Attending Chemistry Boot Camp

The Augsburg Summer Chemistry Institute of 1964

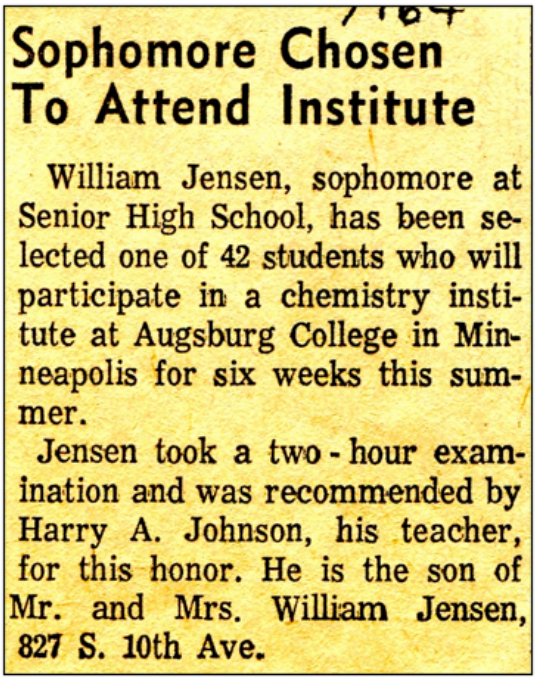
William B. Jensen

Department of Chemistry, University of Cincinnati
Cincinnati, OH 45221-0172

As recorded elsewhere, I took my first formal chemistry course my sophomore year at Wausau Senior High School under Harry Johnson (1). I did quite well and soon became something of a teacher's pet. This was during the 1963/1964 academic year and the height of the fallout from the so-called Sputnik scare of the late 1950s. Frightened that the United States had somehow fallen behind the Russians in science and technology, the government had begun pouring funds into educational programs designed to upgrade the teaching of science in America's high schools and colleges. As part of this campaign, the National Science Foundation (NSF) also began sponsoring both summer workshops for science teachers and summer institutes for promising high-school students.

Sometime in the spring semester of 1964, Harry must have received a flyer soliciting applicants for a NSF Summer Institute in Chemistry to be held at Augsburg College – a small undergraduate Lutheran school located near downtown Minneapolis – and he decided that, as his prize student, I should apply. Acceptance was based on a competitive two-hour exam for college students sponsored by the American Chemical Society (ACS). I have no recollection of having taken this exam but, according to a short newspaper clipping saved by my mother (figure 1), I apparently did well enough to be accepted, along with 51 (not 42 as stated in the clipping) other high-school chemistry students scattered throughout the United States, from Maine on the east coast to California on the west coast.

The Institute was six weeks in length and was scheduled to run from the last week of June through the first week of August. Acceptance may well have been an honor, as claimed by the newspaper clipping, but attendance was not free and required the outlay of about $150.00 to cover the cost of food, housing, textbooks, and miscellaneous day to day expenses, though we were given a $50.00 stipend at the end of the six-week course. These costs may seem trivial by today's standards, but it was a sizable expenditure for my family at the time.



Sophomore Chosen To Attend Institute

William Jensen, sophomore at Senior High School, has been selected one of 42 students who will participate in a chemistry institute at Augsburg College in Minneapolis for six weeks this summer.

Jensen took a two-hour examination and was recommended by Harry A. Johnson, his teacher, for this honor. He is the son of Mr. and Mrs. William Jensen, 827 S. 10th Ave.

Figure 1. A yellowed clipping from the *Wausau Record Herald* saved by my mother and announcing my successful admission to the 1964 Augsburg College Summer Chemistry Institute.

Rather surprisingly, my mother not only got my father to cough up the necessary funds but to also drive us to Minneapolis in order to deposit me at the Institute. The entire family went along for the ride, as well as my close friend Tom Schwartz. The combination of six people in a used car sans air-conditioning, a four-hour drive, and the frustration of trying to locate the college in the unfamiliar labyrinth of downtown Minneapolis, must of stressed my father to the limit. Yet a slightly fuzzy snapshot taken by my mother testifies to our safe arrival (figure 2). This shows us lined up along the grassy boulevard opposite the main academic building on campus. All of us are dressed in our Sunday best, though, in deference to the summer heat, the males have all shed their suit jackets.

Figure 2. A group snapshot taken in late June of 1964 shortly after our arrival at Augsburg College for the opening of the NSF Summer Chemistry Institute. We are standing on the boulevard across the street from the main academic building. *From left to right:* myself, my friend Tom Schwartz, my brother Stephen, my father, and my sister Linda. My mother, as usual, is behind the camera.

I not only have on a white shirt and tie but also a vest with a watch chain and watch-fob. This, I blush to confess, was my so-called "Eliot Ness" suit. At the time I was an avid fan of the television program "The Untouchables" and had developed a fascination with circa-1930 dress styles and with Model A automobiles. Consequently I was delighted when I was able to purchase my first three-piece suit and took every available opportunity to wear it in public. The only person in the photo who appears worse for the wear is my younger brother, Stephen, who has affected the stance of someone struck dumb by the sheer boredom of the entire affair – indeed so exaggerated is his pose that one can almost imagine a trickle of drool issuing from the lower right-hand corner of his mouth.

Figure 3. "Old Main" at Augsburg College as it looks today.

That afternoon the students and their parents all attended an introductory orientation held in the original, circa-1901, college building known as "Old Main" (figure 3). By age sixteen I had already developed an abiding fascination with old buildings and was intrigued by the prospect of having lectures in this one. However, as events turned out, I would never see its interior again as the entire Institute would instead be held in a circa-1955 building known as "Science Hall," which housed the chemistry department on its uppermost floor (figure 4). After completion of the orientation, students and parents said their goodbyes and we were taken across the quad to an L-shaped array of

Figure 4. "Science Hall" at Augsburg College as it looks today. Though I can no longer remember for certain, the chemistry department was most likely located on the third floor, since this would have minimized ventilation problems with regard to the laboratory hoods.

circa-1938, four-story, red brick, dormitory buildings (one wing for the boys at the Institute and one for the girls) and assigned rooms and roommates (figure 5).

This would prove to be my universe for the next six-weeks – Science Hall at one end of the quad and the dormitory at the other – since the rest of the college was shut down for the summer. This shutdown would prove to be the first of many disappointments as I had been looking forward to using the school's library. At the time, both Tom and I were avid readers of the horror stories of H. P. Lovecraft and we had determined that one of my first tasks at Augsburg would be to look up the dreaded *Necronomicon* of the "Mad Arab Abdul Alhazred" in the college library. In retrospect, I do not

Figure 5. A fuzzy snapshot of the old dormitories at Augsburg College. Dating from 1938 and originally known Sverdrup-Oftedal Memorial Hall, their current fate could not be determined from the College website.

know which of our assumptions was the most naive – that the *Necronomicon* was a real book rather than a fictional creation of Lovecraft, or that the library of a small, inner-city, undergraduate college would actually own a 15th-century Latin book on demonology.

