



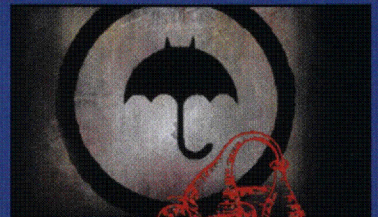
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SUMMER 2015

THE

# HEXAGON

*of Alpha Chi Sigma*





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Spring (March)	January 1
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**Chapters and groups:** Send stories of events, and don't forget photos. Send contact information as well.

**Alumni:** Personal and professional news is always welcome.

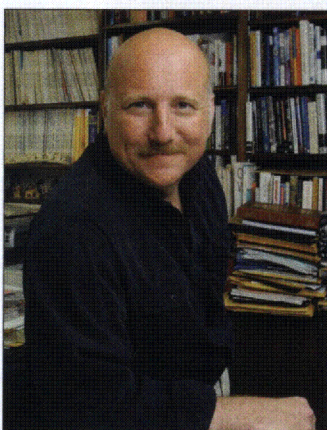
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## EDITORIAL

### Chemists and their Molecules



Brian P. Coppola, GE  
Alpha Beta 1988

Carl Djerassi died earlier this year, on January 30, at the age of 91.

Rightfully, many of Djerassi's obituaries highlighted his synthesis of the steroid hormone, norethisterone, which led to the development of the first oral contraceptive. This molecule is credited with nearly changing the course of human events overnight because of its highly visible effects on socio-sexual behaviors and a bunch of related cultural mores during the 1960s.

It is worth reflecting on the profound effect that all of our pharmaceutical molecules have had on all of our lives, and on our culture. In a little over a hundred years, we have gone from chewing on willow bark and applying pastes and liniments on our bodies, to having an impressive medicine cabinet from which we can extract all sorts of treatments.

Which is not to ignore over-prescription, or abuse, but I think, well above average, we truly benefit from these compounds. And although I have not needed to take too many medications in my life, so far, I have certainly been glad when they were there.

It's a pity we do not know more about the stories of the chemists who discovered, or contributed to the discovery, of most of these molecules, particularly the unnatural ones that were not pulled out of a natural product, which tend to be the headliners.

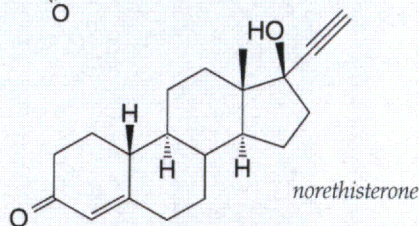
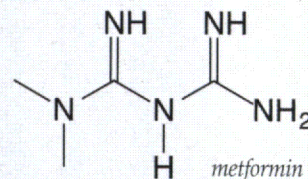
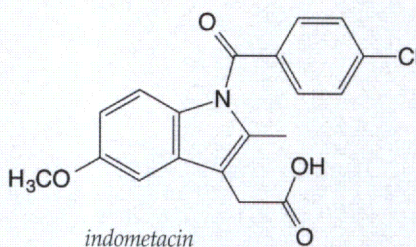
*"Hats off to aspirin,  
of course, and  
to acetaminophen."*

I'm personally grateful to whomever it was who brought indometacin to market, a super-aspirin-like anti-inflammatory that I took when I had a lung infection about 10 years ago.

Hats off to aspirin, of course, and to acetaminophen. And when I fly: to enoxaparin sodium.

Recently, I have become acquainted with metformin, a rather cute little molecule, which inhibits the production of free glucose from polysaccharides. I sort of wish I was not as familiar with the 1.5g of this molecule I am taking each day, but I'd be less happy if it was not there.

So, thanks.



### The Objects of Alpha Chi Sigma

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.



# FREE ELECTRONS

Jared DUSTHIMER, *Alpha Theta 2008*, welcomed daughter Iris Claire Dusthimer on December 27, 2014. She was 7 lbs 1.8 oz and 19 in long. Wife Katie and Jared are proud to be new parents, and are grateful for their happy and healthy daughter.

Joanna OSSINGER, *Tau 1995*, an editor for Bloomberg News, was installed as the new president of the Society of American Business Editors and Writers (SABEW), the largest association of business journalists, at its annual conference last week in Chicago. "SABEW is a great organization with a bright future, and I'm honored to be the new president," Ossinger said. "Our priorities for the year will include boosting our value to members via networking events and workshops that will provide even more training opportunities."

Richard SPONTAK, *Sigma 1984*, Alumni Distinguished Professor of Chemical & Biomolecular Engineering and Materials Science & Engineering at North Carolina State University, has been selected to receive three prominent accolades in recognition of his research in the field of soft functional materials. The Society of Plastics Engineers, the premier professional organization devoted exclusively to polymers, has chosen him for their 2015 International Award, the Society's most prestigious worldwide honor. He has been inducted as a fellow of the Royal Society of Chemistry, which is located in the United Kingdom and boasts such historical members as Sir Isaac Newton, Charles Darwin and Albert Einstein. He has also been elected a member of the Norwegian Academy of Technological Sciences, the equivalent of the American National Academy of Engineering, and will be inducted later this spring in an official ceremony in Oslo. In addition to his research, Spontak has received acclaim as an outstanding educator with a Fulbright Senior Specialist Award last year and various university and society teaching awards including the 2008 University of North Carolina System Board of Governors' Award for Excellence in Teaching.



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 Shrederick C. King  
 Thao T. Nguyen  
 Nichole Pianovich



## On the Cover

This model of the famous 20 mule team stands outside the Rio Tinto Borax Museum in Boron, California. The mule teams, which were operational 1883–1888, were created to carry borax out of Death Valley—"through 165 miles of desolate mountains and blistering deserts"—to the railroad junction at Mojave. The trip took 20 days to deliver 20 tons of borax. Only a portion of the 20 mules could be included in this photograph; the team stretches a long distance to the right, out of view. Photo by Jenny Marshall. ABOVE: The whole mule team.



# Rediscovery of the Elements

## Sir Humphry Davy and the Alkalis



James L. Marshall, *Beta Eta* 1971, and Virginia R. Marshall, *Beta Eta* 2003, Department of Chemistry, University of North Texas, Denton, TX 76203-5070, [jimm@unt.edu](mailto:jimm@unt.edu)

In a previous *HEXAGON* article on Joseph Black,<sup>1a</sup> the three alkalis known in the 1700s were listed: “vegetable alkali” (potash), “mineral alkali” (soda), and “volatile alkali” (ammonia).<sup>1b</sup> All were known to react vigorously with acids and “to change the color of syrup of violets to green.” Ammonia was apparently a compound of nitrogen and hydrogen,<sup>2a</sup> as shown by Claude Louis Berthollet (1748–1822) at his famous laboratory at Arcueil.<sup>1c</sup> It was natural, therefore, that Antoine-Laurent Lavoisier (1743–1794) himself, the “father of modern chemistry,”<sup>1b</sup> who first recognized the true elements and listed 31 that are now found in the Periodic Table,<sup>3</sup> would exclude the “fixed alkalis”—potash and soda—from his list,<sup>3</sup> because they might be compounds of nitrogen as well. Lavoisier was even unsure of whether potash, produced commercially by the incineration of plants, existed before possibly being created in the plants.<sup>2c</sup> He further speculated that “vegetable alkali” was synthesized from components in the atmosphere and “mineral alkali” was formed naturally in the sea.<sup>3</sup> The true nature of potash and soda was not clarified until the next century, at the Royal Institution in London (Figures 1, 2).

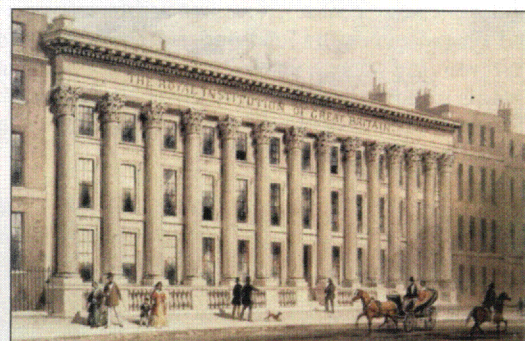
**The distinction between potassium and sodium.** Henri-Louis Duhamel du Monceau (1700–1782) was the first to differentiate clear-



Figure 1. Royal Institution, 21 Albemarle St. (N51° 30.58' W00° 08.55'), was founded in 1799 and has not changed its location since. The Institution was founded by Sir Benjamin Thompson, Count Rumford (1753–1814), an American born British scientist who through observing the boring of cannons realized heat was created by friction.<sup>10,11a</sup>

His colorful history included his 1804 marriage to Marie-Anne Lavoisier, the widow of the famous Antoine Lavoisier.<sup>11a</sup>

Figure 2. Royal Institution, appearance in 1838 (painting by Thomas H. Shepherd, 1793–1864). At this time Michael Faraday was prominent among its scientists, having succeeded Humphry Davy, who was the first to prepare elemental potassium and sodium here in 1807.<sup>10</sup>



ly between “vegetable alkali” and “mineral alkali.”<sup>2b</sup> Duhamel was a botanist; he developed an agricultural/forestry farm at Denainvilliers, a suburb of Pithiviers (75 km south of Paris). Duhamel showed in 1736 that the salts of the two alkalis, as prepared from mineral acids, differ in crystalline form, solubility, and taste. (Today mineralogists describe how “sylvite” (KCl) at Death Valley, California, is the last to precipitate out and tends to form granular masses compared to the distinctive

cubic “halite” (NaCl) crystals; persons taking “low-sodium” salt in their diet are acquainted with the more bitter, astringent taste of KCl.) Duhamel further showed that the alkali component common salt (sodium chloride) is identical with the alkali of Egyptian natron (sodium carbonate), and of borax (sodium borate).<sup>2b</sup> Duhamel’s estate still exists, complete with his chateau and the original ventilated silo, designed by him and reputed to be the first ever constructed (Figure 3).



