

DEPARTMENT OF CHEMISTRY
CORNELL UNIVERSITY
ITHACA, NEW YORK 14853
U.S.A.

NEWSLETTER

Issue No. 28

March 1981

Chairman's Column

This is again my opportunity to address you in the Chairman's Column, to bring you up-to-date on the activities of our Department.

When I last wrote, in the August 1980 issue, it was before two of our newest colleagues, Professor John McMurry and Assistant Professor Barbara Baird, had joined us (and just after Assistant Professor David Collum had arrived). Professors McMurry and Baird have now been here since late last summer, are already in full stride in their research, and are integrated into the life of the Department. It has been most gratifying to welcome them and David Collum as our newest faculty colleagues.

It is with great satisfaction also that I inform you that there will be still another significant addition to our faculty this fall: Peter Wolczanski, who is at present working in the research group of Professor John E. Bercaw at the California Institute of Technology. His current work is on carbon monoxide reduction by transition metals. He will be extending those studies as well as pursuing other avenues of research in inorganic chemistry when he joins us, around August 1.

We have also been benefiting from the presence of Visiting

Assistant Professor Mark Jason, from Amherst College. Professor Jason is teaching our graduate course in physical organic chemistry, and has been interacting closely with the rest of our organic chemistry faculty.

This past fall term we had an exciting series of Baker Lectures by Professor Richard Zare, of Stanford University, on "Chemical Stereodynamics". He had a large and enthusiastic audience, and we look forward eagerly to the book Professor Zare will ultimately write based on his lectures. It will surely become the standard and indispensable reference on angular-momentum theory and reaction dynamics for chemical physicists. Professor Zare threw himself into the life of the Department, and into his lectures, with extraordinary energy and zeal. His visit will have been memorable.

On the same subject, we note with pride the appearance of Professor Gabor Somorjai's book, "Chemistry in Two Dimensions", an expanded account of his Baker Lectures in the fall of 1977, published by the Cornell University Press. It, too, promises to be a classic in its field, and those of us who had the privilege of hearing Professor Somorjai's lectures welcome this permanent record of them. Now we are looking forward to the next in our Baker Lecture series, to be given this fall by Professor Harry Gray of the California Institute of Technology. Those who know Professor Gray will know that we can expect a very lively visit and a dramatic series of lectures on inorganic chemistry.

As well as having had the series of Baker Lectures by Richard Zare this past fall, we had the NIH Lectures in the present spring term, these having been given by Professor Mildred Cohn of the University of Pennsylvania. Her two-week visit has just ended, and I know I speak for all of us in saying how instructive and interesting we found her lectures on "Nuclear Magnetic Resonance Studies of Enzyme Mechanisms and Active-Site Structures". We are now looking forward to the Debye Lectures of the Cornell Sec-

tion of the American Chemical Society, which this year will be given by Professor Richard H. Holm, of Harvard University, during the week of March 23. Professor Holm will speak on the work for which he is renowned: iron-sulfur clusters, and the chemistry of the active site of enzymes. It will have been a full and interesting year!

I have told you often of our progress in equipping our departmental NMR facility. As you know, we have succeeded in acquiring a high-field (300 MHz) superconducting-magnet instrument. It has now been in effective operation for some months, under the supervision of that facility's Director, Dr. Shaw Huang, and has been contributing valuably to the research efforts of the Department. We have also added a much-needed intermediate-level instrument—a 90 MHz multinuclear Fourier-transform NMR. Under the leadership of Professors Gordon Hammes and Bruce Ganem we succeeded in obtaining a grant from the National Science Foundation under its biological-instrumentation program, which went a long way toward providing the needed funds, and a most generous grant also from the Dreyfus Foundation, which gave us just those additional resources we needed to effect the purchase. With these two new instruments we now feel that we have an NMR facility of the kind required for research at the forefront of chemistry for some years to come.