Adjusting to the Big City

From this point on I can trace events in some detail, since, for the first time in my life, I became a regular correspondent, sending my mother weekly letters and exchanging occasional letters with both Tom Schwartz and with Glenn Davis – all of which have survived thanks to my mother's obsession with preserving the most minute trivia of both my childhood and adolescence. Glenn was my Sunday School teacher at the local Mormon Church back in Wausau and was to become something of an intellectual mentor to me. Though a lowly cab driver by profession, he was the only adult I knew who actually read books and who appeared to have a private intellectual life of his own. Our correspondence, begun that summer, would continue, off and on, for the next 20 years.

These letters reveal that I had some initial adjustment problems when it came to the realities of life in the big city. These began almost immediately when my father became temporarily lost while attempting to locate the college campus. At one point we ended up driving through a very seedy business district and I can recall gawking in disbelief at the abandoned and boarded up buildings and at the drunken derelicts sleeping on the sidewalks and bus benches. Though Wausau did have a small dilapidated neighborhood known as the "hollow," located just south of downtown in the flood plane of the Wisconsin River and inhabited by what were called "white-trash, welfare families," there was nothing comparable to this.

Augsburg was basically an "inner-city school" and, when I later became comfortable enough to explore the surrounding region, I would occasionally chance upon an Afro-American neighborhood and be stunned by what I, with my very limited experience, considered to be its terrible squalor – though I suspect that the Minneapolis version of this was almost benign in comparison to the realities in other large American cities. Most people today cannot imagine how segregated America was in the 1960s, and I do not mean just segregated by neighborhoods and schools, but also by entire towns and cities, at least in the Midwest. Though Wausau had a population of roughly 33,000, up to that point in my life the only encounter I had ever had with living Afro-Americans was when, at age four, I was taken by my parents to see the Harlem Globetrotters at the local Catholic High School in Marshfield. I was actually selected by them from the audience to come out onto the floor of the gym to participate in some sort of stunt, but was so terrified that I refused to leave my mother's side. The 1960's were, of course, the height of the Civil Rights Movement, and the resulting riots, marches, and peaceful sit-ins were on the news almost daily. But, like the escalating war in Vietnam, all of this seem to be happening elsewhere and to have little relevance to life in Wausau, Wisconsin.

One minor adjustment to the big city involved the continuous nighttime roar of traffic from the downtown district and nearby freeways, which I was not used to and which, for the first week or so, made it difficult for me to sleep nights. However, by the end of the Institute, I fancied myself a hardened veteran of the big city and, as revealed in a letter of 26 July, offered to give my family a proper city tour when they came to pick me up:

The Institute ends at 3:00 pm on Friday, 07 August. Wish you would write me as to when you are coming. Steve and Linda should come along and possibly we can talk Dad into driving around so they can see the real city (I have discovered that Augsburg is located in what is actually classified as the slums). Remember the University of Minnesota? Well, in Saint Paul there is one just as large, only it is just an agricultural school. Steven would enjoy it.

Knowing my father, I doubt very much that he agreed to the suggested tour. Like all fathers of that era he was hell bent on driving from point A to point B in the shortest possible time and with the minimum number of interruptions. I can still recall his barely veiled disgust whenever he was forced to make a pit-stop to accommodate our seemingly unending need as young children to pee during family road trips.

Adjusting to Dormitory Life

Adjustment to life in the dormitory proved to be even more challenging than the culture shocks of the big city. My roommate was a boy from Chaska, Minnesota, named Dana Kamerud, and we shared a small room on the third floor containing a bunk bed, two desks, a dresser, and a metal closet. The room had no direct access to the hallway. Rather one entered through an even smaller adjacent room containing a single desk and bed and whose occupant was, I suppose, also officially our roommate, though I can no longer remember his name. At the foot of our bunk bed was a door that connected directly with the communal bathroom for the floor, so we were treated to an unending medley of flushing toilets and running water taps.

However, the noisy bathroom was the least of my distractions. Though two chemistry seniors at Augsburg, who worked as lab TAs and graders for the Institute, also resided in the dormitory and presumably acted as House Fellows, life in the dorm was basically a free for all, with all of the problems associated with a group of teenage boys temporarily cut loose from adult supervision. Thus, in a letter written on 04 July, I complain to my mother that:

Study in the dorm is quite impossible. One of the kids down the hall is addicted to playing the radio as loud as possible. There is a group of Luther Leaguers staying at the college. Yesterday ten boys were almost kicked out of the Institute for throwing water bombs and fire crackers off the roof at the Luther Leaguers and five for trying to break into the girls' dormitory.

and on 09 July I further complain that my lab partner was spending more time in our room than in his own and that the implied expectation of socializing made it difficult to study properly.

Regrettably this same lack of proper supervision sometimes extended to the labs as well. I can recall one hot, sticky afternoon in the qual lab when, in a desperate attempt to cool off, several boys got into a water fight using pipettes and pipette bulbs. The lab was lit, not with florescent lights, but with huge tungsten filament light bulbs. The lighting was indirect and was bounced off metal reflectors that surrounding each bulb, save for the very bottom of the bulb, which was silvered and projected out a hole in the center of the reflector shield. At one point, one of the boys, in his unbounded enthusiasm, directed a stream of cold water upwards which hit the projecting bottom of one of the hot light bulbs, causing it to explode with a loud bang into a shower of glass shards. Everyone immediately ducked below the lab bench as a panic-strickened TA came frantically running into what appeared, at first glance, to be a deserted laboratory filled with the faint smoke of an oxidized bulb filament. I can also recall one of the boys later destroying a toilet in the restroom adjacent to our dorm room using a bomb made from cane sugar and potassium chlorate, the ingredients of which he had purloined from both the cafeteria and the chemistry laboratory.

As might be expected from its date of construction, the dormitory lacked both elevators and air conditioning and the latter defect proved to be the biggest single obstacle to proper study, since July of 1964 proved to be one of the hottest on record for the Twin Cities. Already in my first letter to my mother on 01 July I began to complain about the weather:

It has been above 95° since Sunday and it is most miserable. Everyone is thirsty for milk, seeing as there is no refrigerator [in the dorm] so one can't keep it cold and you may have only one glass per meal in the cafe.

And again on 18 July:

It has been in the 90's ever since I got here (it rained only once), but this week it is unbearable. It is impossible to study and I sweat so much I think I may have a small fever.

Likewise at the end of the same letter:

P.S. 90° tonight. I feel so enervated that I ate a quart of sweet pickles for supper ... The local Police Report said that 450 people fainted from the heat today.

In case you are wondering why a sixteen-year old would use a word like "enervated" in his letters, there is little doubt that this was an affectation I had picked up from reading too much Edgar Allen Poe and H. P. Lovecraft, both of whom had excessively wordy prose styles, though to the best of my knowledge neither was addicted to sweet pickles.

The reference to the "cafe" was to the college cafeteria, located in the basement of the dormitory, where we purchased our breakfast and lunch five days per week. For suppers and weekends we were on our own and had to rely on nearby fast food joints and convenience stores (whence the quart of sweet pickles). In retrospect, I am uncertain whether the cafeteria was really called the "cafe" (which strikes me as a bit too trendy for 1964) or this was just my way of evading the fact that I didn't know how to spell cafeteria. Like most teenagers, it would never have occurred to me to look up the spelling of a word in Webster and, in any case, whenever I was told to do so, I had what, at

the time, I considered to be an iron-clad counterargument. “How can I look it up if I don’t know how to spell it?”

