IN THIS ISSUE: CONNECTIONS

For VLS members, spread as we are across time zones, overcoming the limitations of distance-only connections "'tis a consummation devoutly to be wished."

Amanda Scalza, Past Chair, through words and pictures, gives us a firsthand report on the Houston in-person VLS Meeting and insights into the building of more-than-electronic interactions. Many generations have relied upon friendships built on written correspondence, but Amanda's article reminds us of the enhanced experience of face-to-face connections.

Connections across time, not just distance, pay off, too. My editorial relates a how a recent chance connection resolved a question I had given up on years ago.

In his first column, Vice-Chair Experience Nduagu introduces himself. His story of the hows and whys of his career so far, from rural Nigeria to Canada and Vice-Chair of the VLS, lays the foundation for further connections to continue serving VLS members in the future.

In response to our open invitation, AIChE Fellow and VLS Treasurer Neil Yeoman stepped forward, volunteering to provide a regular column entitled “The World Out There”. For his first column, he gives us his thoughts on licensing and the PE for chemical engineers. A brief bio precedes the column, which reveals an interesting connection with NYU’s *Polytechnic Reporter* and this publication.

-- Jennifer I. Brand, Editor

FROM THE PAST CHAIR: APRIL MEETING: IN PERSON AND VIRTUAL!

Amanda Scalza

The Virtual Local Section of AIChE can sound like an ironic idea in and of itself. Now toss in "in person meeting of the virtual local section" and you might be wondering what we are thinking. Having virtual meetings is definitely convenient, and an important feature of our section. It is what allows people from all across the globe to come together to share ideas, working to grow and learn new things. I have learned, however, there is no real substitute for putting a face to a name, learning somebody's story, and connecting at a personal level. As an example, here is my Virtual AIChE story.

Upon first becoming a professional member of AIChE, I lived in a location that did not have a local section. During my student affiliation, I met a very active member of AIChE, and I reached out to him for help. Turns out, he was on the board of directors of this relatively new section, the virtual AIChE. He helped me get in

touch with Dan Lambert, who graciously found a spot for me as membership chair.

During the annual meeting that first year, I was invited to dinner with the executive committee, where I met Dan, Noah Meeks (later chair of VLS), Shannon Brown and more folks. It has been wonderful to see them year after year at these meetings, and know them as more then names from a computer. In 2012, I had only just met these people. Since, we have shared engaging conversation on a breezy afternoon in Austin, experienced art and culture in Utah, and met new friends together in Houston.

So I come to the Spring Meeting in Houston. Here, the Virtual Local Section cohosted a joint meeting. The Texas Gulf Coast Section, and a few member of the South Texas Section met with us, enjoying amazing food and camaraderie with new and old friends, and learning about safety. The appetizers consisted of shrimp cocktail shooters, vegetable pot stickers, buffalo chicken spring rolls and goat cheese bruschetta. Brady Brown, Sr. EHS Specialist at BASF gave an inspiring talk about safety cultures, which was also broadcast to our online viewers. Overall, I know the night went well as we had to politely invite people to leave at the end!

The Virtual Local Section has been an important part of my AIChE membership. I am thankful for its convenience, for its fellowship, for its inclusiveness. I am glad, too, that it has expanded to more than just another webinar, but to a group of people to which I truly belong.

FROM THE EDITOR: IT ALL MAKES SENSE NOW?

Step back through the mists of time with me to those distant days of being introduced to the wondrous secrets of chemical engineering, immersed in a class called something like "Intro to Material and Energy Balances". This was the class which introduced us to strange, out-of-context processes, like sulfuric acid production, using impenetrable prose describing pyrite burners, dust removers, Glover towers, lead chambers, and Gay-Lussac towers, accompanied, if we were lucky, by a minimalist, sparsely-labeled, undecipherable sketch. After wading through all the information, we would be asked to calculate "the complete material and energy balances of each unit and the entire process on the basis of 100 kg of pyrites, as charged". In this way, we were supposed to learn the ins and outs of the First Law, how to double- and triple- check our own calculations, and how to keep track of more details than an IRS agent on a high-profile audit. In addition, we were supposed to acquire, mostly by osmosis, a great deal of mysterious jargon, seemingly unconnected to reality as we had known it in our pre-engineering school days.