I have spoken to you also of our campaign to establish a computer facility in our Department, which we had decided was now our first priority. We have applied to the Chemistry Division of the National Science Foundation for a major equipment grant and we are hopeful that our proposal will be acted upon favorably. That will still leave the pressing problem of finding matching funds, and, as we did for the NMR, we shall be appealing for private and corporate donations to help us accumulate the necessary total. A major segment of our Department will benefit enormously from the kind of in-house facility we are proposing. If we are successful in acquiring the system we are aiming for, it too, will serve us well

for some years to come. Our efforts to establish that facility are being led by Professor Jon C. Clardy, whose own x-ray crystallographic computing would be one of the facility's important functions.

My term as chairman of our Department comes to a close this June 30, and I take pride in informing you that on July 1 I will be succeeded as chairman by Professor Roald Hoffmann. Professor Hoffmann's name is known to all of you. He is a scientist of world renown, and I have had the opportunity to tell you in these columns of some of the many honors that have come to him. He has received the ACS Alpha Chi Sigma Award in Pure Chemistry, the Fresenius Award of Phi Lambda Upsilon, the Harrison Howe and Linus Pauling Awards of the Rochester and Oregon Sections of the ACS, the International Academy of Quantum Molecular Sciences Award, the A. C. Cope Award in Organic Chemistry (jointly with R. B. Woodward), and honorary doctorates from the Royal Institute of Technology in Sweden and from Yale University. I am certain that this does not end the list of honors that will come to him, and that you will be hearing of additional ones in the coming years. Professor Hoffmann is much in demand throughout the country — indeed, the world — as a speaker at scientific congresses and symposia, and, closer to home, he has been a dedicated and inspiring teacher. He will be a splendid representative of our Department and we are all indebted to him for his willingness to serve. I know that he will have the loyal and enthusiastic help of all of our faculty, students, and staff — just as I have had, which I hereby acknowledge with gratitude.

I hope to see many of you in Atlanta next month, and of course it will as usual be a very great pleasure to greet you at our Alumni Open House this June.

Ben Widom

Executive Director's Column

What do our B.A. chemistry graduates do after they leave Cornell? Last summer we conducted a poll of 1979 B.A. graduates. Here are the results.

60 questionnaires were sent out; 38 were answered, 8 were returned as undeliverable.

Attending medical school	9
Attending law school	2
Attending graduate school in chemistry	8
Attending graduate school in business	2
Attending graduate school in other disciplines	3
Working	14
as chemists	9
as others	5

Summary:

63% are continuing in school. 24% are attending medical school, 5% law school; 34% are attending graduate school, 21% in chemistry. 37% are working, 24% as chemists.

E. Peters

Lauby's Recollections

The Development of Chemical Education and Research at Cornell

Starting with this issue, I propose to present a series of descriptions of the beginnings and progress through the years of instruction and research in chemistry at Cornell University. Because I did not enter Cornell as a freshman until the fall of 1917, my coverage of the happenings at Cornell up to that date cannot claim to be personal recollections but rather will involve material selected from many excellent sources. These include "Autobiography of Andrew D. White"; "The Builder: A Biography of Ezra Cornell" by Philip Dorf; "Founders and the Founding" by Carl Becker; "A History of Cornell" by Morris Bishop; and "The Cornell Campus" by K. C. Parsons. It is my hope that my limited write-up will induce some of you to enjoy reading one or more of these fine books. For detailed information about Cornell chemistry, I will draw freely from an unpublished copy on the history of the Chemistry Department of Cornell compiled by Professor Emile M. Chamot. He attended Cornell as an undergraduate in the 1880's, and had a distinguished career in teaching and research at Cornell from 1891 to 1938. Professor F. H. Rhodes, after retirement, supplemented Chamot's historical material, concerning himself particularly with early instruction in industrial chemistry and the establishment of the School of Chemical Engineering in the College of Engineering. University Archives also has pertinent documentary material which is fun to dig into.