My craving for cold milk is also interesting. This was not because I was a fanatical citizen of “America’s Dairy State,” but because it was my mother’s beverage of choice for growing children. We never drank soda pop at home (my mother believed it would dissolve your bones), nor did we ever have dessert with meals. When our demands for sweets became insistent, my mother would whip up some bizarre – albeit supposedly healthy – alternative, such as wholewheat angel-food cake, frozen fruit-juice bars, or a horrible sticky, diarrhea-brown, substitute for fudge made with powder milk that she had gotten from the cookbooks of Adelle Davis, whose views on nutrition she followed religiously. She was particularly fixated on the virtues of yeast powder suspended in milk, acidophilus culture, fried liver, and massive doses of vitamin C. And, of course, there were the “healthy” commercial alternatives – Graham Crackers were better for you than cookies and Ovaltine better than chocolate milk, etc. Predictably, when I complained of feeling run-down from the summer heat, she promptly mailed me jars of both yeast tablets and vitamin C.

In any case, it was not until the 26th of July, about two weeks before the end of the Institute, that I finally reported a successful resolution of my milk craving:

I found a dairy store nearby and now can buy cold milk by the quart. However, if I am unable to down it in one meal, I must throw it out for lack of refrigeration.

My letters also reveal that, for the most part, I actually liked the food in the “cafe,” which surprises me, since I was a finicky eater. Thus on 01 July I write:

The food is pretty good (we had french toast for breakfast and ham for dinner), but I’m getting pretty tired of hamburger.

And again on 04 July:

The food in the cafe is really good. So far we’ve had turkey, fish, and beef stew.

As revealed in a letter of 09 July, my complaint about hamburgers was because the only inexpensive place I could find off campus for suppers and weekend meals was a local hamburger chain, though I occasionally rebelled and attempted an alternative:

Suppers are fairly good and I average about 75¢ each (since I’m never very hungry because the food is so good at dinner) ... Tonight my roommate and I got sick of Hartee’s hamburgers, so I found a discount bakery shop and bought two-dozen rolls for 15¢. Then we went to the dairy store and bought some sandwich meat and a couple of pounds of seedless grapes.

and, finally on 18 July, I report an escalation of food costs:

You realize, of course, that I don’t have to pay for any of the cafeteria meals until the end of the Institute, hence money sent goes for supper (I now spend approximately $1.00 per meal).

Making Friends

My first letter home suggests that my initial impression of my fellow students at the Institute was not very favorable:

I find a great deal of competition among the participants (almost all of whom are seniors), and most of them quite freely brag about how much they know. Others know very little, even some of the simplest chemical basics, while others have had physics.

However, as might be expected, I gradually began making friends. I naturally spent considerable time with my assigned roommate, though less for reasons of shared interests than shared living space. My first real friendship came about a week after the start of the Institute, when, suffering from television deprivation and desperate for entertainment of any sort, my roommate and I hiked over to the University of Minnesota and bought tickets to the first movie theater we encountered. This proved to be an art theater that was playing a French film with subtitles and this was probably the first foreign film I ever saw. It was here that I also met another boy from the Institute by the name of Merle Vandeputte:

Friday night my roommate and I got sick of homework and vowed to go to the first movie we could find, which happened to cost $1.25. It was a movie in French entitled “Sundays and Cybele” and one that I surprisingly enjoyed. I also met one of the members of the Institute whom I didn’t know before. His name is Merle Vandeputte and he looks almost exactly like Clyde [my youngest maternal uncle]. He and I both enjoyed the movie (my roommate doesn’t care for abstract French films).

Merle (figure 5) was from Milroy, a small town in southwest Minnesota, and the two of us began explor-

Figure 5. The participants in the 1964 Augsburg College Chemistry Institute. Dr. Courtland Agre is on the far left in the second row and Dr. Earl Alton on the far right in the front row. The two senior chemistry majors who functioned as lab TAs and dormitory councilors are on the far left in the last row and the far right in the second row. I am third from the right in the front row. All of the boys with whom I became friends are looking toward me rather than at the camera, which suggests that I had just made a sarcastic comment of some sort. Standing immediately behind me is Merle Vandeputte. In the center of the second row are Manning Butterworth (Hawaiian shirt) and Norman Henderson (white shirt). The boy standing third from the left in the front row may be the mysterious "boy from Maine" whom I mentioned in my letters but never named. I am uncertain, but I think the second boy from the left in the front row was the classical pianist, whose rendition of Gershwin's *Rhapsody in Blue* so entranced me. As may be seen, in keeping with the almost total dominance of science nerdom by males during this period, only three of the 51 participants were girls, and I blush to confess none of them made any lasting impression on me.

ing Minneapolis together the very next morning, as described later in the same letter:

Saturday morning Merle and I got up at 8:00 am and walked over the the University of Minnesota. We spent the entire day lining up bookstores, but were disappointed because all were closed on account of the 4th. We plan to hike over again after school on Monday. About 2:00 pm we walked five miles uptown and back again, making a total of 25 miles that day. He is learning German by himself and we spent the rest of the day translating the Hamburg Daily.

I can recall the two of us exploring the old chemistry building at the University of Minnesota from top to bottom and discovering, on one of the upper floors, graduate students working at lab benches that, because of overcrowding, had been placed in the hallways and, even more astounding, groups of students working at benches that had been placed outside on the roof of the building in the hot July sun!

However, I reserved my most exciting discovery for my letter of 18 July:

I have already worn out my shoes since I walk about 15 miles each Saturday ... Last Saturday I spent the entire day at the University of Minnesota chemistry library – most unusual in that I wasn't suppose to be there. A large sign stated that only graduate students with special permission were allowed. Evidently I resemble a graduate student (I haven't shaved for a week – ha, ha).

Here I discovered classic volumes on the history of chemistry by such authors as Kopp and Ladenburg. Though I still did not know enough German to read them, I knew of both their existence and iconoclastic status through my reading of Mary Elvira Weeks' *Discovery of the Elements* – a book which I first encountered in the 7th grade at the Wausau Public Library,

and I thrilled at the realization that, unlike the fictitious *Necronomican* of Lovecraft, such volumes really existed and were even available in the United States. Little did I realize that many years later I would spend many an evening in this library during my brief sojourn teaching high-school chemistry in the Twin Cities.

Yet another friend was my laboratory partner mentioned earlier, though for some odd reason I never mentioned his name in my letters and instead always mysteriously referred to him as "the boy from Maine." Thus on 04 July I report:

At 7:00 pm the boy from Maine (who is my lab partner) invited me and my roommate to a fireworks display. Just got back and in fact it is 12:00 am right now.

And again on 26 July*:*

Yesterday one of the boys in the dorm lent me his bicycle and the boy from Maine and I rode uptown. I am very disappointed though. Both the Minneapolis and Saint Paul libraries, and the State Historical Society, are closed on weekends and on weekdays at 5:00 pm. Hence, not only is the Institute no fun, it is planned so that we can have none in any other way.