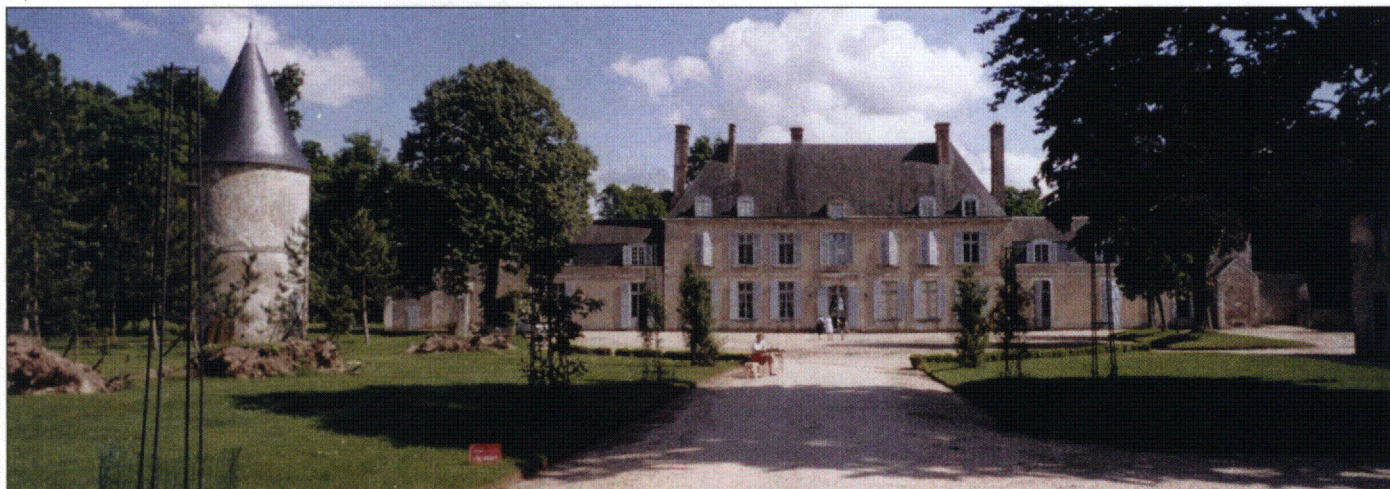


Figure 3. Duhamel's estate, complete with vented silo (left).<sup>13</sup> Rue Duhamel du Moncean, Denainvilliers, France (N48° 9.02 E02° 14.47). Courtesy, Wikipedia Commons, public domain.



Figure 4. Upon entering the Royal Institution, in the hallway is this portrait of Davy by Sir Thomas Lawrence (1769–1830), dated 1821. Davy joined the Royal Institution in 1801. By the method of electrolysis he was the first to prepare metallic potassium and sodium, and went on to prepare strontium, barium, calcium, magnesium, lithium, and boron. He was the first to recognize the elemental nature of chlorine and iodine.

Two decades after Duhamel's work, Berlin chemist Andreas Sigismund Marggraf (1709–1782), reproduced Duhamel's work and further differentiated "vegetable alkali" and "mineral alkali."<sup>18</sup> He prepared the saltpetres (nitrates) of each with nitric acid and demonstrated (1758) that "cubic saltpetre" (sodium nitrate) flashed yellow with charcoal and "prismatic saltpetre" (potassium nitrate) flashed blue-violet. These colors are the same as those observed in introductory chemistry classes by dropping metallic sodium and potassium into water.

**The derivation of the names sodium and potassium.** On the coasts of the Mediterranean Basin and Western Europe, there exists a scrub-by tidal plant named saltwort, with the generic



Figure 5. Statue of Humphry Davy at Market Jew Street, Penzance, Cornwall (N50° 07.14 W05° 32.18). Davy never forgot his roots in Cornwall and contributed scientific researches directed to the safety of the tin miners in the area.

name *Salsola* (meaning "salty"), given by Linneaus in 1753.<sup>4</sup> This thistle-like plant was burned in trenches by the seashore to produce alkali economically. Of this genus, two species—*S. soda* and *S. kali*—were common sources of alkali. The "kali" was derived from Arabic "qily" meaning "ashes," and "soda" was derived from the Italian word for saltwort, ultimately derived from the Arabic "suwwad." Although incinerated plants generally produced "vegetable alkali," it was observed (e.g., by Duhamel) that *Salsola* could give either kind of alkali, and if *Salsola* was grown very close to the brackish water then "mineral alkali" was the main ash.<sup>2b</sup>

The adoption of the names "soda" and "potash" for "mineral alkali" and "vegetable

alkali" occurred during the 17th and 18th centuries. Early references (1690) to "soda" include "soude"<sup>2a</sup> by Nicolas Lemery (1645–1715), the advocate of the corpuscular theory of "pointy particles" for acids and "spongy particles" for bases.<sup>18</sup> From the ashes of burned wood came "pot-ash," prepared by boiling the ashes in metallic pots. The name "potash" originated from the German Pottasche, and was approved by the Académie française in 1762.<sup>2b</sup>

By the beginning of the 19th century the distinction between sodium and potassium compounds was clear, and each was now recognized as an element<sup>2f</sup>—in his lecture notes of 1806 John Dalton (1766–1844) recognized "soda" and "potash," and assigned each with its respective atomic weight<sup>5</sup> (28 and 42; modern values 22.99 and 39.10). But no one had ever "seen" the elements in uncombined form.

**Humphry Davy (1778–1829).** The first person to prepare the alkalis in elemental form was Humphry Davy, at the Royal Institution in London, in 1807.<sup>6b,7</sup> Humphry Davy (Figure 4) was born in Penzance in Cornwall (Figure 5). As a youth he was an alert and curious student; his first love was roaming about the countryside observing nature, the community, and the fishers and the tin miners. Drawing from the tales and ghost stories of his aunts and grandmother, he could tell stories that spellbound the common folks of Cornwall. This ability to captivate an audience was to prove beneficial later when he presented public lectures on science at the Royal Institution.<sup>7</sup> Davy was a visionary; as he admitted himself, he preferred to "invent, rather than imitate."<sup>8</sup> As he rose through the ranks of the scholars, he became the most widely known scientific figure in the British Isles, if not also on the Continent.<sup>7</sup>



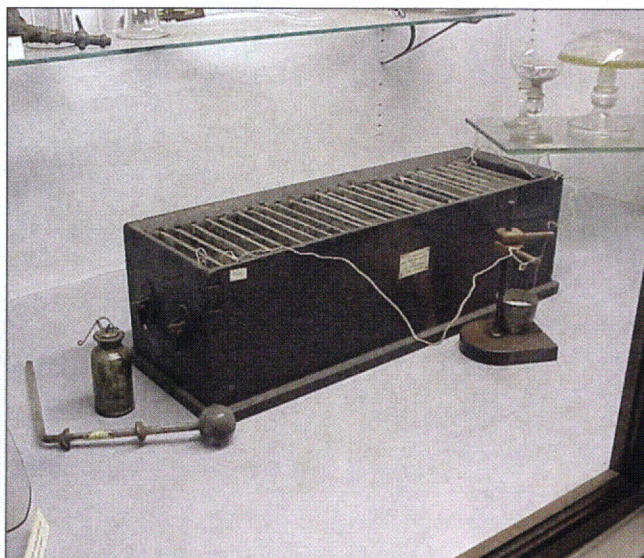


Figure 6. Exhibit in the Royal Institution: The slatted box is of the original design of the voltaic pile used by Davy. Typically, he would line up 100 or more 4- or 6-inch pairs of copper and zinc square plates, immersed in an alum/dilute sulfuric acid solution.<sup>12</sup> This design was the same as that of Berzelius, who was conducting galvanic studies before Davy to show the differential migration of ionic species.<sup>14</sup> The Berzelius museum was visited by the authors in 2000 and is now closed; it was located across the street from the Swedish Royal Academy of Sciences, Lilla Frescativägen 4A (N59° 22.02 E18° 03.09).

RIGHT: Figure 8. Royal Institution: Original samples of metals prepared by Davy.

