled at even today.

It may have been the extreme poverty of Beppo's family which led him early in his youth to petty thievery. Inherent, however, were his brutal manner with smaller children, his tendency to bully those weaker than himself. His escapades were well known, and nearly drove his mother to distraction. She endeavored to right him, and, under constant pressure from her, he finally agreed to learn a trade. This attempt to better himself, however, proved to be too great a strain on Beppo. He frequently ran away from the Seminary of St. Roch, where his wealthy maternal uncle had placed him for training. At last, the despair of his teachers, he was expelled and sent home. Beppo now saw the wisdom of choosing a suitable profession, since added pressure had been applied after he left the Seminary. Considering the life he had led thus far, he made a strange choice-the ecclesiastical profession. It seemed to him to provide more leisure and less work than any other; therefore, the young scoundrel entered the Convent of Cartegirone, near his home. To his surprise, life there was most interesting for a time. The convent apothecary, who had been asked to look after him, found the boy a willing listener, and soon Beppo had learned many of the principles of the arts of chemistry and medicine. After a while, however, he became bored with life at the convent. He was learning much, it is true; but so doing, he was compelled to work hard, a condition that he found most annoying and unsatisfactory. Accordingly, he reverted to his old practices and in a short time was being punished by the monks for his malicious pranks. Perhaps he realized that their prayers for him were useless. At any rate he left the convent without acquiring any moral scruples and, in order to pacify his mother, pretended for a time to be interested in the profession of painting. Under the cover of this activity he began his real life's work. The rudiments of chemistry learned at the convent proved to be most useful, and soon he was making a good living by fortune telling, showing visions by the use of phosphorus. He has also learned some sleight of hand. All in all, he had managed to compile a bag of tricks that was to assure him of the plaudits and gold of the ignorant and superstitious. It is easy to imagine his fat, pudgy hands flying about to perform his magic, his small eyes, in a round innocent face, slyly watching the crowd for its response. To the unsuspicious, he seemed the very essence of honor and truthfulness. Not until he had deprived them of their hard-earned money did they begin to wonder and to talk. As Beppo's income increased, this buzz of amazement grew, into a mighty road. He seemed to sense what was coming, since he alone was aware of the enormity of his trickery. After an incident in which divining rods, devils, and buried treasure were involved, he left town in haste, the Law panting at his heels.

For the remainder of his life, Beppo was but one step ahead of the Law or in the process of wriggling away from its grasp. Yet in spite of this handicap, he managed to continue to practice his profession and to increase his wealth. He traveled in great style and gorged himself with rich food to compensate for his impoverished, hungry childhood. It was at this time that he met and won the woman who was to become him partner in crime. Little is known of Lorenza Feliciana except that she possessed compelling beauty-an asset of inestimable worth to Beppo. It may be supposed, also, that her morals were on a par with his. At any rate, she quickly learned the principles of his profession, and they set out together as the Count and Countess Cagliostro to seek new wealth and acclaim.

The travels of this impudent pair took them to most of the major cities of Europe, where they acquired many followers, including people of rank and influence. They appeared in each new location with forged credentials and immediately set about to defraud as many victims as possible before the inevitable discovery. Finally the Count was so vain as to return to Palermo, believing, no doubt, that his apparent wealth and the beauty of his mate would so impress the townspeople that the old charges against him would be forgotten. Imagine his surprise, then, when he was seized and thrown into prison almost the moment he set foot in the town. His protestations were of no avail, and for a time it seemed that he was in serious trouble. The townspeople, however, reckoned without his beautiful partner. As clever and wily as her mate, she managed to find a protector in one of the landed gentry, and the charges against Beppo were withdrawn.