Despite my repeated failure to access most of the libraries and museums in the Twin Cities, the Institute did offer some compensation in the form of a small reading nook located at the far end of the laboratory hallway. This contained some chairs and low bookcases populated by castoff chemistry textbooks provided by the professors and a large pile of unbound issues of the *Journal of Chemical Education*. On those afternoons when I finished lab early (as I frequently did during the qualitative analysis phase of the course), I would spend time there paging through the issues of the journal and avidly reading any articles dealing with the history of chemistry.

Yet a third friend was a boy from the Twin Cities by the name of Norman Henderson (figure 5). Since he was local, he had the luxury of going home on weekends and on one occasion invited me to join him and his family for Sunday dinner. While I was disappointed by the menu, for dessert his family introduced me to yet another wonder of the big city which I felt merited a detailed description in my letter of 09 July:

Sunday I was invited to dinner by Norman Henderson, who lives in a suburb of Minneapolis called Edina. Unfortunately we had hamburgers for dinner, exactly what I had been living on all week. After supper we went to a place called Bridgeman's. This is a large chain of ice cream parlors. This particular one happened to carry 37 flavors, such as pink bonbon, mint, orange ice, peach, and butter brickle (I had English toffee).

I can also recall the two of us sitting in the family living room that evening, ostensibly writing up our lab reports on Faraday's laws of electrolysis that were due on Monday, while simultaneously being distracted by the television set, which, after three weeks of viewing abstinence, seemed almost infinitely fascinating.

My fourth encounter was briefly recorded in my last letter of 03 August:

Spent the weekend on a farm in southern Minnesota. Will tell you of the details on the way home.

Though I did not mention the boy's name in my letter, I had no trouble identifying him in looking at a list of the Institute's participants nearly 50 years later. After all, who can forget a name like E. Manning Butterworth? With a moniker like that you might expect someone from a private school on the East Coast, but in fact, as noted in my letter, he was the son of a prosperous farmer from Minnesota. The farm itself was located near the tiny town of Eagle Lake, about 83 miles south of Minneapolis, and was surrounded by endless flat fields of corn. The farm house was a large, rambling structure from the 1920s with a walkup attic filled with antique toys and science equipment. Manning (figure 5) was also a fanatic reader of science fiction and must have owned every issue of *Analog Magazine* ever published. However, his major hobby was model rocketry and we spent much of the weekend firing off rockets in the corn field behind the house. These consisted of a wooden nosecone and a cardboard tube body with fins into the bottom of which you wedged a commercially prepared cylinder filled with gun powder and ignited with a fuse. The rocket body had a small sleeve attached to the side which you slipped over a stick pounded into the ground and positioned so as to determine the rocket's approximate trajectory.

A fifth encounter involved the nameless boy who occupied the room adjacent to Dana and myself, though we never became close friends. However, at some point we discovered that he was a competent classical pianist. I can recall that we managed to gain access to a grand piano in the nearby college auditorium and that I sat in utter amazement as he pounded out, by memory, the complete score to Gershwin's *Rhapsody in Blue*. I was so fascinated by this performance that I think I must have cajoled him into repeating it on at least two more occasions before the end of the Institute.

Chemical Antiques and Books

One of the advantages of the big city was that it gave me access to second-hand book stores and antique shops containing treasures well beyond anything I had previously encountered and thus planted the seeds for a life-long addiction to collecting and preserving historic chemistry books and apparatus – an addiction that would culminate many years later in my appointment as Curator of the Oesper Collections in the History of Chemistry at the University of Cincinnati.

Most of the book stores were located in a small business district on the north edge of the University of Minnesota campus known as Dinkytown, where, as mentioned earlier, I would later live for four months while student-teaching high-school chemistry in the suburbs of St. Paul. As my letter of 09 July indicates, Merle and I lost no time exploring the local book offerings:

Merle and I finally got to the bookstores and I have some very nice chemistry books (one dating from 1858).

and once again on 18 July:

I bought an 1858 chemistry book, and some chemicals with my $5.00. Would you please mail my chemical balance. It has a blue base, a set of brass weights, removable pans, and is very light (shouldn't cost much to mail). The reason is that I can sell it to one of the students here (it originally cost me $14.00) and with the money (if sold for $6.50) I can buy a much better balance which I have found.

The book in question – the first antique chemistry textbook I ever purchased – was the 1858 edition of David Wells' *Principles and Applications of Chemistry*, and it still resides on my office shelves. My reason for requesting the balance from my home laboratory was that I was hoping to sell it to one of the boys at the Institute in order to recover the cost of an antique balance I hoped to purchase. This was an 1890 marble-topped box-balance manufactured by Henry Troemner of Philadelphia and, like the Wells textbook, I still own it, though it now resides on the shelves of the Oesper Apparatus Museum at Cincinnati.

By the 26th I had begun a two-way traffic in used chemical apparatus:

Saturday I found an antique shop. Not a second-hand junk shop mind you, but an actual antique shop. Some lady runs it as a hobby and it looks like a shop straight out of one of those revolutionary-style New England towns (It even has a picket fence). Will you please call Pat Chrouser and tell him I can get him a photographic balance like mine, only a little older, with weights for $6.00. Please send his reply before Friday. If so, I can purchase it and he can pay me back when I come home.

What I didn't mention in this letter was that in this same shop I had also purchased a circa 1860 boxed assay balance with tiny concave pans for weighing cupel buttons. However, a few days later I discovered roughly a dozen unused antique analytical balances gathering dust in the stockroom at Augsburg and, rather surprisingly, I had the hutzpah to ask if I could purchase one. The answer was yes but, before the deal could be completed, several of the other boys at the Institute with home laboratories got wind of it and began clamoring to purchase balances as well. This created a dilemma, since the balances were of varying quality and complexity, and there were squabbles over who got which one. In the end, in the interest of fairness, it was decided that we should draw lots – the boy with number one having first choice, the boy with number two having second choice, etc. Unhappily I drew number twelve and so ended up with the least desirable choice. To even things out we were allowed to choose among the available sets of analytical weights in the opposite order, so I ended up with the fanciest weight set. Both items still reside on the filing cabinet of my study at home.

Though I was strongly attracted to the brass and wood of the antique balances, I was still thinking in terms of items for practical day to day use in my home laboratory rather than in terms of museums and collectibles. As a consequence, I felt I no longer had any use for the assay balance and so returned it to the antique shop in exchange for several antique pharmaceutical measuring glasses, though these, to my great anger, were later damaged by another boy in the dormitory who took to playing with them in my absence. In retrospect, I greatly regret this decision, since the assay balance was in fact far rarer than my rather mundane analytical balance and I would dearly love to have one today for inclusion in the Oesper Collections.

One of the wonders of Dinkytown at that time was a shop run by a German who sold refurbished microscopes to students at the University Medical School. Some of these were late 19th- and early 20th-century models made of brass and were truly stunning examples of craftsmanship. Though reasonably priced at between $75 and $100 each, they were still well beyond my means and I could only look and admire from afar. Many years later, when I briefly lived in Dinkytown and was much better funded, I discovered to my

Figure 6. A rather out of focus snapshot of Courtland Agre as he appeared in his younger days when teaching at St. Olaf College.

regret that both the German and his antique microscopes were no more.