**The preparation of elemental potassium and sodium.** Alessandro Volta (1745–1827) in 1799 invented the voltaic pile or galvanic pile—the first electric battery (Figure 6). His announcement was communicated to the Royal Society of London in 1800, and the word of this new source of electricity spread rapidly, allowing research to develop in many new directions. It was quickly discovered that the voltaic pile could decompose substances; one of Davy's original findings was that water could be decomposed into hydrogen and oxygen in two separate vessels connected only by a conductor.<sup>7</sup> Turning to the alkalis, he attempted decomposing potassium and sodium, but again could obtain only hydrogen and oxygen. Reasoning that the water was the source of these gases, he tried potash only slightly moistened; the result was molten metallic globules which he described as the “peculiar inflammable principle” which was “the basis of potash.” (Figure 7) As he described the experiment, the globules resembled quicksilver, some of which “burned with explosion and bright flame... finally covered with a white film.”<sup>6a</sup> (He had observed the ignition of evolving hydrogen and the formation of potassium oxide/hydroxide.) We have an eye-witness to the discovery,

Edmund Davy, his cousin, who was acting as assistant: “. . . [Humphry] could not contain his joy—he actually bounded about the room in ecstatic delight; and some little time was required for him to compose himself sufficient to continue the experiment.”<sup>6a</sup> A few days later Davy repeated the experiment to obtain elemental sodium. Without a doubt, the elemental production of the “fixed” alkalis was the most famous of Davy's discoveries. (Figure 8)

Davy next turned to the alkaline earths. After some unsuccessful attempts, a suggestion by Berzelius (see Figure 6) to use an amalgam allowed the production in 1808 of elemental calcium, strontium, barium, and magnesium. In Davy's laboratory, elemental boron (Figures 9–11) was produced the same year by reaction of elemental potassium (simultaneously with Gay-Lussac, *vide infra*); and elemental lithium was prepared in Davy's laboratory in 1817 promptly after its discovery by Johan August Arfwedson (1792–1841) in Sweden.<sup>14</sup>

**Joseph Louis Gay-Lussac (1778–1850).** This French chemist, with Friedrich Wilhelm Heinrich Alexander von Humboldt (1769–1859), determined the composition of atmospheric air at the famous laboratory at Arcueil,<sup>6b</sup> described

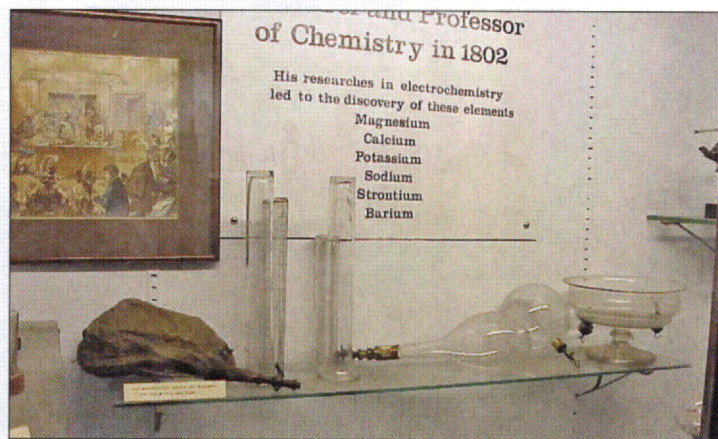


Figure 7. Royal Institution: The bladder to the left was used in Davy's laughing gas experiments. The item to the extreme right is an electrolysis bowl of 1806 design.



in a previous *HEXAGON* article.<sup>1c</sup> Gay-Lussac moved on to l'École polytechnique in Paris, where he co-discovered boron.<sup>6b</sup> He and Louis Jacques Thénard (1777–1857) (the discoverer of hydrogen peroxide) at l'École polytechnique suggested that potassium and sodium were respective compounds of potash and soda with hydrogen.<sup>6b</sup> It remained for Davy to demonstrate the hydrogen was generated from residual water—pure potassium and sodium could not be forced to evolve hydrogen, no matter how savagely they were heated.<sup>6b</sup>

The rivalry between Davy and Gay-Lussac was intense. Davy had been awarded a Prize by Napoleon for his electrochemical work,<sup>8,9</sup> but Gay-Lussac was offended by the presumptive manner of Davy and was displeased by Davy's taking on the “iodine problem” which he had been studying for two years.<sup>8</sup> As described in a previous *HEXAGON* article,<sup>1c</sup> this new substance, discovered by Bernard Courtois (1777–1838) in 1811, was a most confusing material—it looked like a metal, but dissolved in ether! When Davy visited Paris in 1813, he recognized the new substance as an element and named it “iodine” in analogy to the chlorine family to which he ascribed it—much to the consternation of the scooped Gay-Lussac, who





Figure 9. The famous California open-pit boron mine (N35° 2.94 W117° 40.98) is located in the Mojave Desert at Boron, 40 miles northeast of Los Angeles. This is the largest borate mine in the world. This deposit was formed 20 million years ago.



Figure 10. The Rio Tinto Borax Visitor Center, Suckow Road, Boron, California (35° 1.79 W117° 41.24), has a large variety of exhibits explaining the history and uses of borax and its derivatives, as well as many fascinating mineral specimens.

had named it "Iode."<sup>16</sup> The "romantic, qualitative" Davy and the "cautious, quantitative" Gay-Lussac ordinarily, in their dual roles, "served chemistry well,"<sup>8</sup> however, Davy could easily overshadow Gay-Lussac, and the (London) Royal Society delighted in noting (20 January 1814) that Gay-Lussac had been trumped:<sup>6b</sup> "[Iodine] was discovered about two years ago; but such is the deplorable state of scientific men

in France, that no account of it was published till the arrival of our English philosopher there."

**Other contributions of Davy.** The most important discovery of Davy was the alkali and alkaline earth metals, but the most important invention was the safety miner's lamp.<sup>8</sup> (Figures 12,13) Davy was always mindful of the dangers associated with the tin mines of his Cornish



Figure 11. In the Borax Visitor Center, this impressive crystal of kernite ( $\text{Na}_2\text{B}_4\text{O}_6(\text{OH})_2 \cdot 3\text{H}_2\text{O}$ ) is displayed, with Jenny Marshall present, to show its enormous size. Ordinarily the only borate in a boron mine is borax ( $\text{Na}_2\text{B}_4\text{O}_7(\text{OH})_4 \cdot 8\text{H}_2\text{O}$ ), but this mine is unusual in that it has three additional minerals: kernite, colemanite ( $\text{CaB}_3\text{O}_4(\text{OH})_3 \cdot \text{H}_2\text{O}$ ), and ulexite ( $\text{NaCaB}_5\text{O}_6(\text{OH})_6 \cdot 5\text{H}_2\text{O}$ ).

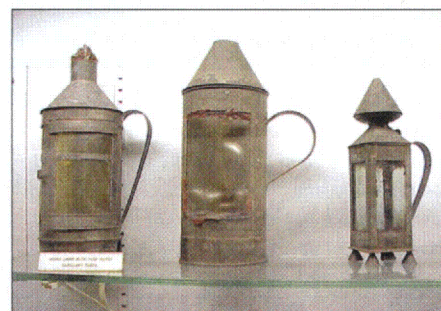


Figure 12. Royal Institution: Davy's early designs of the safety lamp utilized small holes to cool the gases emanated from oil lamps so that pockets of firedamp would not be ignited.

hometown (Figure 14)—sometimes the flame of a lamp would ignite pockets of firedamp (methane) in the deep recesses of the tin mines, with disastrous consequences. Davy's final solution was a lamp surrounded by a wire gauze which would not allow the flame to come in contact with the explosive gases. Other notable discoveries of Davy included the effect of laughing gas (nitrous oxide,  $\text{N}_2\text{O}$ , discovered by Joseph Priestley in 1772), suggested by Davy as an anesthesia in surgical operations;<sup>8</sup> and the cathodic protection of ships' hulls by plating with copper sheets.<sup>8</sup>

Davy's fame as a riveting lecturer drew devoted audiences to the Royal Institution; his first lecture was given in 1801 on "The New Branch of Philosophy; Galvanism [chemically produced direct-current phenomenon]." The preeminent *Philosophical Magazine* reported "Mr. Davy . . . acquitted himself admirably, from the sparkling intelligence of his eye, his animat-





Figure 13. This is a “Cambrian lamp,” a modern replica of the “Clancy lamp,” the final version of Davy’s safety lamp. Davy never claimed a patent on the safety lamp, instead developing the design as a charitable gift to the miners of his home county. (From the collection of the authors)



Figure 14. A historic tin mine in Cornwall, near the Camborne School of Mines, University of Exeter. This cultural heritage site is in Pool, near Redruth (N50° 13.90 W05° 15.74). Two millennia ago, nearby streams once enjoyed the visit of Romans, traveling in boats of shallow draft, who collected tin ore for the home base in Italy.