In 1776 the Count and Countess appeared in London and were soon involved in the most expert scheme they were ever to handle. Freemasonry, which was at that time flourishing in England, had just undergone a searching examination by order of the government and had come through with flying colors and increased popularity. Here Beppo perceived the chance for a grand coup. He joined one of the lodges and was finally acclaimed a Master Mason. He now set about to evolve a system called "Occult Freemasonry," which combined his knowledge of occultism with the information he had gleaned on Freemasonry. He declared that it was his purpose to perfect Egyptian Masonry, and he promised his eager followers, both men and women, a complete moral and physical regeneration. By means of fasts and long vigils he reduced them to a weakened state, so that they were only dimly aware of what was going on about them. The rituals through which they were then put served to impress upon them the powers of the supernatural and to develop in them an awe of the Count, who seemed to them to be of another world. Some thought of him as the Wandering Jew, and he did not attempt to correct those who believed him to be several centuries old. This gave him an air of mystery, which was heightened by the fact that he seemed to have no difficulty in discussing his means of salvation for hours. Such a flow of language seemed remarkable in a man of such little education unless one noticed that his followers applauded his every word and idea, no matter how commonplace. His principles spread with such rapidity that soon he was acclaimed over all Europe; his portrait adorned millions of homes, He went to France, and it is thought that he had a hand in bringing about the French Revolution through his immense power.

As usually happens in cases of this sort, the Count overestimated his strength. Perhaps he began to believe, as did his followers, that he was endowed with supernatural powers. At any rate, he endeavored to foresee the future of persons close to the Queen. His prediction proved to be false, and he was thrown into the Bastille, where he languished for nine months. It may be that this fact disillusioned his followers; on the other hand, they had been duped for such a length of time that it was only natural for them to begin to show suspicion and a little hostility. When the Count was released from prison, he was asked to leave France. He now attempted to start up anew in England, but found it impossible. His enemies, while he was imprisoned, had been strengthening the case against him, and there was no one to whom he could turn for support. French spies followed him to England; he tried flight to Bole, Bienne, and Trent, but everywhere he was received with hostility. To make his defeat even more complete, the Countess, who unfortunately was no longer attractive, began to pine for her home. He finally took her to Rome in 1789.