All told, my poor mother must have spent most of her time that July at the Wausau Post Office, since, in addition to my repeated requests that she mail me books and laboratory equipment, I was also sending a box of laundry home each weekend. Being a typical spoiled male adolescent, it simply never occurred to me to look for a laundromat, whether in the basement of the dormitory or elsewhere.

Rebelling Against the Curriculum

The organizer and director of the Institute was an Augsburg faculty member by the name of Courtland Agre (figures 5-6). Born in South Dakota, the grandson of Norwegian and Swedish immigrants, Agre had received his undergraduate and graduate training in chemistry at the University of Minnesota. During the Second World War he worked as a polymer chemist for the 3M Company in St. Paul, after which he joined the faculty of St. Olaf College in Northfield, MN. Following a sabbatical at Berkeley, Agre joined the faculty of Augsburg College in 1958.

A forceful personality, he had the habit of removing his glasses whenever emphasizing a point and holding them just off his face by the hinge with his pinky finger pointing in the air – a characteristic gesture that was usually accompanied by the equally characteristic phrase "People we are cognizant!" spoken in a oddly pitched voice that one could only reproduce by hardening the palate and inhaling while speaking. Needless to say, many of the boys at the Institute soon learned how to imitate these foibles with uncanny accuracy.

The rumor quickly spread among the Institute's participants that Agre was filthy rich due to a number of key patents he held on the adhesive used on 3M's best known product – Scotch Tape – and that he only taught at Augsburg as an act of charity. I doubt if this was really the case, but two events did occur during the Institute that seemed to lend credence to these rumors. Thus, during the final week, we were all invited to his home for a lawn party and cookout. As it turned out, he lived in a huge, rambling, circa 1930 imitation half-timber Tutor mansion located on the shore of Lake Nakomsa and complete with a wood-paneled study and library – hardly the type of house one could afford on the salary of a teacher at a small inner-city undergraduate college. If I recall correctly, his sons were also present at this gathering, though they were younger than the Institute participants. To my surprise, when doing an internet search for information on Agre, I discovered that one of these boys, by the name of Peter Agre, would later go on to win the 2003 Nobel Prize in Chemistry, though I have no clear memory of having been personally introduced to him at the party.

The second piece of evidence occurred when we were taken for an afternoon field trip to visit the 3M research laboratories (figure 7) in St. Paul, where it rapidly became apparent that Agre was well-known (4). This was briefly described in a letter of 26 July to my mother:

Wednesday it finally rained, or at least for a half hour. We all went to visit the 3M laboratories that day. Brother! What a setup! The man who talked with us earns $20,000 a year, has his own private laboratory, and can come and go as he pleases!

I particularly remember one of the research projects we

Figure 7. The 3M research complex in Maplewood north of St. Paul as it appears today.

were shown involving the photoconductivity of zinc oxide. This had been sprayed onto a sheet of aluminum metal which was then placed under a photographic enlarger and exposed to the image of a conventional negative. The 3M chemist then attached one terminal of a lead storage battery to the aluminum plate and the other to a squeegee that he dipped in a solution of ionically conducting dyes. When he ran the squeegee over the plate, out popped a beautiful positive image – and in color no less! I was absolutely fascinated by this and, when I got home after the end of the Institute, I immediately confiscated my mother's role of Reynolds Wrap and the DC transformer from my brother's electric train and tried to replicate it in my basement laboratory, but without success, since, of course, many of the necessary technical details had not been revealed to us during the tour.

The second Augsburg faculty member connected with the Institute was Dr. Earl Alton (figure 5). However, he was so quiet and unassuming that, unlike Agre, he failed to leave any lasting impression beyond, of course, his failure to leave a lasting impression.

This brings us to the question of just what the purpose of the Institute was in the first place? One might imagine, for example, an Institute in which precocious high-schools students were given the chance to work in a real research laboratory or in which they listened to a series of guest lectures by various chemists on advanced topics not covered in a typical high-school chemistry course. Such, however, was not the case with the Augsburg Institute. Its sole purpose was to cram us through a complete 30-week introductory college chemistry course in just six weeks, including laboratories, quizzes (40 in total), and hourly exams (12 in total) – and not just a typical college course, mind you, but an advanced course! As spelled out in Agre's characteristic prose style on the mimeographed summary given to parents at the end of the Institute:

This was a very demanding Institute and essentially covered more than a year of college chemistry on a very high plane of demand. Ordinary college students would not be able to maintain the high demands on the participants.

After an 8:00 am breakfast in the "cafe," we began each morning at 9:00 am with three hours of lecture, followed by a quick lunch in the "cafe" and a two and a half hour afternoon laboratory session, from 1:00 pm to 3:30 pm. Besides a lab apron, we were required to purchase an introductory college textbook (whose name, for reasons that will soon become apparent, I can no longer recall) and a copy of the 3rd edition of C. H. Sorum's *Introduction to Semimicro Qualitative Analysis*. For the first three weeks, half of the Institute did qualitative analysis during afternoon lab and the other half did a series of watered down physical-chemistry experiments that were provided as mimeographed handouts, and vice versa for the last three weeks.

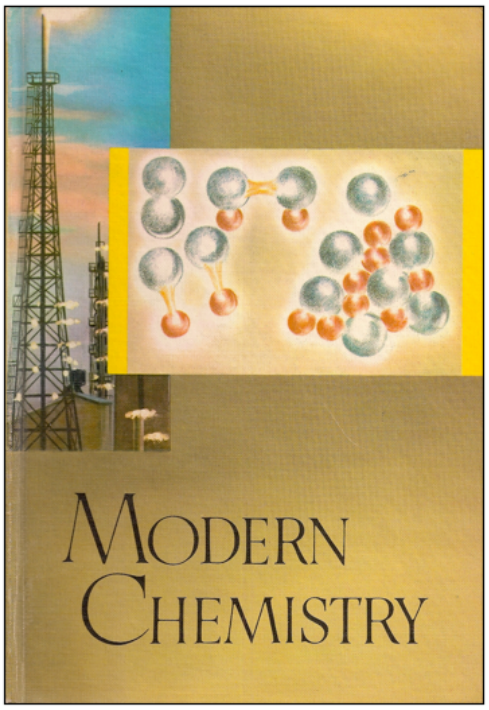


Figure 8. The cover of my high-school chemistry textbook.

Of course, since I had been studying qualitative analysis since the 7th grade and had won two science fairs based on this subject, I knew Sorum inside and out and had no trouble with either that part of the lectures based on his book or with the labs themselves. Unfortunately the introductory college text that Agre had selected was a very different matter altogether. In the high-school chemistry course I had taken in Wausau, we had used the 1958 edition of *Modern Chemistry* by Dull, Metcalfe and Williams (figure 8). This was the 8th edition of a text by Charles Dull dating back to 1918 that was now in its multi-authored "lets try to revise and preserve a best seller that has seen better days" stage. On examining the copy on my office shelves, I find that it was largely a descriptive inorganic text. The only quantitative calculations involved the ideal gas law and basic stoichiometry. The book still used the Bohr model of the atom and Lewis diagrams and made no mention of Schrödinger, s-, p-, d- or f-orbitals, wave-particle duality, probability models of electronic structure, hybrid orbitals, or molecular orbitals. Nor, aside from the ideal gas law, did it contain a single mathematical law or equation.