Specifically, in this class, we had an awful lot of terms describing heat and its behavior: heat capacities (mean and specific and total), specific heats, sensible heats, latent heats, and many others I am sure I have forgotten.

"But heat is heat," I hear my teenaged self shrieking in despair. "It is energy in motion, so why complicate it unnecessarily?" All this extra terminology, even with the help of my trusty Merriam-Webster, was baffling and annoying when all I wanted to learn was engineering, not arcane technobabble.

Think about it. Sensible heat? Does heat have reasoning powers, so that it can be deemed reasonable and sensible? Will the next chapter or the next class introduce us to illogical heat? Or wild, irrational heat? Or silly, foolhardy heat? And even if these less-stable heats existed, couldn't they all be balanced the same way, at least in the engineering sense?

And what about latent heat? Is that heat which is dormant, a sleeping giant of the thermo world? Or heat with potential, perhaps lurking, ready to spring into a full-blown conflagration if left under a pile of oily rags in the corner? Or, by stretching the definition, could it be "occult" heat? After all, certain other parts of the curriculum seemed like black magic.

However, I was way too busy to dwell on the unnecessary obfuscation of these silly terms, so I shelved my linguistic frustrations and plodded on, memorizing less-than-sensible definitions, solving the assigned problems, and, in time, simply becoming inured to the terminology. I abandoned any rebellious thoughts of a crusade to rationalize this muddle. After all, words can have special meanings in special applications. Take "unionized": does that mean atoms with all their electrons or does

it mean workers organized into collective bargaining units? And, besides, there was a slim chance that maybe there was something that I was simply not seeing that would be useful to me later.

Fast forward a few decades, to the present, where I have just returned from a sojourn even further back in time. As part of a project evaluating the effectiveness of historical educational experiences and how they influenced innovation, I immersed myself in the book that Michael Faraday said inspired him to study chemistry: *Conversations in Chemistry* by Mrs. Jane Marcet. In print on both sides of the Atlantic for nearly 50 years, in both authorized and plagiarized editions, it features twenty-six conversations between Mrs. B, a private instructor, and her two teenaged pupils, Emily and Caroline. This well-written text comprehensively covers the theory and applications of chemistry at the time, and is clearly illustrated with experiments, which might well have been carried out by students of Mrs. Marcet's era.

My electronic copy (thank you, Project Gutenberg) is the fifth edition (1817), revised and updated from the original 1806 edition, with an additional 21st century caution against trying the experiments at home. Reading it gave me new respect for the then-prevailing caloric fluid theory of heat. Although that theory has rightfully been laid aside now, Mrs. Marcet's explanations using the caloric theory do describe and explain the experimental evidence at hand and make useful predictions about chemical behavior. In addition, they ignited a flash of insight into my long-dormant (or latent?) freshman frustrations.

What I did not put together while concentrating on energy balances in sulfuric acid plants was that words, too, are fluid, in the sense that they change over time and place. Reading historical documents, I am finding, is like Americans and Brits talking – we all think we speak the same language, just because we use a lot of the same words, but, in fact, those words often have different meanings. Consulting contemporary dictionaries, I found that many common words have changed their meanings significantly from a mere century or two ago. With a little help from my friends (Thomas Sheridan's 1789 dictionary and the 1828 edition of Samuel Johnson's 1755 dictionary), I have learned "industry" once meant "diligence or assiduity" not the modern "manufacturing"; "arts" once meant "the power of doing something not taught by nature and instinct; a science, as the liberal arts; a trade; artfulness, skill, dexterity; cunning", not the modern "liberal and fine arts"; and "science" once meant "knowledge; certainty grounded on demonstration; art attained by precepts or built on principles; any art or species of knowledge".