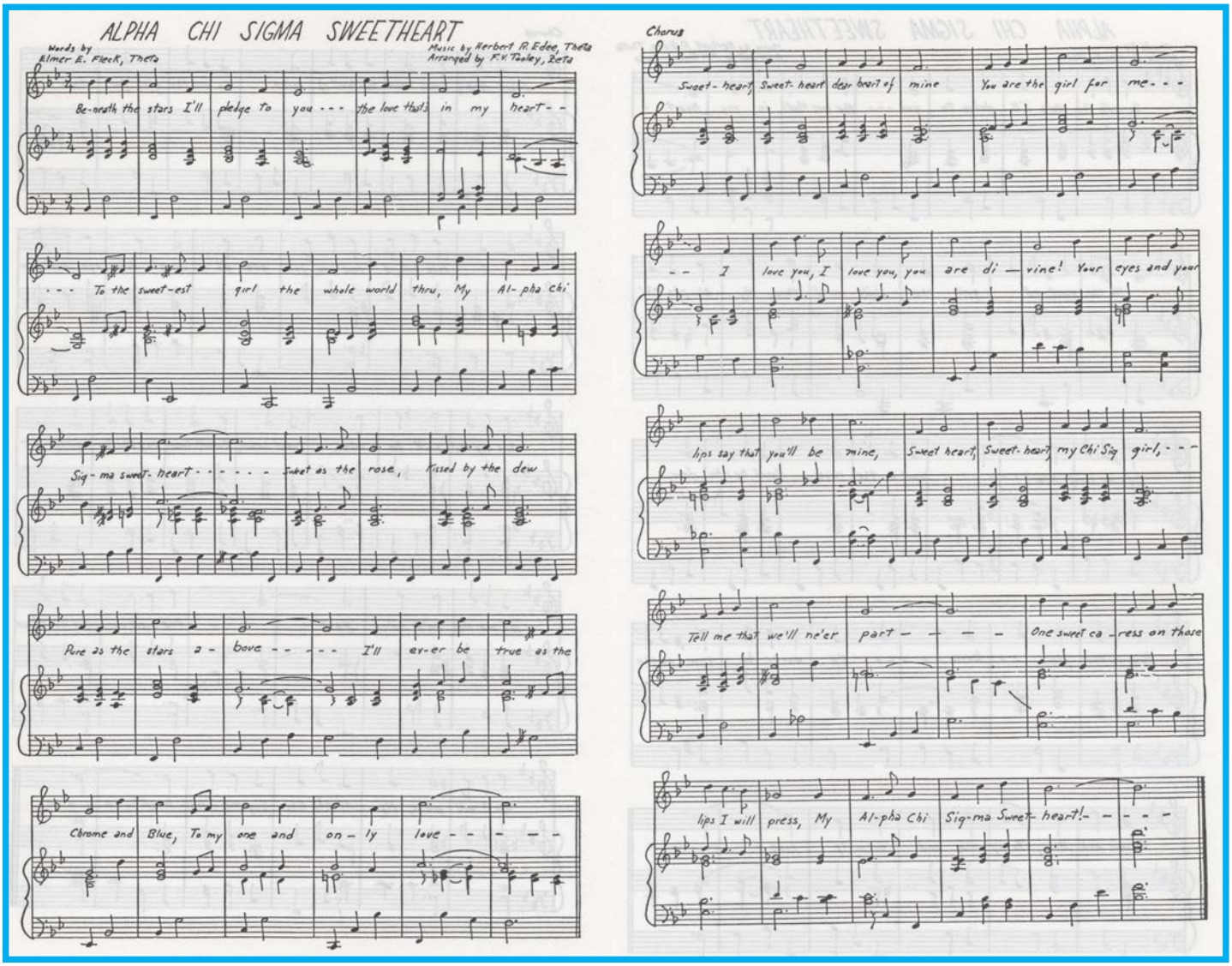
This trip proved to be the final one for the Count and Countess Cagliostro. It would probably have been the same wherever they turned. Even at such a late date the Count might have been able to save them if he had been able to resist the temptation to take up Egyptian Masonry again. However, he could not neglect any possible source of wealth. In the same year that he took the Countess to Rome, he was arrested on charges of heresy. All might have been well even then had not the Countess confessed to the authorities and implicated her mate to such an extent that his conviction was assured.

This was the final blow to the defense structure Cagliostro had been attempting to build. After an imprisonment of eighteen months, he was given a life sentence, and his manuscript on Egyptian Masonry was burned. He appealed in vain for help to those who once had looked at him with awe. Perhaps they saw him at last as the arrogant, greedy scoundrel who had robbed them of their gold and given them in return a parcel of false beliefs. At least it is known that they turned a deaf ear to the pleadings which once would have roused them to a hysterical show of devotion. Cagliostro was allowed to remain in jail for the following four years. In 1795 he died, an outcast, in the prison of St. Leo.