In fact, our high-school textbook was not unique

in these omissions. Since the early decades of the 19th century, virtually all introductory chemistry courses – whether at the secondary or college level – were conceived of as being introductory courses in the descriptive inorganic chemistry of the common elements. However, the 1960s were the beginning of a radical change in the content and emphasis of introductory chemistry courses. Spurred, as noted earlier, by the Sputnik scare of the late 1950s, there was a widespread movement in the United States to "upgrade" the content of science courses at both the high-school and college levels. In the case of chemistry, this led to a progressive change from the traditional descriptive inorganic course to a watered-down baby physical chemistry course, with a large added dose of physics and mathematics – and the textbook selected by Agre was an extreme example of this new emphasis. One consequence of this change was that both chemistry homework and exam success were now reduced largely to the art of mathematical problem solving rather than the mastery of chemical concepts, facts, and vocabulary

Already in my first letter of 01 July, I gave hints that things at the Institute were not exactly as I had anticipated:

I'll be up until 12:00 pm again tonight. The homework is unbelievable. Sunday I was up until 11:30 pm and I am still a day behind on reading assignments ... I find the qual course easy but the general chem. course is a different matter. It seems to reteach everything in a different manner and jumped into physics the first chapter. (Do you know that 1 gm cm^2/sec^2 = 1 erg = 1/10^7 joules?).

In my second letter of 04 July, I inserted a call for assistance:

Please send my two books on chemistry problems, which are in my large bookcase. One is a gray paperback and the other a large paper-bound manual which will be found among my lab manuals.

However, I would soon discover that the requested books were actually keyed to the older chemistry curriculum I had experienced in my high-school course and provided little assistance in dealing with the quantum increase in physics and mathematics competency now demanded of me.

By my third letter of 09 July I was actually expressing a glimmer of confidence that I was up to the challenges ahead:

I no longer find ergs and joules hard. The problem sets now incorporate integral and differential calculus (which we covered in two days) and such things as determining how much energy is required to raise an electron from one energy level to another based on Einstein's version of quantum mechanics and the Bohr atom. The equation is:

$$I, II = -2\pi^2 e^4 m Z^2 / n^2 h^2$$

I do average on the oral check tests, which are based on the daily reading assignments, but finals are a bit different. We had our first major test on Monday and the top 15 grades were listed on the blackboard. In the qualitative analysis course I was second, but I was 15th on the general chem test. The No. 1 student was the only one who had taken physics ... Please send my "Handbook of Chemistry and Physics" (the large one with india-paper pages and the gold covers), plus the books I requested in my second letter. I am learning more here than I did all year in high school.

I am uncertain what happened in between, but by the time I sent my fourth letter home on 18 July, my momentary bubble of optimism had burst and I immediately launched into a long and rambling critical inditement of the entire Institute:

The lectures are unbearable, most of them having to do with physical chemistry and math, both of which I find quite boring as study material. Sitting in a room about the size of our living room with 50 other people in 90° weather talking about thermodynamics is not my idea of a pleasant morning. I find I am not mature enough to tolerate chemistry 18 hours a day (7:00 am to 1:00 am) and it got so bad that I went out to the nearest second-hand book store and bought three second-hand "Mad Magazines" to read.

Reading this 50 years later, stimulated a latent memory of sitting in one of Agre's early morning lectures. The room is literally packed from wall to wall so that the first row of chairs is less than three feet from the front of the lecture bench. I am sitting in the center of the second row. Though the science building, unlike the dormitory, had a few window air conditioners, it is nevertheless unbearably hot and humid in the lecture room due, in part, to the large number of bodies. I am exhausted from lack of sleep and, as Agre drones on, I begin to nod in and out of consciousness. At some point, in the far distance, I hear Agre's oddly pitched voice loudly demanding that "Someone please wake up the boy in the second row!" And thus I gained the reputation of being the only participant daring enough to fall asleep during class.

The main culprit in this unfolding farce was, as I went on to explain, the textbook selected by Agre:

After being here for three weeks I can say that I am quite disappointed in the Institute. I gain no advantage from the laboratories as I have as much equipment at home as we are allowed to use here and just as much guidance, since the only time the professors are around is during lectures. The large chemistry text that we now solely use (we have no lectures on Sorum) is not a first-year book, as was implied. Neither Augsburg nor the University of Minnesota use it, simply because, as Dr. Alton said, the college students can't understand it. Unfortunately neither can we. To top it off, it is arranged so that our reading assignment per night (40 pages) and our problem assignments (an average of 4.5 hours per night) give you one of two choices: either read the assignment or do the problems. Unfortunately most of the students choose to do the problems by memorizing all of the equations in the book while I rant and rave over how the book got the formulas and what they mean.

To emphasize my point I even attached my crude version of a cartoon I had seen somewhere (figure 9).

By the end of the Institute I so hated the general chemistry book we had used that I immediately disposed of it – thereby giving it the dubious distinction – as friends aware of my almost pathological bibliomania will readily testify – of being the only chemistry book I ever voluntarily parted with. Hence also the reason why I can no longer recall either its title or its authors, though I am certain I would instantly recognize it should I ever come across a copy. Yet, in spite of a life-time of book collecting and the massive collection of textbooks found in the Oesper Collections, I have never encountered another copy, thus suggesting that it was as much of a pedagogical disaster at other schools as it had been during the Augsburg Summer Institute.