The flash of insight from re-reading Mrs. Marcet's descriptions of different behaviors of the caloric fluid (heat) was realizing she used the word "sensible" throughout her whole book as I would probably now use the word "tangible" or "palpable." Sheridan

and Johnson give ten meanings for "sensible", nine of which are related to "perceptible by the senses" and the tenth of which reads almost like an afterthought: "in low conversation it has sometimes the sense of reasonable, judicious, wise." My modern interpretation, then cited as the "low conversation" option, was the problem. Sensible heat changes the temperature of the material, and a change in temperature can be seen on a thermometer or felt. The latent (which meant "hidden, concealed, or secret" in the early 1800s) heat was caloric which changed the phase of the material at a constant temperature, without any "sensible" effects.

So it all makes sense now – those words "sensible" and "latent" were just archaic usages, reminders of former theories and former times, when relying on first-hand observations, including the data from all the senses, was a primary tool of scientific investigation. The terminology, therefore, makes perfect sense, in the modern sense of sense, of course. But now I am wondering what insights might await me if I re-read *Sense and Sensibility* with my older dictionaries by my side.

-- Jennifer I. Brand, Editor

FROM THE CHAIR-ELECT: ABOUT ME AND THE VLS

Experience Nduagu

For my first column as Vice-Chair of VLS, I would like to say thank you to the membership for the privilege accorded to me to serve in these capacities and to tell some personal stories to introduce myself and my goals for the AIChE VLS.

I grew up in Amaoji, a rural village in southeastern Nigeria with a population of less than five thousand people. Almost every family in this neighbourhood engages in sustenance farming, growing crops such as oil palm, cocoa, tuber crops (e.g. yams, cassava, cocoyam etc.), cereals (e.g. maize) and vegetables (garden egg, okra, etc.), mostly for their own consumption. Also, some animals are reared in this community; they include sheep, goats and poultry. There were virtually no chemical or chemical-related industries in this community; at the time the only chemical-related facility nearby was an oil palm processing plant, located 6 km away and close to the Isiala Ngwa Local Government Headquarters in Okpula Ngwa. Though I visited the oil palm processing plant once, I did not establish a link between this processing plant and chemical engineering.

A chemical engineering career became my pursuit not because I was inspired by

my visit to the palm oil processing plant but because of what I read in science career books. I read that a good knowledge of mathematics and chemistry are important for chemical engineering studies. It was also with excitement that I read the diverse areas of applications of chemical engineering and its processes. The excitement came because mathematics and chemistry were my best courses in secondary school, thanks to one of my friends whom I also consider a mentor – he made me "fall in love" with science, especially with these two subjects. We spent many nights together studying, burning numerous midnight candles, in a literal sense of it. He was very good in science subjects and he was very generous to teach and mentor me.

My dream of obtaining a bachelors degree in chemical engineering was later realized at the Federal University of Technology Owerri (FUTO), Nigeria, after completing a five-year program. During those years of undergraduate study, I began a search for international platforms that bring chemical engineers together. It was around 1999 that I discovered AIChE; however, I was unaware of any convenient student or professional chapters. Though the national chemical engineering organization, the Nigerian Society of Chemical Engineers (NSChE), was vibrant in FUTO, I looked forward to connecting and rubbing minds with chemical engineers from across the globe.

A few years later, I was in Finland for my graduate studies and my search for an international professional platform for chemical engineers continued. Unfortunately, AIChE did not have a presence at the Abo Akademi University, Finland where I did my MSc and PhD (between 2007 and 2012) programs. As a doctoral student, I browsed the AIChE website, looking for a local section I could be join; there I came across the AIChE VLS.

After reading about the AIChE VLS, I realized that my best option was to join it. The first reason for my decision was unavailability of local sections around my geographical location and the second reason was my passionate desire to connect with other chemical engineers from across the world. Thereafter, I started attending monthly meetings of the VLS. My networking goals were not immediately realized; however, I benefited tremendously from the monthly presentations that cut across almost all areas of chemical engineering. This benefit was able to sustain my interest; thus, I discontinued my search for local AIChE chapters I could be part of.