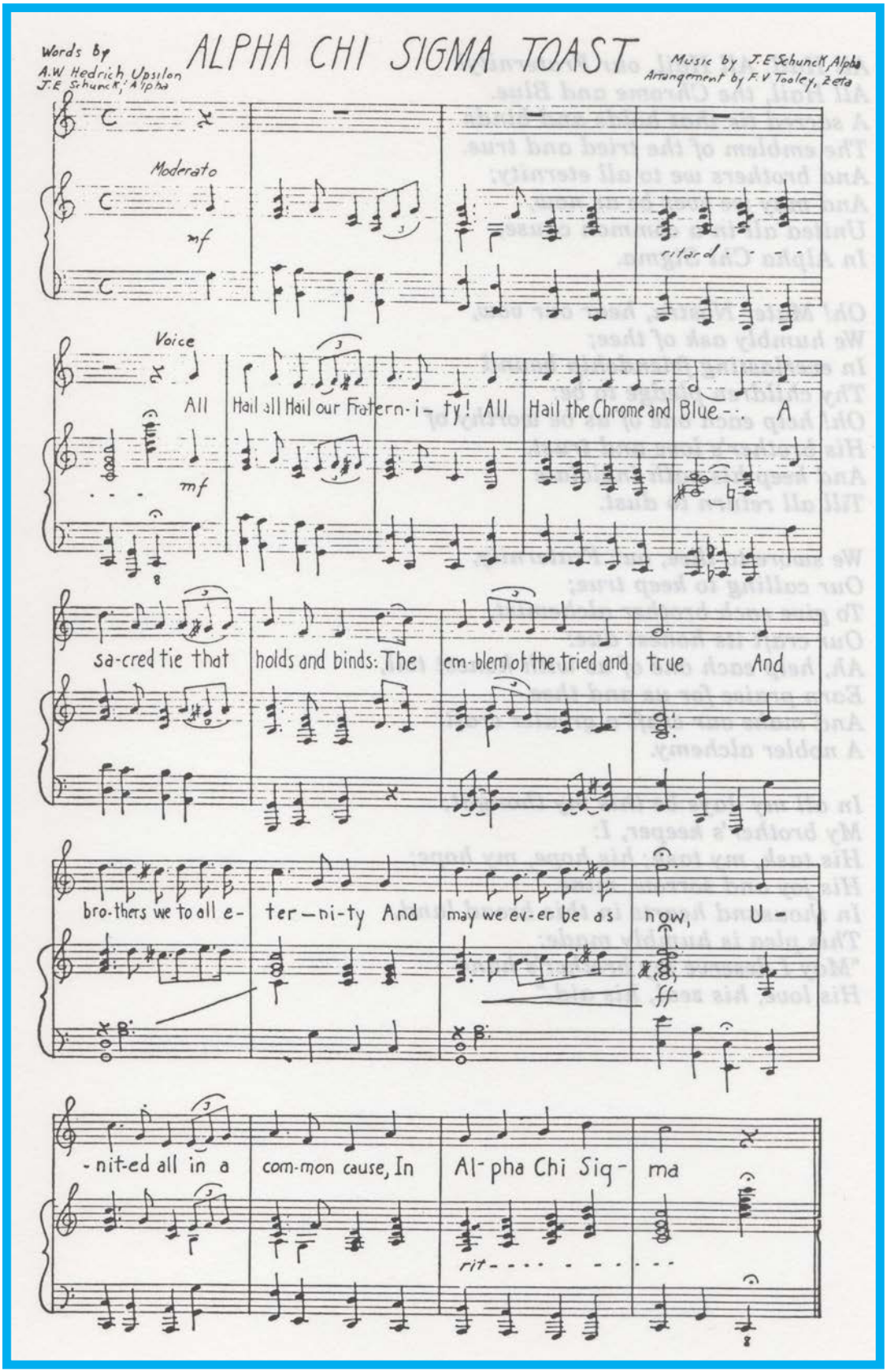
Thus is recorded the eventful life of one of history's greatest scoundrels. He was never bothered by even the faintest twinge of conscience; he could defraud and rob and, at the same time, roll his eyes piously toward Heaven; he had the audacity to appeal for help to those he had duped when the web of his own villainy began to tighten about him; and he was, no doubt, surprised and even a little hurt to find that the reins had slipped from his hands and were being held by those who had a better sense of direction than he.