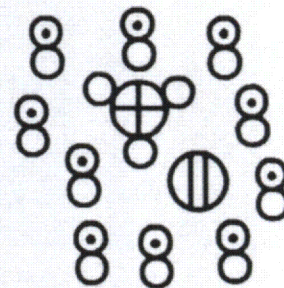
ed manner, and the *tout ensemble* we have no doubt of his attaining a distinguished eminence.”<sup>8</sup>

**Michael Faraday (1791–1867).**<sup>6c</sup> Davy’s devoted attendant was Michael Faraday, whom some people have described as Davy’s *greatest* discovery. (Figure 15) Davy and Faraday were opposite in temperament and class; whereas the buoyant Davy concentrated on attaining “a gentleman’s comprehensive education,”<sup>8</sup> the serene Faraday, son of a blacksmith, came to the Royal Institution with minimal education. He heard his first lecture by Davy in 1812, and the next year became Davy’s assistant—just in time for the two-year journey to the Continent. Because of Davy’s fame, Napoleon had awarded him a special medal and invited him to visit France, even though the two countries were at war. Because Davy’s valet was afraid to take the trip, the threesome, Davy, his wife, and Faraday, took the risky 1813–15 trip. Faraday actually doubled as a luggage-bearing attendant; Davy’s wife treated him like a hireling, but Davy was kind. Faraday tolerated the overbearing treatment and rose to the occasion; he brushed shoulders with the most famous scientists in France—Gay-Lussac, Ampere, and Cuvier, as well as the visiting German scientist Humboldt—and learned much. He even met Count Rumford, the founder of the Royal Institution (see Figure 1), who had just separated from his wife, Marie-Anne nee Paulze Lavoisier, the widow of Antoine-Laurent Lavoisier who had been guillotined in 1794.<sup>8</sup>

From his lowly background, Faraday—described as “unmatched” as an example of “self-taught genius”<sup>8</sup>—rose to fame at the Royal Institution.<sup>8,10</sup> With the barest of mathematical skills (he was trained only in algebra), he was the one to develop the concept of the electromagnetic field, later quantified by James Clerk Maxwell (1831–1879). He developed electrochemistry and introduced the terms electrode, anode, cathode, and ion.<sup>11b</sup> In chemistry he invented the precursor of the Bunsen burner, discovered benzene, and liquified chlorine. In 1825 Faraday instituted the Christmas lectures at the Royal Institution, which continue to this day. (Figure 16) The unit of capacitance (farad) was named in his honor.

**Epilogue. Why Sodium and Potassium Chloride are not SoCl and PoCl.** Dalton pioneered the concept of atoms to explain chemical reactions, postulating a one-for-one combination of atoms to demonstrate specific summations of weights of the elements to form compounds. Dalton was color-blind (hence, the term “daltonism”)<sup>1c</sup> and it was natural for him to visualize featureless spheres, like clumps of grapes, which were differentiated solely by their

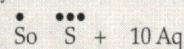
weights, to explain his ideas. While this model proved essential for a descriptive model of the nano-world and its atomic weights, it proved to be unwieldy for shorthand descriptions. For example, consider Glauber’s salt (modern formula  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ ), which by Dalton’s symbolism<sup>2f</sup> would be rendered as:



(The reader should not be confused by the incorrect stoichiometry; during the early 1800s a sulfate was considered to be  $\text{SO}_3$ , water was believed to be  $\text{HO}$ , and sodium oxide was  $\text{NaO}$ .)

Using equations, Thomas Thomson (1773–1852)<sup>2e</sup> attempted letter symbols, such as *w* for oxygen, *c* for carbon, and *h* for hydrogen, so that oxalic acid =  $4w + 3c + 2h$  and sugar =  $5w + 3c + 4h$  [sic].<sup>2e,6d</sup> Thomson, at the University of Edinburgh, was a most successful author, writing a famous textbook, *A System of Chemistry*, and the very informative and clearly-written *History of Chemistry*. Thomson was very important in the early years of the 19th century by embracing the new ideas that became modern chemical theory; for example, he was virtually the first non-French antiphlogist. He championed the ideas of Dalton that promoted the concept of an atom-by-atom construction of the universe. Soon Thomson was using the initial letters of the names of elements, e.g., “Po” for potassium.

Meanwhile, Berzelius was refining accurate atomic masses, which proved to be indispensable a few decades later for the conceptualization by Mendeleev and Meyer for the periodicity of the elements. Berzelius, who discovered selenium, cerium, silicon, and thorium,<sup>1d</sup> adopted the “initial letter” symbols of Thomson and used these abbreviated symbols to represent these compounds. With so many examples of “S,” “I,” “O,” “So,” and “Po,” Berzelius toyed with the idea of symbolizing oxygens with dots and water with an “Aq.” Glauber’s salt would be represented by:



But this was visually misleading and made difficult the balancing of equations by inspection.

Latin names were used more commonly by Germanic nations than by the English or the French. Berzelius, for example, used the term





Figure 15. Faraday's statue. 2 Savoy Place, before the Institution of Electrical Engineers (N51° 30.58 W00° 07.12), on the Victoria Embankment of the Thames River (John Henry Foley, sculptor).

"Kalibasis" for the potassium analysis of a material. Berzelius substituted the Latinized symbols, "Na" (natrium) for "So" and "K" (kalium) for "Po," which removed the confusion of "So," "S," "Po," and "O."

Dalton called Berzelius' symbols "horrifying;"<sup>6d</sup> it was "unnatural" for scientists to use symbols other than in a mathematic sense. Even Berzelius himself could not make much use of his own invention at first. However, the symbolism gained greater acceptance after it was discovered that water contained two hydrogens and one oxygen<sup>1c</sup> and thus that one-to-one atomic combinations were not the rule. By the mid-1800s, with more accurate relative atomic mass determinations, the Berzelius formulations were mandated. However, they originally employed superscripts rather than subscripts, although in the first part of the 20th century some texts, particularly those of the French, maintained the "superscript" convention.

Thus—we have Berzelius to thank when we write such formulas as  $\text{Na}_2\text{SO}_4$  (instead of  $\text{So}_2\text{SO}_4$ ) and  $\text{K}_3\text{PO}_4$  (instead of  $\text{Po}_3\text{PO}_4$ ). ☉

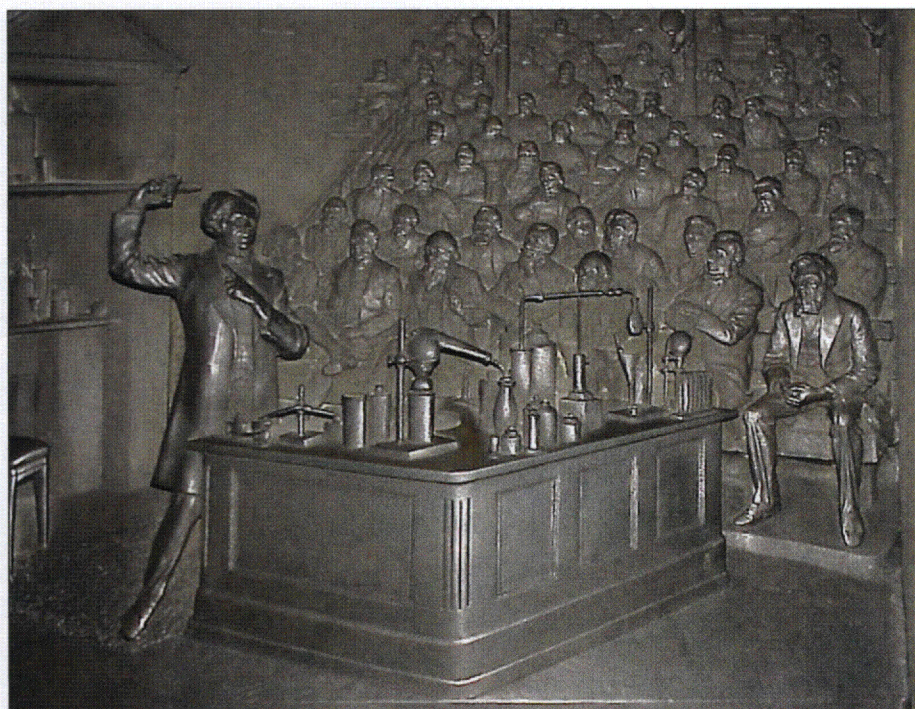


Figure 16. The Royal Institution was famous for its lectures popularizing science, and soon evolved into an entertaining educational tool for the public, including the youth. The Christmas lectures were inaugurated by Faraday in 1825. This bronze replica by W. B. Fagan shows Michael Faraday lecturing. In the front row of the audience, from right to left, are Tyndal, Huxley, Wheatstone, Crookes, Darwin, Daniels, and Frankland.