My experience shows that there may be thousands of students and professionals outside the United States who are looking for ways to be part of the AIChE community. They want to connect with chemical engineers from different geographical locations. These people are not able to participate in AIChE because there are no local sections and student chapters in their localities. The good news is that the VLS section is set up to fulfil this need. The VLS section offers an opportunity

to be part of a global network of chemical engineers who meet (mostly virtually) and connect with each other as chemical engineering professionals from different geographic locations, industries and backgrounds. For example, members of the Virtual Local Section come from more than 30 countries representing almost every continent and more than 25 industry categories are represented. The AIChE VLS is known for its diversity, increasing membership, rich programing. There exist tremendous opportunities to engage, volunteer, and develop leadership skills. Since I joined AIChE, I have fully participated in VLS activities and have taken advantage of some of the volunteering and leadership opportunities that VLS offers. In 2014, I became the Membership Chair of VLS and served in that position until my current role.

As the membership chair, I completed a number of monthly or quarterly routine membership contact and data captures and analysis. In addition to those, I also accomplished some exciting and memorable tasks. I will present of one of those here. I led the organising and facilitation of a Special Student and Young Professional (YP) event, with theme "Navigating AIChE Local Sections", which was hosted by the VLS. This event was carried out in collaboration with the YP committee, the Local Sections Committee and the AIChE Secretariat. The purpose of the event was to help graduating seniors transition smoothly from student members to professional members in their local sections. The planning of this event took many months, involved robust communications with stakeholders. Major tasks included deciding the topic, event's scheduling and platform, panelists, and many others transparent to the users. The event was successful as it attracted many participants and addressed an important issue confronting graduating students ad young professional members interested in maintaining their AIChE connections.

I benefitted, too. Through this event, I made meaningful connections with the panelists, who were the chairs of the YP and the Local Section Committees as well as the Liaison for YP and Local Sections at the AIChE Secretariat. The successful organization of the event reinforced my confidence in possessing good organizing skills. Prior to my graduate studies, I had significant experience organizing events in the non-profit sector, but I thought I had lost those skills due to lack of practice – I no longer organize and host events. This was a win-win, I benefitted tremendously from the volunteer leadership of this event, while giving value to students, YPs, and the VLS.

The VLS has recorded significant growth over the years; I want to continue to be part of this success story, even to contribute at greater levels than I have done previously. While I would like VLS to maintain areas of strength, I see some aspects that require greater efforts in order to make VLS stronger and more robust. Let me list the things that I would like to see happen in the Virtual Local Section in the next two years. These goals are: 1) Significant increases in

membership, focusing on international members 2) Increases in networking opportunities and more active participation by members 3) Creation of avenues for mentoring and inter-generational knowledge exchange. I think these will strengthen the VLS and the profession.

I would like to see the membership of VLS increase by at least 50% in the next two years. This goal is inspired by the fact that there are many hundreds of international chemical engineers who would like to make VLS their professional community. Besides that, a major goal of the VLS is to support geographically isolated chemical engineers irrespective of the location they operate from. Since the VLS is not limited by geography, I believe that the VLS has the capacity to serve more people that it does today. Now, more than 85% of the members are from the United State. My vision is to see that the VLS is well-positioned to attract and to serve a significantly larger number of international professional chemical engineers and students who do not have access to local chapters. However, I want to insure the proposed membership increase may not adversely affect the benefits our members get or the quality of our programing. This is because the same virtual structures and platforms that are currently used to serve the members can equally be used when our membership increases significantly. However, such an increase in membership would require more efforts to increase engagement and networking among members. This is a challenge that the VLS currently faces but the second and third goals are intended to address that.

As part of the strategies to encourage networking and inter-generational knowledge exchange, a mentoring program is needed. This program will provide opportunities for students, and young and experienced professionals to connect, interact, and learn as mentors and mentees. The program will be evaluated periodically for effectiveness and changes made where necessary. Mentors in this program will be recognized for their contributions.

It is with excitement that I accepted my election as the Vice Chair and Chair-Elect and I look forward to an ever-brighter future for VLS. I would like to read your comments on what you think about my first column. Please let me know feedback on the goals I listed and/or what should be added to the goals, so that together we can build a stronger, richer, more robust and engaging VLS and membership.