In order to appreciate the whys and wherefores of the beginnings of chemistry at Cornell it is well to establish first some understanding of the state of our country and of education in the 1860's. What conditions were favorable for reform and innovation in college education? What circumstances brought about the unlikely collaboration of a well-to-do, patrician, highly educated

scholar with a grim, self-educated potter, farmer, mechanic, and hard-driving developer of communication systems and railroads? Why were their plans for Cornell so bitterly attacked by church, press and public? How account for their immediate success in getting such a revolutionary university as Cornell started? Why did the Cornell ideas on education have such a stimulating effect on other colleges for reformation of their educational system? In particular, why was chemistry to play such a leading role at Cornell right from the start and why was it to reach such an eminent position so soon? If I can answer these questions only partially, I will rest content.

The war between the North and the South from 1861 to 1865 left the United States confused and ready for change. Railroads were providing mass transportation and opening up the West, offering to the venturesome easy escape from the conservative established society of the east coast and better opportunities for innovation and individual freedom. The population of the country was very highly rural and agriculture dominated the economy. Our endless forests and vast mineral deposits were being tapped; industry was expanding. New technology, new materials, and people trained to develop and apply them were sorely needed. A spirit of optimism toward the future set in and the time was ripe for social, economic and educational change.

Education for most children was limited to the one-room school house and a few years of study of the 3 R's. Most teachers themselves had barely been through the elementary grades. Special courses for training teachers were unknown and few young people went on to secondary education in academies. Still fewer went on to college. The established colleges in the East were, almost without exception, sectarian; established by individual denominations primarily for the training of clergymen and the preservation of rigid, dogmatic theological systems. College faculties, with a few notable exceptions, were composed largely of clergymen, untrained and incompetent. Students were mostly children of

parents who were devoted to their particular religious sect and who wanted their offspring to be brought up in that discipline. Coeducation was regarded with horror and there was little opportunity for women to acquire a meaningful education.

Collegiate curricula usually were predominantly devoted to study by rote of the classics, ancient history, mathematics, and theology. A few courses in "natural philosophy" timidly offered a smattering of simple descriptive chemistry, physics, geology and biology, but these were regarded with suspicion. Science and technical subjects were thought inappropriate for university consideration and training in these areas was generally lacking. Application of science to the needs of the country were commonly ignored. Graduate education in America was just beginning, Yale granting the first American Ph.D. in 1861. Law and primitive medicine were the only professions served. Liberal ideas of education, which had been suggested by such thinkers as Franklin and Jefferson, had made little impact except in a few isolated cases such as Union College, and their reforms did not last. Student enrollments were declining because of the sterile offerings by established institutions.

The situation was somewhat better in the Midwest where new colleges were being organized and the social and economic climate was more open to innovative ideas. Oberlin and Antioch colleges had initiated liberal systems. President Tappan at the University of Michigan had developed innovations which Andrew D. White found suggestive and stimulating. The rapid developments in the newer states demanded that the urgent needs of agriculture, health, and industry be serviced. Coeducation was being accepted. But even in the West, sectarian private colleges with orthodox curricula were still being formed in almost all communities.

The educational pot was boiling in central New York with its rural population, influx of immigrants, improved mass transportation,

and its concern with agriculture, milling, lumbering and budding industry. The public was in a mood to welcome educational reforms. Fortunately, two extraordinary men appeared to spearhead educational change.

Andrew D. White was born in 1832 in the village of Homer. His well-to-do father moved to Syracuse and became a leading and very prosperous banker. Surrounded by comfort, security and culture, Andrew had the fairest of prospects. His parents were devoted to their church, but White became a bookworm, reading widely. This reading led him to scepticism of orthodox theology and he refused to be confirmed. He hoped to enter Yale where he thought he would have fine educational opportunities. His father insisted that the young man go to Geneva College (later to become Hobart), a sectarian institution founded by his family's denomination. His parents thought the discipline there would counteract his revolt against orthodoxy. But it had just the opposite effect. The curriculum was limited to the classics and theology, the faculty was clerical, and the small student body consisted mostly of boys forced to attend by parents devoted to their church. His classmates were not interested in their sterile courses, had no respect for the faculty, and indulged in dissipation and violent pranks. Young White could only console himself by independent reading and collecting books. He started to dream of what an ideal university should be. After one year he refused to return to Geneva and finally persuaded his father to allow him to attend Yale. He was bitterly disappointed in his hopes for a liberal education there. Yale education was then in a very low state, antiquated, classical, and theological, with a rigid, dull curriculum. So little respect was given science that the gifted Professor Silliman had the greatest difficulty developing instruction in geology. That this was typical of the time was attested by Professor Agassiz at Harvard in the 1850's. He called that institution "a respectable high school where they taught the dregs of learning." No wonder college enrollment was dropping alarmingly.