{*Section* VI}
Songs and Toasts

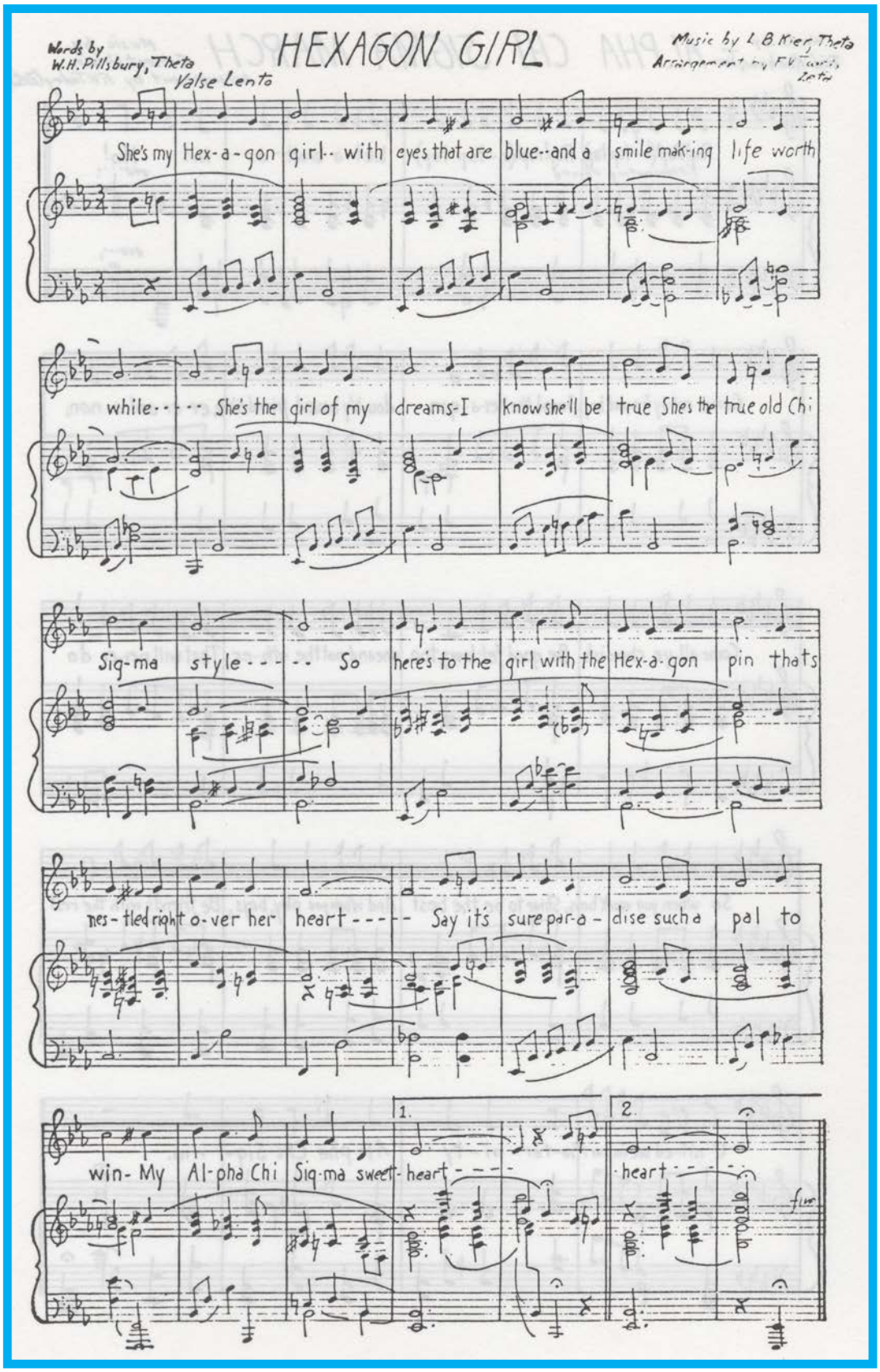
Alpha Chi Sigma Sweetheart



Alpha Chi Sigma Toast



Hexagon Girl



I'm Going to be a Chemist

To the tune of "It's a Long Way to Tipperary"
By Jerome Alexander
Used with permission

It's not easy to be a chemist,
It's a long way to go.
Qualitative, quantitative,
Must be accurate, you know.
Precipitation, then filtration,
Colloids make me tear my hair.
It's a long, hard road to be a chemist,
But my heart lives there.

Many curious carbon compounds,
In combustion I burn.
To my panic, bonds organic
Are too devious to learn.
Aliphatic, aromatic
Pyrrol, benzene or lactone ring?
It's a long, hard road to be a chemist,
But I will be that thing.