## Acknowledgments.

The authors gratefully acknowledge Professor Frank A. J. L. James, head of the Royal Institution Centre for the History of Science and Technology, The Royal Institution, 21 Albemarle Street, London W1X 4BS, for furnishing continued assistance and information regarding the history of the Royal Institution and its scientists throughout the "Rediscovery" series.<sup>1f</sup> For the Cornwall region, Dr. Simon Camm of the Camborne School of Mines, University of Exeter, has been especially helpful and has served as a guide for the authors as they researched the tin mines, and the discovery of titanium, previously described in *The HEXAGON*.<sup>1a</sup>

## References.

- J. L. and V. R. Marshall, *The HEXAGON of Alpha Chi Sigma*, (a) 2001, 92(1), 4-5; (b) 2005, 96(1), 4-7; (c) 2007, 98(1), 3-9; (d) 2007, 98(4), 70-76; (e) 2009, 100(4), 72-75; (f) 2012, 103(3), 36-41; (g) 2014, 105(2), 24-29; (h) 2014, 105(3), 40-45.
- J. R. Partington, *A History of Chemistry*, Vol. 3, 1962, Macmillan (London), (a) 33; (b) 69-70; (c) 487-488; (d) 503; (e) 716-721; (f) 782-813.
- A. L. Lavoisier, *Traité Élémentaire de Chimie*, 1789, Paris, 168.

- <http://www.efloras.org/florataxon.asp>, *Salsola soda* Linnaeus 1753; *Salsola kali* Linnaeus 1753.
- J. Dalton, *A New System of Chemical Philosophy*, 1808, Manchester.
- J. R. Partington, *A History of Chemistry*, Vol. 4, 1962, Macmillan (London), (a) 32-73; (b) 77-96; (c) 99-139; (d) 158-160.
- R. King, *Humphry Davy*, 1978, The Royal Institution of Great Britain, London.
- G. Caroe, *The Royal Institution*, 1985, John Murray (London).
- "The Napoleon Prize," BBC News, 15 March 2008, "Napoleon's medal cast into the sea;" Royal Society of Chemistry, "New Light Shed on French Wartime Honour for British Chemist," 14 March 1808, <http://www.rsc.org/AboutUs/News/PressReleases/2008/WartimeHonour.asp>.
- F. A. J. L. James, *Guides to the Royal Institution of Great Britain: 1 History*, 2000, Royal Institution of Great Britain, London.
- A. Greenberg, *A Chemical History Tour*, 2000, Wiley-Interscience, (a) 162-163; (b) 193.
- H. Davy, 1806 Bakerian lecture, "On some chemical agencies of electricity," published in *Phil. Trans.*, 1807, 97, 1-56.
- A. Candoré, *International Molinology*, 1996, No. 53 (November).





Brothers gather for lunch at the Denver ACS Meeting under the watchful eye of the Bubba Gump Shrimp.

## Beta Mu Chapter Reactivated!

Congratulations to the reactivated *Beta Mu* Chapter at Occidental College! The Supreme Council unanimously passed a proposition on January 17, 2015, to officially reactivate the *Beta Mu* Chapter of the Alpha Chi Sigma Fraternity to full active Chapter status. The installation took place on Saturday, April 25, 2015.

## Gamma Nu Chapter's Family Science Saturday

Submitted by Merryn Cole, DC, *Alpha Theta* 2003

*Gamma Nu* held their annual Family Science Saturday, providing chemistry demos and hands-on activities. The physics department also hosted a room of physics fun. This spring, kids were invited to make slime, sample liquid nitrogen ice cream, and make shrinky dinks. They were also invited to watch a series of flame demos, a thermite reaction, homemade smoke bombs, elephant's toothpaste, carbon dioxide soap bubbles, and more. Each of the stations was staffed by brothers and pledges. Everyone worked together to put on this well-attended public event.

## Gamma Theta turns 30

The *Gamma Theta* Chapter of Alpha Chi Sigma honored its 30th anniversary this past April with a fantastic, jam-packed weekend at Truman State University in Kirksville, Missouri. This event would not have been possible without the hard work and planning of our very own *Gamma Theta* brother, Ciara Witt. The 30th anniversary celebration weekend took place April 10–12, 2015, but the plans to create this wonderful event began in the fall of 2014 when a *Gamma Theta* alumnus sparked the idea. With the help of our chapter advisor, Dr. Moody, and

the chapter's exec board, the chapter was able to organize and fund a memorable and fun-filled weekend for its alumni in addition to its active chapter.

On April 10, at 8 p.m., the active members and alumni alike gathered at Pickler's Famous in the downtown Kirksville area. The night was filled with wonderful music, drinks, and most important, reconnecting with our alumni. Twenty alumni and two charter members from all over the state were able to join our chapter for the evening, and they were all welcomed by the active members.

On April 11, alumni and active members met at Truman's Magruder science building for a palonza feeding frenzy. This is a *Gamma Theta* tradition for both actives and alumni alike, and was much appreciated by the alumni who were in attendance.

The final event of the 30th reunion weekend was *Gamma Theta's* initiation of the Spring 2015 pledge class. Alumni took part in some major roles during the initiation process, including helping with the setup and teardown. The 30th reunion was enjoyed by past and present *Gamma Theta* brothers, and we cannot wait for the next reunion to come around.

## Bluegrass District Distiller/Brewery Tour in Kentucky

Submitted by Merryn Cole, DC, *Alpha Theta* 2003

The Bluegrass District members toured the Town Branch Distillery and Brewery on June 27, followed by dinner. The tour was led by the Master Distiller who is a chemical engineer. The tour included both the distillery and brewery, followed by tastings in their pub. Anyone interested in future events, please contact Merryn Cole. She can suggest wineries, distilleries, or other attractions in the Lexington area.

## Alpha Chi Sigma Lunch at the Denver ACS Meeting

Brothers attending the 248th American Chemical Society National Meeting and Exposition in Denver participated in the traditional Alpha Chi Sigma luncheon on Tuesday, March 24, starting at 11 am. The luncheon is a nice opportunity to meet and dine with brothers from around the nation, and they are held at every meeting. Collegiate members are invited to attend for free as guests of the Fraternity. Guests of brothers also are welcome.

The March luncheon was held at Bubba Gump Shrimp at 1437 California Street. The group included: Gary Anderson, *Alpha Eta* 1962; Ken Bush, *Epsilon* 1984; Faith Yarberr, *Alpha Sigma* 1992; Chris Petrelli, *Pi* 2010; Zachery Crandall, *Beta Phi* 2015; Margaret Brausch-Tun, *Beta Phi* 2013; Tyler Ryther, *Beta Phi* 2015; Justin Meyer, Guest; Laura Tvedte, *Gamma Theta* 2008; Rachel Morgan Theall, *Gamma Theta* 1995; Sarah Phillips, *Alpha Sigma* 2011; Mark Evaniak, *Beta Sigma* 1980; Sidney White, *Psi* 1963; Jay Pittman, Guest; Dena Chubbic, *Beta Gamma* 1996; Jonathan Wenzel, *Delta* 1996; Blake Inderski, *Gamma Theta* 2013; Morgan Grandon, *Gamma Theta* 2014; Linda Schultz, *Beta Eta* 1972; Leland Johnson, *Gamma Iota* 1990; Derek Dormedy, *Gamma Zeta* 1990; Matthew Huber, *Beta Phi* 2015; and Martha Hollomon, *Gamma Omega* 2010.

For any questions about this or future luncheons, please contact Grand Professional Alchemist Jonathan Wenzel at 573-999-1753 or [gpa@alphachisigma.org](mailto:gpa@alphachisigma.org).

## Steel District Conclave at Case Western

Submitted by Yashavika Duggal, Alumni Secretary, *Gamma* 2013

Brothers at *Gamma* woke up bright and early, well, early by college undergraduate standards, at 9 a.m. on March 21, 2015. Today was the day they'd been waiting for: the Steel District Conclave. The morning started with breakfast and some much-needed coffee. The *Gamma* collegiate brothers were joined by five professional brothers, including two District Counselors (Sean Pawlowski-SD and Joshua Strenger-NC).

After breakfast and registration, we started the morning with a presentation by brother and professor, Dr. Rajesh Viswanathan. On the surface, his lecture was about bio-organic chemistry and his current research program. But the main points of his lecture went much deeper. It was very apparent that he was proud of every single person in the lecture hall, even though he only personally knew three of us. Why? For him being in Alpha Chi Sigma, and being asked to present to his brothers, was a humbling





ABOVE: Sean Pawlowski leads an open forum during which brothers can ask any questions regarding fraternal business. LEFT: Josh Strenger takes a moment to answer questions about professional expansion.



Dr. Rajesh Viswanathan presents his lecture on bio-organic chemistry and what it means to be a brother of Alpha Chi Sigma.

experience. Ever since his initiation, he has been interested in fraternal knowledge and loves to help brothers with chemistry whenever he can.

After Dr. Viswanathan's presentation, we started talking more about fraternal issues. The two District Counselors took the stage for an open forum about expansion and how to avoid cliques and hazing. In summary—

**On Cliques and Hazing:** (a) cliques can be present in a pledge class, between the brothers and pledges, within families, even within Bigs and Littles. One way to prevent cliques is for

people in positions of responsibility, especially the existing group of active members, to be proactive and invite people to talk to you. If you don't make people feel included, they will find someone else who does. (b) Even though it might not seem like it, there are a lot of traditions that brothers hold that are legally hazing. Instead of holding onto old harmful "traditions," brothers are encouraged to embrace their pledges as equals and start new traditions. (c) Read through and make sure all brothers are aware of the risk management policy.