INTRODUCING NEIL YEOMAN

Our new columnist is Neil Yeoman, AIChE Fellow, VLS Treasurer and an experienced newsman. Neil has not only served as the VLS Treasurer since its 2010 founding but he has also spoken at four meetings of the separate YP group the VLS had in its earlier years and at our December 2015 meeting. He wrote the first VLS Bylaws; he recruited three of our other guest speakers; and has had letters to this newsletter and an interview published here. In addition to

being the founding treasurer of the VLS Neil has been the treasurer of the AIChE Separations Division since 1990, a member of AIChE's Equipment Testing Procedures Committee since 2011 and its Licensure and Professional Development Committee since 2014, and he is the immediate past chair of the AIChE Admissions Committee on which he has served since 2005. Neil served a 3-year on the Career and Education Operating Council (2008-2010) and two 3-year terms on the AIChE BOD (2005-2007 & 2009-2011), the only person to so serve since the middle of the last century. Although retired since 2001 Neil still does technical work as a volunteer consultant to the Design Practices Committee of Fractionation Research, Inc., a committee of which Neil was one the six founders in 1976, which he chaired for eight years in the 1980s, and of which he has been secretary since 2002.

Another interesting connection: for a short time, earlier in its life, a student who was simultaneously the Editor-in-Chief of the *Polytechnic Reporter*, the weekly newspaper of the NYU Polytechnic College of Engineering. A half century earlier, when that institution was known as the Polytechnic Institute of Brooklyn, Neil Yeoman as the *Polytechnic Reporter*'s Editor-in-Chief.

More about Neil can be found at AIChE Engage.

THE WORLD OUT THERE: THE PE LICENSE

Neil Yeoman

AIChE Engage has been asked two questions about PE licensing and I have commented briefly on both. I would like to expand a bit on the subject. My comments were:

On March 29 I wrote - *Everybody should seek the PE license as soon as they can. Nobody can tell at the start of a career where the career will go and there are many pathways where a license is helpful and some where it is essential.*

On April 11 I wrote - *Licensing should not be required because it really proves very little and some of the world's best chemical engineers might have difficulty getting licensed as the systems now exist. However, that such is the case should not deter people from seeking licenses. For most new graduates it should be pretty easy to take and pass the FE exam and they should do so, not because it proves more than their ability to pass the test but because there may be a time that a license is needed. Like one of the other contributors I never had to use any of the several active licenses I had before I retired. The system never required it, but I can think of many situations where it might have been required, if not for me then for other people. And, of course, the system might change. Getting a PE license is a good career move. That the PE licensing system as applied to chemical engineering is flawed (like so much else in this world) should not stop people from seeking the PE*

license that might at some time prove very important to them.

On April 15 I wrote - *There has been some heated discussion on the question of whether or not PE licenses should be required. While I have always actively, and often aggressively, encouraged ChEs to get licensed if it is at all practical I vehemently oppose making it mandatory. Yes, it is true that organizations differ in their commitment to the safety of the public but the variation in the qualifications of people with PEs is far greater; and there are far more PEs who are not qualified to assume responsible charge of important activities than there are functioning organizations that are irresponsible. The system is imperfect and our profession must seek to do what is best. As the system now exists AIChE supports the Industrial Exemption, and rightly so. One major fault of the system is a lack of understanding of what it takes for an engineer to become qualified for responsible charge. There appears to be one state that denies ChEs the opportunity to take responsible charge of the process design of chemical process plants in favor of mechanical, electrical, or civil engineers.*

I have been observing the PE licensing system for a very long time and am well aware of its faults, just as we all have been observing other faulty aspects of the world around us. People should no more opt out of the PE licensing system because of its faults than they should opt out of the world for its faults. I have never had to use any of my PE licenses but when my then employer of 25 years exited the engineering business long before I was ready to retire one of the two opportunities I had for employment that met my specific requirements required a PE license. For reasons outside the scope of the issue here I followed another path (and am very glad that I did), but had that path not been available having that PE license might have proven extremely important and well worth everything it took to obtain and maintain it.

ANY MID-CAREER THOUGHTS?

Our contributors come from a range in the experiences, concerns, goals, and viewpoints our contributors, but there is still room for more perspectives. In particular, I would like to hear from the mid-career professionals. Please contact me at jbrand@unl.edu if you would like to see your name and thoughts in print in future issues.