Then they fed me assorted physics,-
Mass Law, Phase Rule and light dart,
With mathematics, the fanatics,
Tore our atoms all apart.
Molecules we thought were stable,
Snapped in activated state,
O, I'm bound, I'm going to be a chemist
Working-early and late.

In a factory for experience
In a chemical technology-
Values and levers were deceivin',
All were mysteries to me.
How they work evaporators,
Autoclave, tank tower and still!
When at last I get to be a chemist,
I'll be thankful, I will!

The Thermodynamics Final

To the tune of "Battle Hymn of the Republic"
Author Unknown

Free energy and entropy were whirling in his brain,
With partial differentials and Greek letters in their train;
For delta, sigma, gamma, theta, epsilon and pi
We're 're driving him distracted as they danced before his eye.

Chorus
Glory, glory, dear old thermo,
Glory, glory, dear old thermo,
Glory, glory, dear old thermo,
I'll get you by and by.

Heat content and fugacity revolved within his mind,
Like molecules and atoms that you never have to wind,
With logarithmic functions doing cake-walks in his dreams
And partial molal quantities devouring chocolate creams.

Chorus

They asked him on the final if a mole of any gas
In a vessel with a membrane through which hydrogen could pass
Were compressed to half its volume, what the entropy would be,
If two-thirds delta sigma equaled half of delta P.

Chorus

He said he guessed the entropy would have to equal four,
Unless the second law would bring it up a couple more.
But then it might be seven, if the thermostat was good,
Or it might be almost zero if once rightly understood.

Chorus

The professor read his paper with a corrugated brow,
For he knew he'd have to grade it, but he didn't quite know how
Till a sudden inspiration on his cerebellum smote,
And he seized his trusty fountain pen and this is what he wrote:

Chorus

"Just as you guessed the entropy, I'll have to guess your grade,
But the second law won't raise it to the mark you might have made
For it might have been a hundred if your guesses had been good,
But I think it must be zero 'till they're rightly understood."

Chorus

Mineralogically Speaking

My love hath eyes like azurite
A cupric carbonate;
Her cheeks are red as hematite
She is conglomerate,
Of all that's precious, fair, and dear.
Her lips are cinnabar.
Though fair be treasures far and near
Yet she is fairer far.

Her hands and arm are magnesite
(That's $MgCO^3$).
Her hair is brown as sphalerite
(That's ZnS, you see).
She's slender as a laccolith
Of metamorphic rock;
A geologic wonder with-
A solid granite block!

The Chemists at Work

To the tune of "I've Been Working on the Railroad"

I've been working in Organic, all the livelong day.
I've been working on mercaptans, just to pass the time away.
Can't you smell them when you enter? The sweetest perfume I know,
And there's one thing sure that I can promise, they'll stay with you when you go.

Can't you hear the moving atoms, rearrange themselves?
Changing their configurations, just like the bottles on the shelves
Conjugated double bonding more electrons along
Hydrogens upon the carbons, sigma bonds made strong.

Once a chemist was producing an explosive new
But the temperature kept rising, and now he's rising too.
They say fame's ladder's bad for climbing, Consider the fellow in the air.
It's plain that chemistry is spreading in the field most everywhere.

The Calculus

A poem by John M. (Jack) May, Beta Delta 1972
(with apologies to Henry Wadsworth Longfellow)

My grades in school were falling fast
As through my freshman year I passed
My algebra was all a fake
And yet I knew I'd have to take
The Calculus!

The tests were bad, by grades beneath
The mean; a C was out of reach
And like a foreign language rung
The accents of that unknown tongue
The Calculus!

The limit of a Riemann sum
Confused me till my brain was numb
I studied every night and yet
I feared that I would never get
The Calculus!

"Oh, stay," the barmaid said, "and drink,
Another beer will help you think,"
A tear stood in my bloodshot eye
But still I answered with a sigh
"The Calculus!"