**On Expansion:** (a) Professional Groups and chapters are much more laid back than collegiate chapters. Most meetings are once a month and are 10 percent business and 90 percent getting together. (b) Collegiate expansion requires more effort because of all the bylaws and requirements that need to be followed.

This hour and a half was very deep and all the brothers walked out of the room with a new sense of purpose. We wanted to improve as much as we could in order to be an ideal chapter. We want to eliminate all potential cliques so all brothers can feel included, extinguish any possible chances of hazing, and expand the Fraternity in both professional and collegiate directions.

After the open forum, collegiate brothers separated from the professionals. It was time for the Professional Induction Ceremony. In total, six brothers went through PIC. Congratulations! The PIC concluded all of the official business of the Fraternity. The night ended with an Italian dinner and brother bonding.

## Wyvern Achievement: Rebecca Marsnik, Beta 2013



Rebecca Marsnik, Beta 2013, at the Alpha Chi Sigma Tech Fest.

I had a boss once who told me that your favorite part of a job will often be something you never expected. I have found this to be true about many jobs, and being outreach coordinator has been no exception. As a communications major and someone who loves public relations, I thought outreach would be an excellent way to give the Beta Chapter a good name within the community. I do still love this aspect of outreach, but something else struck me after attending a few events as a coordinator. I discovered that my favorite part of doing outreach was seeing people learn and get excited about what we were doing. Whether it was kids, adults, or even our own members, when I could see that someone was truly enjoying their experience, I knew I was making a difference.

My first experience as a coordinator was a two-day event that started early in the morning and consisted of three stage shows as well as hands-on demos each day. It was exhausting, and by the end of the first day, I didn't know if I would be able to do it all again the next day. After the last group, we handed out evaluations where the kids wrote down what they learned and who was their favorite group during the day. I read through them afterward and found over and over that kids were talking about how much they loved learning about catalysts and surface tension and different things that we taught them. That moment really stuck with me as a reminder that even though the details of the lessons might fade, they will always remember how much fun they had learning about science.



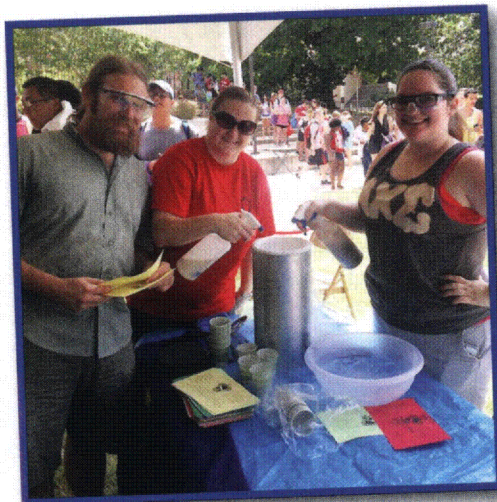
Fast-forward to the last event of that semester. I was a seasoned coordinator by this point, but I was still worrying about this event because it was for alumni of the Science and Engineering school. How do you impress scientists with demos for kids? It turns out that even scientists get excited about dry ice! Who knew? We had person after person come up to us and ask us questions about our demo or tell us how cool everything we did was. I realized during this event that even when you have a degree, you continue to learn new things, and you don't have to be a kid to get excited by science.

We recently made a requirement that pledges do an outreach event. With our 15 pledges this last semester, I got to watch each and every one of them become incredible members of our outreach program. Whether it was seeing how good they were with kids and parents or having them give us a new demo or new way to explain a demo, it was wonderful to see how every one of these people was going to be an asset to outreach and to our chapter.

### Wyvern Achievement: Marlena Patrick, *Alpha Sigma* 2012

Traveling to national Conclave at *Alpha Kappa* Chapter this summer inspired me to set a goal: I was determined to earn all of my Wyverns by the next year. Conclave really is an eye-opening experience, especially when I saw how active and involved our brothers in other chapters were with science outreach. For that, I want to give my most heartfelt thanks to all of the chapters of *Alpha Chi Sigma* for giving me the inspiration (and therefore motivation) to achieve my goal.

*Alpha Sigma* Chapter has been hosting the weekly Science Club at Leverett Elementary in



Sarah Phillips, *Alpha Sigma* 2012, works an outreach booth for *Alpha Chi Sigma*.

Fayetteville, Arkansas since 2008, where we organize and supervise fun experiments in their afterschool program. Getting involved with our established program opened up new outreach opportunities. Our chapter began a relationship with Fayetteville Public Library, where we host a few demonstrations and experiments with local children every semester. The campus Society of Physics Students contacted the chapter to help with their Spooky Science Halloween event. And I also judged several local science fairs where I helped the students develop a research frame of mind.

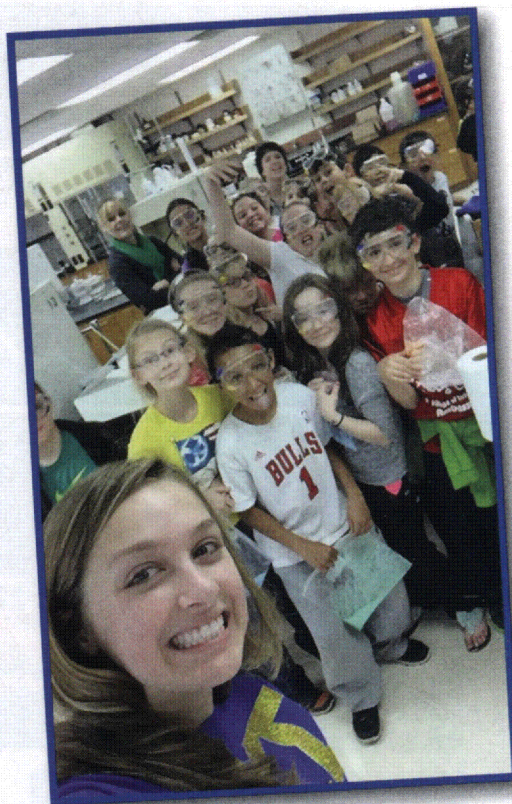
### Wyvern Achievement: Sarah Phillips, *Alpha Sigma* 2012

One of my favorite types of events has been judging science fairs. I love to get to see how students' minds work and help guide them in their projects. I have judged several science fairs recently and my favorite so far has been judging the science fairs at Haas Hall Academy, a charter school in Fayetteville, Arkansas. The school strives to have a math- and science-based education to better prepare students for college where, without this education, they may struggle in their first-year math and science courses. I could see this in how their science fair was run, in how the teachers encouraged and guided the students in their projects. Each student was encouraged to pursue a project they were passionate about and not just a cookie cutter project they found on the Internet.

I enjoyed most getting to talk to the students because I could see that they were really thinking about what they were doing. I could remember back to when I was their age and how I wanted to fix problems with science. I enjoyed hearing their stories of why they chose their projects and how they were inspired. They may not have necessarily known the answer to some of the questions I asked, but they were sure willing to give it their best shot. I particularly enjoyed hearing about how they would do their projects differently because most of them knew there was more information that could have been gathered and variables that they initially did not think about. None of them ever said their projects were perfect. All in all, I liked knowing that I was helping young minds in their pursuit of science.

### Wyvern Achievement: Miranda Kalaskey, *Gamma* *Eta* 2013

On Sunday, April 25, 2015, the Integrated Sciences and Technology Department of the Marshall University biotechnology center organized an event to celebrate DNA Day at Marshall University. DNA Day serves to celebrate the anniversary of the discovery of the



Miranda Kalaskey *Gamma Eta* 2013, takes a group selfie with her young scientists on DNA Day.

double helix nature of DNA by Watson and Crick in 1953. On this 63rd anniversary, 99 local students and parents visited the campus to learn more about the structure of DNA, and members of the *Gamma Eta* Chapter of *Alpha Chi Sigma* Fraternity were on hand to assist in the event.

The day included activities for all ages. For the younger students, decorating helical cookies and making crafts out of pipe cleaners. For the middle-aged students, piecing together a molecule of DNA using various candies, as well as extracting DNA from strawberries. For the older students, running an electrophoresis gel on a sample of DNA.