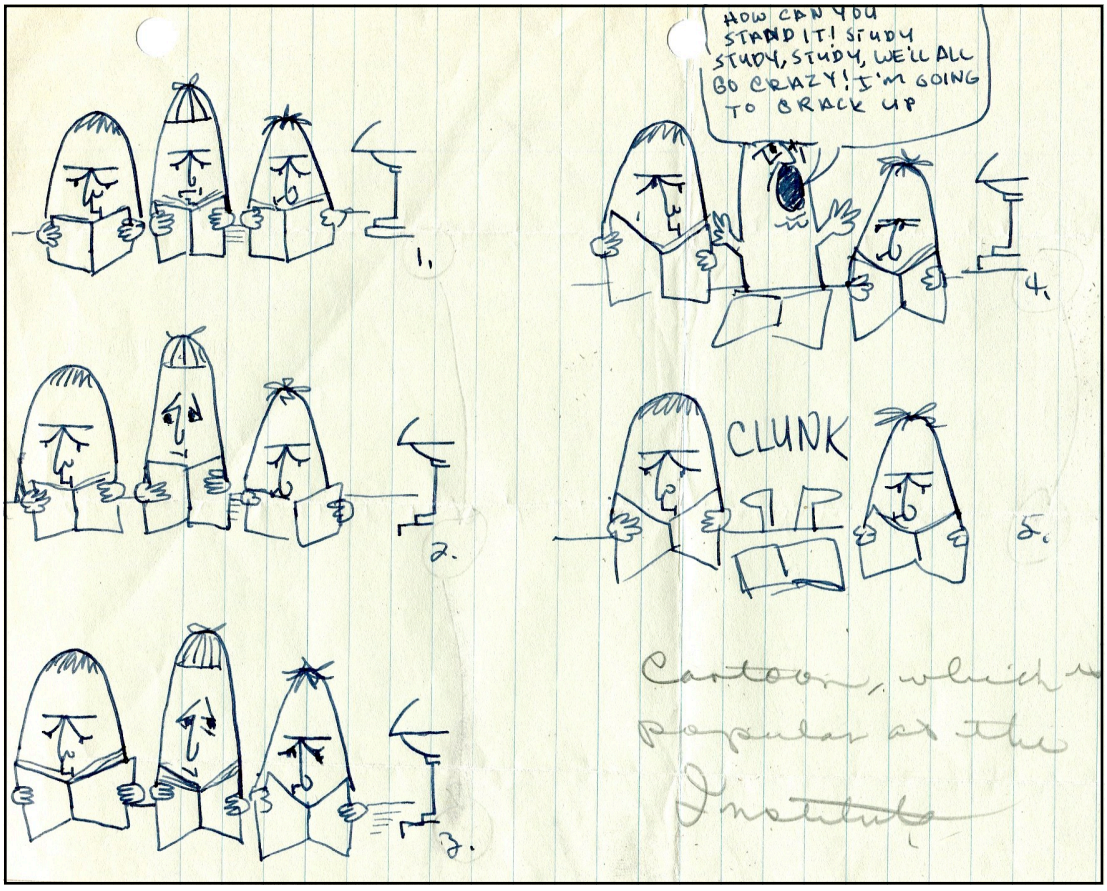


Figure 6. A crude cartoon which I appended to one of my letters, expressing my increasing revulsion with the unending regimen of study and homework at the Institute. It is not original and was probably based on something I saw in a student newspaper at the University of Minnesota and crudely redrew from memory. In any case, it made my point not only to my mother but, to judge from my penciled comment, to my fellow students as well.

But my diatribe was far from over and, in conclusion, I now launched into a series of excuses, complete with an egregious appeal to sonorous platitudes on the true nature and value of education, in an attempt to prepare my parents for possible disappointment:

The diligence of my fellow students doesn't go unrewarded. On our exams memorization gives unbelievably good results. To me, however, this is a gross sin. Education should entail comprehension not memorization and unless the Institute operates on this principle – which it doesn't – I think it a failure. The student will leave with vague, fleeting memories of some entangled formulas which he can't apply until college chemistry, and which, by then, he will recall only in nightmares. No matter how hard I try, I just can't waste time in this unbearable heat (It was 105° all yesterday in the lab) memorizing equations about things I don't understand or, for that matter (I hope), anyone else. I fear my test grades will suffer accordingly.

You might console father that his money will, in my opinion, be put to good use (education has a fixed price but knowledge has infinite value). However, I may possibly never figure it out. Perhaps I am one of the insufficient IQ, creative types. But in any case the chance to see Minnesota is worth the money.

I had obviously gone from being a big fish in a very small pond to being an average fish in a much larger pond and I was not happy with my change in status. In reading this letter a half-century later, I am somewhat embarrassed to recognize that both my change in attitude and my list of excuses are virtually identical to those that I would encounter in later years among some of my own chemistry students.

On the other hand, my friend, Tom Schwartz, had a more balanced view of the matter. I had obviously bombarded him with a series of similar complaints and, in reply, had received a letter satirically – albeit humorously – chastising me for my incessant whining, as well as for the earlier Lovecraft/Necronomicon fiasco:

To the mad Arab, Abdul Alhazard. To the abysmal possessor of ghoulish wonders. To the most insidious mind on either side of Transylvania. Greetings!

It sounds as if Augsburg is crawling with slime. Imagine their audacity trying to make a grade-monger out of you. We'll fix their wagon on Halloween. What's all this about calculus, thermodynamics, etc., etc., etc.? It (or they) doesn't (or don't) have the wholesome, quenching sound of necromancy, alchemy, mesmerism, animal magnetism, astrology, or that most dreaded practice – catalepto-clairvoyance. Anyway, while I call up familiar spirits (you know – conjure, conjure), you study on! I bet physics class is really going to be a tough grind for you next year after this temporary purgatory.

As with the five stages of dying of Kübler-Ross, by 26 July I had apparently passed from the stage of "anger" to the stage of "resignation:"

Sorry my handwriting is so messy, but I'm in tough shape. I can hardly stand to do even the simplest homework. I now understand people who have no work incentive. I don't know what the Institute's secret is, but it sure beats communism.

and, like T. S. Eliot's *Hollow Men*, I would end, in my final letter of 03 August, with a whimper rather than a bang:

Just a brief letter, since it is 1:30 in the morning. My only thought now is to get home. I no longer care about anything, not even homework. I went to a free concert last Tuesday and will go again this Tuesday. I have just enough money until Friday and will break even ... Two cats wandered into the dorm tonight, both as thin as skeletons. Fed both with a pint of whipping cream and let the big one go. The other one, which wandered in approximately an hour after the first, is sleeping under my bed [I had the lower bunk]. He is a kitten and about as big as my hand. I haven't the heart to turn him out so I must hide him from the councilors (can't keep pets in the dorm). Must get some sleep now.

When I awoke the next morning the kitten was gone, having apparently wandered out of the dorm on its own accord.

The first week of August finally brought an end to my agony. I had already summarized the final financial accounting for my mother in my letter of 26 July:

Dr. Agre will collect money on Tuesday, August 4. I owe $35.00 for dormitory, $12.00 for books, $1.00 for a laboratory apron, and $52.50 for food – $50.00 from the school leaves $50.50 which I must have by then. I hope I have given you sufficient notice.

and, on the last day of the Institute, we were each given a two-page mimeographed academic accounting for our parents. This listed all 51 participants and their grades and relative rankings on the various quizzes, exams and labs. It makes unusual reading in this era of privacy laws, when teachers are forbidden to make student grades public, but then the spirit of the Institute was, from its very beginning, one of intense competition. These rankings, which indicated how many students

received higher scores, reveal that, though I was listed as first in that portion of the Institute dealing with qualitative analysis, I was near the middle of the pack (29th) when it came to the general chemistry portion (5).

This document also reveals that we were required to retake the ACS exam that we had taken previously in order to gain admittance to the Institute. As explained in Agre's characteristic prose style, this retake was intended to evaluate the impact of the Institute:

Each student took a 2-hour examination at his high school before selection for the Institute. This is the 1960 ACS General Chemistry Exam for COLLEGE students with the percentile ratings based on college students after one year of college chemistry. Thus this exam was a demanding one for high-school students but necessary to discern the best of the students. On-coming college freshman average under the 5-percentile while the lowest student for the Institute produced about 40% [actually 38%] for selection ... The same exam was taken after the Institute on the last day. The difference between the initial and this result represents possible gain.

The recorded results show I received a 53% on the initial exam, which once again placed me, along with several others, in the 29th ranking or near the middle of the pack. On retaking the exam at the end of the Institute I received a 93%, which, though the 8th highest grade category, still placed me in only the 24th ranking, since so many others had improved as well.