"Beware the guy who does the best.
Beware the awful final test."
This was my roommate's last goodnight
I studied till it blurred my sight
The Calculus!

At finals time I filled with dread
What hope for he with empty head
I gnashed my teeth, I moaned and wailed
When all was done, I knew I'd failed
The Calculus!

The Physical Chem

The following is a take-off on "The Jabberwocky" from "Through the Looking Glass" by Charles L. Dodgson (Lewis Carroll), written in 1872. It was written by J. Michael Jonte, Beta Phi 1973, in 1977 as a diversion while studying for cumulative exams at the University of Arizona. A short time later it "mysteriously appeared" on the back of a Physical Chemistry exam there. It was choreographed and presented in two-part harmony during "Hell Week 1977" at South Dakota School of Mines and Technology by Will Smith, Beta Phi 1975, as a technical communications (English 304) surprise project.

'Twas Bronsted and the Second Law
Did Gibbs and Duhem in the text.
Difficult were the graphs to draw
And the solutions all too complex.

Beware the Physical Chem, my son!
The laws that arn't, the constants that vary.
Beware the phlogiston, my little one
And of the molality be wary.

He took his entropy in hand
Long time the adiabatic foe he sought
So rested he by the delta T
And stood awhile in thought.

And as in Newtonian Thought he stood
The Physical Chem with Beer's Law Plot,
Came Bohring through the orbital wood
And took quantum leaps when hot!
PV! RT! And with fugacity,
The entropy discharged his wrath.
It reached a degenerate state, and being late,
He returned by the mean free path

"And hast thou passed the Physical Chem?
Come to my arms my ideal boy!
Oh, C sub V and Free energy!"
He virialed in his joy.

'Twas Bronsted and the Second Law
Did Gibbs and Duhem in the text.
Difficult were the graphs to draw
And the solutions all too complex.

Notes

The Greek Alphabet

English Spelling	Greek Capital Letter	Greek Lowercase Letter	Greek Capital Letter Spelling	Greek Lowercase Letter Spelling	Corresponding English Letter	Corresponding English Sound
Alpha	Α	α	ΑΛΦΑ	αλφα	a	ä
Beta	Β	β	ΒΗΤΑ	βητα	b	b
Gamma	Γ	γ	ΓΑΜΜΑ	γαμμα	g	g
Delta	Δ	δ	ΔΕΛΤΑ	δελτα	d	d
Epsilon	Ε	ε	ΕΨΙΛΟΝ	εψιλον	e	eh
Zeta	Ζ	ζ	ΖΗΤΑ	ζητα	z	z
Eta	Η	η	ΗΤΑ	ητα	e	aa
Theta	Θ	θ	ΘΗΤΑ	θητα	th	th
Iota	Ι	ι	ΙΟΤΑ	ιοτα	i	ee
Kappa	Κ	κ	ΚΑΠΠΑ	καππα	k	c, k
Lambda	Λ	λ	ΛΑΜΒΔΑ	λαμβδα	l	l
Mu	Μ	μ	ΜΥ	μυ	m	m
Nu	Ν	ν	ΝΥ	νυ	n	n
Xi	Ξ	ξ	ΞΙ	ξι	x	ks
Omicron	Ο	ο	ΟΜΙΚΡΟΝ	ομικρον	o	uh
Pi	Π	π	ΠΙ	πι	p	p
Rho	Ρ	ρ	ΡΩ	ρω	r	r
Sigma	Σ	σ	ΣΙΓΜΑ	σιγμα	s	s
Tau	Τ	τ	ΤΑΥ	ταυ	t	t
Upsilon	Υ	υ	ΥΨΙΛΟΝ	υψιλον	u	oo
Phi	Φ	φ	ΦΙ	φι	ph	f
Chi	Χ	χ	ΧΙ	χι	ch	k
Psi	Ψ	ψ	ΨΙ	ψι	ps	ps
Omega	Ω	ω	ΩΜΕΓΑ	ωμεγα	o	oh