All those who attended were filled with enthusiasm for the sciences, and those who volunteered were given the opportunity to foster the education of others. One special treat of the day was that the majority of the students who attended were home-schooled, and who rarely if ever get to see science in action in this manner. *Alpha Chi Sigma* brothers enjoyed talking with attendees about the chemical structure of DNA. Events like this are crucial for fostering the second object of the Fraternity, "to strive for the advancement of chemistry both as a science and a as profession," because in order for chemistry to advance, we must instill a love for it in the future generation of scientists and citizens. ○



## IN MEMORIAM

ABER, John W., *Nu* 1957  
BOYD, Jr., Alfred C., *Beta Nu* 1954  
CAMPBELL, Donald R., *Alpha Kappa* 1954  
CARNEY, Jr., Homer C., *Sigma* 1950  
CHRISTENSEN, Robert C., *Alpha* 1960  
DOST, Edward J., *Alpha Psi* 1938  
GREATHOUSE, Arthur B., *Delta* 1958  
HUMPHREYS, Harrie M., *Chi* 1949  
MCCONNELL, Wayne V., *Alpha Gamma* 1940  
PETTY, William G., *Beta Delta* 1951  
SEASTONE, James C., *Nu* 1956  
WEINHEIMER, Herbert C., *Pi* 1942

Dr. Alfred C. BOYD, Jr., "Al," *Beta Nu* 1954, on December 5, 2014, a previous resident of Bowie for 52 years, died quietly in Annapolis with his family by his side. Al was born on December 12, 1929, in Buffalo, New York. He graduated from Canisius College, then went on to get his Ph.D. from Purdue University. Other than being a soda jerk in high school, Dr. Boyd had only one job his entire life as a professor emeritus of chemistry at the University of Maryland in College Park for 56 years. Since moving to Annapolis, Dr. Boyd was a parishioner at St. Mary's Church. Prior to that, he was a parishioner of St. Piux X in Bowie, Maryland for over 30 years where he was also the organist and choir director, and was also an organist at Our Lady of Lodes Catholic Church in Arlington, Virginia, for over 20 years. Al was a member of the Chemical Society of Washington and sang in the University of Maryland Chorus for almost 25 years. He loved people and enjoyed talking, even with those he didn't know, about food and how much he loved to cook. Dr. Boyd also loved chemistry and classical music, especially Wagner, as well as reading about Egyptian and European history. He was preceded in death in September of 2009 by his wife of 50 years, Patricia Ann Boyd.

Homer Charles CARNEY, *Sigma* 1950, 82, of Del Mar, California, passed away peacefully on April 5, 2012, with his family by his side. Charles was born in Bakersfield, California, on November 22, 1929. He was raised in Bakersfield and grew up at his parent's grocery store, Carney's Market. An outstanding student, he was awarded a four-year college scholarship from the Scaife Scholarship Foundation. Charles attended Bakersfield Junior College and then entered UC Berkeley in his sophomore year. He was MA of Alpha Chi Sigma at UC Berkeley where he graduated in 1951 with a B.S. in chemical engineering. He later received his M.S. in nuclear engineering from UC Berkeley in 1964. After working at GE for a few years after earning his B.S., Charles was commissioned as an ensign in the U.S. Naval Officer Candidate School in 1955 and he served as a nuclear officer with the Special Weapons Team aboard the USS Wasp and the USS

Ticonderoga. After leaving the Navy as a lieutenant in 1957, Charles worked at Aerojet-General Nucleonics in San Ramon, California, 1958–1970, where he became director of their Advanced Process Systems Division. Following his retirement in 1991, he enjoyed researching his family genealogy and writing life stories, of which one was published. He also enjoyed reading, listening to music, corresponding with relatives, and attending various cultural events.

Harrie M. HUMPHREYS, *Chi* 1949, died December 21 at Bethel Health Care. He was born February 17, 1925, in Denver, Colorado, son of Moreland M. and Ann L. Humphreys. He attended Denver public schools. Harrie was in the U.S. Army 1943–1946, including service in Luzon and Japan. He was discharged a staff sergeant in the 11th Airborne Division. Harrie entered Yale University in 1946, graduating in 1950 with a B.S. in chemistry. While at Yale, he was a member of Phi Beta Kappa and Alpha Chi Sigma, and captain of the freshman golf team. In 1954, he received a Ph.D. in physical chemistry from Columbia University and started working for Union Carbide at its Tonawanda NY Laboratory. He transferred to Union Carbide's Patent Department in New York City in 1957. He attended Fordham University Law School at night, receiving a L.L.B. in 1961 and was admitted to the New York State Bar the same year. From 1971 to 1985, he served as Group Patent Counsel for patent and technology matters of one-third of Union Carbide's operations. In 1954, he married Sophia (Sally) Matras, who predeceased him in 1982. In 1984, he married Claire Murphy. They retired from Union Carbide in 1986. He remained a consultant to Union Carbide for three years. In 1989, they moved to Jacksonville Beach, Florida, and for several years volunteered as kitchen helpers at the local homeless shelter. They returned to Connecticut in 1999. Harrie was a member of St. Joseph Church, Brookfield. His lifelong hobbies were golf (although he never got better

than a 5 handicap) and music. He played the piano, guitar, soprano and baritone ukulele and was a member of singing groups in Florida and Danbury. Harrie is survived by his wife Claire and his sister-in-law Eileen Murphy. He is also survived by three nieces and eleven grand nieces and grand nephews.

David H. KENNY, *Tau* 1947, associate professor emeritus in the Department of Chemistry, Michigan Technological University, passed away at his home on February 10, 2015. Kenny attended Cornell University, receiving his A.B. in Chemistry in 1949 before working at the General Motors Research Laboratory. He left GM and served two years in the U.S. Army Chemical Corps, then attended the University of Michigan and obtained his M.S. and Ph.D. in chemistry (1958). He subsequently taught at Eastern Michigan University for two years and at the University of Baghdad as a visiting lecturer on a Smith-Mundt grant. Kenny started at Michigan Tech when it was the Michigan College of Mining and Technology in 1962 as an assistant professor. He received tenure and promotion to associate professor in 1964. Kenny had a major responsibility for the Honors Program in first-year chemistry, also teaching general chemistry and organic chemistry. He retired in 1988, receiving emeritus status in 1989.

"Dave Kenny continued to visit the chemistry department for our special events long after he retired, so I knew him even though we didn't overlap professionally," says Sarah Green, professor in the Department of Chemistry. "He was always a very cheerful visitor and was pleased to hear updates on the students and new faculty." In addition to his long academic career with Michigan Tech, Kenny published the book "My Two Years in Iraq: A Memoir." In it he recalls being recruited by the Department of State to become a Smith-Mundt Visiting Professor at the University of Baghdad from 1960 to 1962.

### A Note for Contributors

We certainly appreciate the added appeal of pictures in *The HEXAGON*. When taking photos for submission, please:

- Always use a flash indoors.
- Do not edit or alter your images. *The HEXAGON* production staff can and will determine if an image needs color correcting or additional processing.
- Set your digital camera quality to its highest setting with the least compression. Photos that are less than 8 inches wide at 72 dpi, or that have a file size of under 1 megabyte, may be too small for print production.
- Please send us the image file that is directly from the camera. Photos that are extracted from iPhoto albums, Facebook pages or Word documents have file sizes that have been compromised.
- Print photos are welcome!



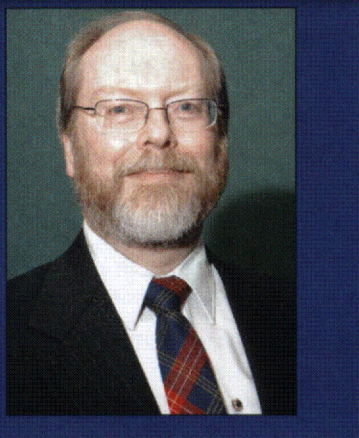
## 100 years ago... Summer 1915

On June 12, the Fraternity used the last letter of the Greek alphabet to name its newest chapter. Grand Recorder-Treasurer L. I. Shaw conducted the transmutation of the Pitt Alembic chemistry club at the University of Pittsburgh into *Omega* Chapter of Alpha Chi Sigma. Several Alpha Chi Sigma alumni from the area assisted with the installation. The ceremony was carried out in the Assembly Room of the Mellon Institute Building, followed by a banquet at the German Club in Pittsburgh. The post-banquet party continued late into the night and (as they say) a good time was had by all.

On June 18, all members of the Supreme Council met in Evanston, IL. The meeting covered many topics including chapter resistance to recent changes and proposed changes to the bylaws. Bylaw number 4 now required the collegiate chapters to collect lifetime *HEXAGON* subscription fees from their members. Many chapters doubted their ability to meet that obligation, so the Council directed the National Office to help with the collection process. The Council was caught off guard by the backlash over a proposed revision to Bylaw 29, which would have prohibited the common fraternal practice of letting a brother's girlfriend wear his badge, so they decided not to pursue that bylaw change. The Council was unanimous in its opinion that the report of the Ritual Committee was completely unacceptable. After some discussion with D. M. Nelson, MA of the Chicago Alumni Chapter, the responsibility for revamping the Fraternity's initiation ceremony was turned over to the Chicago Alumni.