Lessons Learned

The purpose of military bootcamp is partly legitimate training and partly initiation – the latter often bordering on meaningless harassment. Ultimately it seeks to psychologically divest trainees of their individuality and to replace it instead with blind obedience and loyalty to the group. It is not intended to be enjoyable but is still something that one is supposed to be proud of having survived. I, however, cannot recall being proud of having survived the Augsburg Chemistry Institute. When it was finished, I put it out of my mind as quickly as possible. Though I would return to the Twin Cities my second year of graduate school to briefly teach high-school chemistry and would also return several times in later years to visit friends and to give lectures at various colleges, I never again revisited Augsburg and the scene of my summer of discontent.

I suppose that one could argue that, in spite of my intransigence, I was well trained by the experience. As predicted by Tom, I had no trouble earning an A in high-school physics the next year, nor in passing the college equivalence exam my senior year which allowed me to skip introductory college chemistry and to proceed directly to organic chemistry. However, the advantage of having done this was quickly nullified by the fact that I remained at the local extension campus in Wausau for two years, though it had no chemistry courses left for me to take my second year. So, by the time I transferred to the main campus in Madison my third year, I was back in sequence with everyone else. My reasons for remaining in Wausau for the first two years of college were two-fold – one financial and one having to do with a now defunct rule that all freshman and sophomores on the Madison campus were required to live in the dormitories. It seems that the one lesson I did take away from my experience at Augsburg was an extreme loathing of dormitory life and a firm vow never to live in one again.

One of the unspoken goals of the Institute was doubtlessly to encourage outstanding high-school students to pursue careers in chemistry. However, I strongly suspect that, in this regard, it had little impact. Though, like myself, my friend Merle Vandeputte was seriously interested in chemistry as a career, many of the other boys at the Institute were indifferent. They were simply very good and highly competitive students who excelled at anything connected with science and math, and the Institute was just one more opportunity to exert their academic dominance. Thus, for example, Manning Butterworth was one of the top students at the Institute, yet to judge from what I observed during my weekend visit to his family farm, he was far more interested in aerospace science than in chemistry *per se*.

Not only was there no official followup with regard to career choice, there was unfortunately also no personal followup. Though either Norman Henderson or the mysterious boy from Maine (I cannot remember which) happened to be passing by Wausau the following October and made a point of stopping at the house for an evening visit, none of the friendships survived the end of the Institute itself and there would be no future correspondence, exchange of Xmas cards, or reunions (6). I recently read somewhere that a followup study of the winners of the famous Westinghouse Science Fair – a highly competitive national event that was widely publicized in the 1960s and 1970s – showed that very few went on to earn college degrees in science and engineering. Once again they simply proved to be very good students who thrived under the encouragement of enthusiastic teachers, but who, nonetheless, lacked both an intrinsic interest in science and a sustained commitment to its pursuit.

However, in thinking it over, I now feel that I may have also come away with a few more lessons than just my newly acquired loathing of dormitory life – albeit

lessons that were largely subconscious and which only gradually revealed themselves over the course of my teaching career. The first, and most obvious, of these was to always strictly limit the amount of material covered, not only per lecture but in the course as a whole. Overwhelming students with massive amounts of information and homework is both counterproductive and dispiriting.

The second lesson was not to substitute mindless mathematical problem solving for conceptual understanding. Most of us mentally process and retain concepts qualitatively and pictorially, not quantitatively and mathematically. A chemistry course, and especially an introductory course for nonchemistry majors, should always be about the concepts and facts of chemistry rather than about the tricks and techniques of solving algebraic story problems. Of course some mathematical work is necessary, but it should always be illustrative and selective and never be allowed to dominate the course.

The third and final lesson was to never introduce an equation or theory that was not justified by a preliminary discussion of the experimental facts it was designed to rationalize. In this regard I recall being particularly bent out of shape that summer by the textbook's introduction of molecular orbital (MO) theory. Previous to this, I had never heard of this theory. Up to that point every chemistry textbook I had ever read dealt with only Lewis diagrams and VB theory. The relationship of these to the facts of molecular structure and classical valence theory were almost self evident. But MO theory seemed to jettison all of this. Instead we had abstract energy diagrams, counterintuitive distributions of electron density (e.g. π-bonds), and antibonding as well as bonding electrons. Had anyone bothered to explain that this theory had evolved out of the needs of molecular spectroscopy and shown me a Berlin force diagram rationalizing why placement of electron density in certain regions about a molecule could actually weaken rather than strengthen a bond, I think my reaction would have been less violent. But the textbook made no attempt to justify the model and I became convinced that I was being asked to rote memorize chemical nonsense – albeit nonsense that the textbook never referred to again once the exam on the subject was over.

Of course, with the exception of the inappropriately massive quantities of information covered per unit time, most of the pedagogical failings of the summer course at Augsburg were fairly typical of what I would encounter in my university undergraduate and graduate chemistry courses and, in this sense, it prepared me for the many disappointments to come. As for my attempts to incorporate these lessons into my own teaching, I flatter myself that I was moderately successful for the first 20 years, but ultimately failed as the university administration began to interfere more and more with what we taught and how we taught in its drive to make the curriculum as uniform as possible throughout the state. In the end, I found myself forced back to where I had started 25 years earlier and, not wishing to be part of this educational abortion, I finally gave up and chose to take early retirement instead.

References and Notes

1. W. B. Jensen, "Remembering High School Chemistry," 2006, Jensen Website.

2. C. H. Sorum, *Introduction to Semimicro Qualitative Analysis*, 3rd ed., Prentice-Hall: Englewood Cliffs, NJ, 1960.

3. C. E. Dull, H. C. Metcalfe, J. E. Williams, *Modern Chemistry*, Holt, Rinehart, Winston: New York, NY, 1958.

4. Technically the laboratories are located in the suburb of Maplewood, just north of St. Paul.

5. On examining Agre's report I discovered that he ranked students not only according to grade, but also, in the case of student's having the same grade, randomly. Thus seven students received 100% on the final retake of the ACS exam, but rather than all seven being ranked as 1, they were instead randomly ranked as 1 through 7. I have recalculated his rankings to eliminate this egregious error.

6. After writing this, it occurred to me to check the internet to see if I could determine what eventually happened to the few boys whose names I remembered. Not surprisingly, my prediction concerning Manning Butterworth proved correct and he did indeed go into the field of aerospace science. He has published numerous papers in such places as *The Astrophysical Journal*, *The International Journal of Geometric Methods in Modern Physics*, *The Journal of Astrophysics and Astronom*y, etc. He currently lives up the road from me in Dayton, Ohio, where I presume he is connected in some way with research for the U.S. Air Force. Alas, Merle Vanneputte did not become a chemist. He is listed as a private computer consultant living in San Diego. My roommate, Dana Kamerud, became a Senior Research Scientist in the Operating Sciences Department of General Motors in Detroit, where he specialized in policy analysis, and now (presumably retired) resides in Wayzata, Minnesota. Norman Henderson was more difficult to find as his name is quite common. However, based on his current photograph, I believe he is the Norman Henderson who is presently listed as Director of the Prairie Adaptation Research Collaborative (PARC) at the University of Regina in Canada and who is a well known expert on the ecology of prairie lands, though the dates and details of his university training given in his online vita do not seem to coincide with those expected of someone who would have graduated from an American high school in 1966.