## 75 years ago... Summer 1940

A coalition of chapters hosted the 16th Biennial Conclave: *Sigma* Chapter at Cal-Berkeley, *Alpha Alpha* at Stanford, *Beta Gamma* at UCLA, the San Francisco Professional and Los Angeles Professional. Conclave No. 16 was the first West Coast Conclave, and to get there many of the brothers met in Chicago or specified points along the way to board one of the chartered air-conditioned Pullman cars added to Union Pacific's Chicago-to-Berkeley route, exclusively for Alpha Chi Sigma travel. The pre-Conclave Supreme Council meeting was held en route on the train. While most of the Conclave was held on the Berkeley campus, on Day 3 (a Sunday), buses transported everyone to Stanford University for a legislative session, campus tour and an illustrated lecture on photochemistry by Stanford professor Dr. Philip Leighton. The buses returned to Berkeley in time for dinner followed by the model initiation of Linus Pauling. Legislative accomplishments of the 16th Conclave included a modification to the *Articles of Organization*, removing the requirement to have one district established for every five collegiate chapters. The change gave the Supreme Council the flexibility to appoint District Counselors on the basis of need and geography. The offices of Grand Recorder and Editor were redefined such that as of August 1, 1941, they would become paid staff positions, allowing John Kuebler to earn an income for the work he was already doing. The



D. Mitch Leavings, OA, Grand Historian  
Beta Delta 1975

pledging ceremony presented to the Conclave was approved for use. An expanded pledge manual was authorized to include songs and reprints of the recent alchemy articles that had appeared in *The HEXAGON*. At the conclusion of the Conclave, Walter Ritchie and Watson Chapman were elected GMA and GPA, respectively. The race for GCA pitted Northern District Counselor Marvin Rodgers against GMC Harold Gaw. After the votes were counted, Brother Gaw retained a seat on Council and Brother Rodgers took on Southern District Counselor Clyde Hutchison in the GMC race. The vote went to Hutchison.

The number of districts increased by one with the creation of the Mid-Atlantic District. The new district was comprised of *Alpha Iota*, *Alpha Kappa*, *Alpha Rho*, and *Alpha Pi* collegiate chapters along with the Washington, Philadelphia and Wilmington professional chapters. A District Counselor was not appointed.

## 50 years ago... Summer 1965

The Supreme Council met in Indianapolis. With no activity over several semesters, *Beta Zeta* and *Beta Kappa* Chapters were declared inactive. Jack Phil of Thomson & McKinnon joined the Council for dinner and the Fraternity's investment portfolio was discussed at length. The Council reviewed Conclave bids from *Gamma*, *Alpha Beta*, *Alpha Theta* and the Detroit Professional Chapter. After considerable discussion, the bid was tentatively awarded to *Alpha Beta* at the University of Michigan—if they could get some of the costs down.

## 25 years ago... Summer 1990

*Gamma Beta* Chapter at Florida State University played host to the 40th Biennial Conclave. Accommodations for the delegates and guests were intended to be off-campus and reservations were made at a nearby motel. Between the time arrangements were made and the actual date of the Conclave, a housing shortage on the FSU campus caused the university to buy up what available housing it could... including the motel to be used for Conclave housing. The university agreed to honor the contract and housing wound up being on-campus after all. One of the advantages of stay-

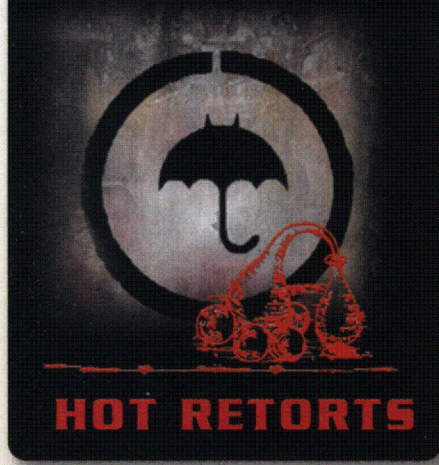
ing at the Southernaire Inn was that right across the street was a local hangout called The Pub. The Pub was normally closed during the summer, but the Local Arrangements Committee convinced the owners that if they were to open during Conclave week, they would find it profitable. The owners weren't disappointed. All Conclave attendees were welcome at The Pub, but color coded name tags were instituted to differentiate those of legal age from the soft drink-only crowd. This Conclave marked the awarding of the first Star and 3 Star Chapter Awards. Kuebler Awardee Gerry Dobson, with numerous family and friends in the area, packed the banquet hall to standing room only for a fascinating slide show presentation covering Fraternity history and the contributions of several brothers to the chemical sciences. In addition to Brother Dobson's address, GCA Paul Jones presented a complete set of all volumes of *The HEXAGON* to Dr. Lawrence Fredman, associate director for the National Foundation for the History of Chemistry, and Robert Leasure and Doulass Dee were recognized as Alpha Chi Sigma Scholars, making for a very full Kuebler Banquet. Legislation during the Conclave revolved mostly around the mechanics of collegiate chapter operation and a process for expelling members. There was extensive debate over the VGMA Committee's report that a fifth member of the Supreme Council was not necessary, but in the end the committee's recommendation was accepted. For recreation, a night was set aside for the dual function of committee meetings and a bowling tournament. A picnic at Wakulla Springs was enjoyed by all.

## 10 years ago... Summer 2005

The Supreme Council met in Indianapolis. Council members were given Prussian Blue propeller beanies which they wore during the opening business session. Sadly, no photos are available. In serious matters, *Gamma Lambda* and *Upsilon* Chapters were declared inactive. Brad Hulse of Morgan Stanley met with the Council and the Fraternity's investment portfolio was discussed at length. The 2006 Conclave was awarded to the joint bid of *Beta Gamma* Chapter and the Los Angeles Professional despite concerns about travel costs for a West Coast Conclave. John Becker was tasked with identifying a cost effective way of getting people to Los Angeles. Keeping the National Office head count constant, AGR Christopher Martz resigned and Jane Pepper was hired to serve as Professional Member Services manager. In this capacity, she will work on fund raising for both the Fraternity and the Educational Foundation. Ms. Pepper joined the Supreme Council for lunch at Cracker Barrel and everyone got acquainted.

GMA Gary Anderson, GMC John Stipp and Southeastern District Counselor Michael Heilman traveled to Midland, Michigan, to present the Dow Chemical Company a plaque recognizing Willard Henry Dow as the 2004 inductee into the Alpha Chi Sigma Hall of Fame. Brother Dow was initiated by *Alpha Beta* Chapter at the University of Michigan in 1917. ○





# Re-Discovered

**GE Note:** GR Patrick Johanns sent these to me sometime in 2013 and I just re-discovered them. Thanks, Pat!

## Twenty-one Provocative Questions, Stories and Tales

**One.** What do you get when you cross a joke with a rhetorical question?

**Two.** There is a band called 1023MB. They haven't had any gigs yet.

**Three.** Higgs Boson walks into a church and the priest says, "We don't allow Higgs Bosons in here." The Higgs Boson replies, "But without me, how could you have mass?"

**Four.** Why did Karl Marx dislike Earl Grey tea? Because all proper tea is a theft.

**Five.** Einstein, Newton and Pascal are playing hide and seek. It's Einstein's turn to count, so he covers his eyes and starts counting to 10. Pascal runs off and hides. Newton, on the other hand, draws a one-meter by one-meter square on the ground in front of Einstein and then stands in the middle of it. Einstein reaches 10 and uncovers his eyes. He sees Newton immediately and exclaims, "Newton! I have found you! You're IT!" Newton simply smiles back and says, "You did not find me, Albert; you found Newton over a square meter. You found Pascal!"

**Six.** A programmer's spouse tells him: "Could you please run to the store and pick up a loaf of bread? If they have eggs, get a dozen." The programmer returned home with 12 loaves of bread.

**Seven.** There are only two difficult things in computer science: cache invalidation, naming things, and off-by-one errors.

**EIGHT.** Entropy . . . it is not what it used to be.

**Nine.** Jean-Paul Sartre is sitting at a French café, revising his draft of Being and Nothingness. He says to his server, "I'd like a cup of coffee, please, with no cream." The server replies, "I'm sorry, Monsieur, but we're out of cream. How about with no milk?"

**Ten.** Two chemists walk into a bar. The first one says, "I'll have some H-2-O." The second one says, "I'll have some H-2-O, too." The second chemist dies.

**Eleven.** Two kittens on a sloped roof; which one slides off first? Easy! The one with the lowest mew.

**Twelve.** How can you tell the difference between a chemist and a plumber? Ask them to pronounce unionized.

**Thirteen.** A logician's wife is having a baby. The doctor immediately hands the newborn to the spouse, whose wife asks impatiently: "So, is it a boy or a girl?" The logician replies: "Yes."

**FOURTEEN.** Say, did you hear about the man who got cooled to absolute zero? Well, he's OK now.

**FIFTEEN.** A Buddhist monk approaches a hot dog stand in New York City and says "Make me one with everything."

**SIXTEEN.** Heisenberg was speeding down the highway. A police cruiser pulls him over and the officer asks, "Son, do you have any idea how fast you were going back there?" Heisenberg replies, "No, but I knew exactly where I was."

**Seventeen.** Why is it that engineers confuse Halloween and Christmas? I think it is because Oct 31 = Dec 25.

**EIGHTEEN.** An ancient Roman walks into a bar and asks for a martinus. "Whaaaa? You mean a martini, don't you?" the bartender asks. The Roman replies, "If I wanted a double, I would have asked for it!"

**Nineteen.** It's so hard to explain puns to kleptomaniacs . . . they are always taking things literally.

**Twenty.** Three logicians walk into a bar. The bartender asks, "Do all of you want a drink?" The first logician says, "I don't know." The second logician says, "I don't know." The third logician says, "Yes."

**Twenty-one.** Helium walks into a bar and orders a beer. The bartender says, "Sorry, we don't serve noble gasses here." Helium doesn't react.





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