Andrew D. White's experience at Yale only confirmed his low

opinion of the prevailing systems of higher education. Again he took refuge in his precious books and continued to draw plans for an ideal university. He went on to study in France, served a stint as attache to the American Minister to Russia, and then went to the University of Berlin for further study. He greatly admired the liberal German university system which gave him additional ideas to incorporate in his dreams for higher education. These began to crystallize into a determination to widen and humanize collegiate instruction to meet American needs for putting science on a par with language, classical history and philosophy. Although he always remained deeply religious, he believed that the dominance of orthodox theology should be eliminated and freedom of thought along all lines should be encouraged. The finest library facilities should be provided. Upon his return to the United States he started to explore possible sources of support for the founding of his dream university which he planned to locate in his home city, Syracuse.

Ezra Cornell was born the son of a Quaker potter in 1807 near New York City. The family moved to De Ruyter, New York, to work a poor hill-top farm. As a Quaker, Ezra was brought up to believe that "industry and virtue buys success." He had little formal schooling and was largely self-educated. Endowed with considerable mechanical ingenuity, he gained experience along many practical lines in addition to potting and farming. In 1826 he went to Syracuse to work as a carpenter on the construction of the Erie Canal. In 1828 he walked to Ithaca and soon became manager of a plaster mill at the foot of Ithaca Falls. Here he distinguished himself by building a dam at the top of the falls and drilling a tunnel through solid rock to deliver water power for the mill.

Beginning to prosper as a result of his driving energy, Ezra worked on improving the design of farm plows. When Morse invented the telegraph and was seeking some way to set up telegraphic communication, Cornell was ready to contract to build the first telegraph line from Washington to Baltimore. It was to be buried in the

ground by using a special plow which he designed. Becoming convinced by the initial run that underground lines were impractical, he invented the method of stringing wires on poles with glass insulators. He became very busy constructing telegraph lines for the many small companies organized to exploit the telegraph and shrewdly insisted on being paid in stocks of the companies. Eventually he took a lead in consolidation of small lines to form Western Union. This created his large fortune which Cornell was determined to use mainly for philanthropic educational projects. One of the first of these was to build and endow a fine Ithaca Public Library.

Interested in community, state and national needs, he entered politics and was elected to the New York State Senate where he served for many years. When Andrew D. White returned to Syracuse he also was elected to the State Senate and took his seat in 1864. He was promptly made Chairman of the committee concerned with education. Ezra Cornell was Chairman of the Committee on Agriculture, and matters of concern to both committees brought him together with White. The two senators were soon in opposition on various items and their initial relationship was not cordial. However common interest in promoting and reforming education eventually brought them together.

Passage of the Morrill Land Grant Act by Congress in 1862 provided for federal support of education in "agriculture and the mechanic arts" at the college level. Every state was awarded 300,000 acres of federal land for each of its U.S. Senators and Representatives, each state to determine how it would use its grant. This promise of support for education initiated a wild scramble for help between the already existing colleges and the many plans for establishing new ones. There was great danger that in New York the funds might be dissipated by division between a multitude of existing colleges or by undertaking unsound plans for new institutions.

White's ideal university could accommodate Ezra Cornell's

hope to provide practical education to meet the needs of the public. The two senators became fast friends and collaborators in trying to obtain the Morrill Land Grant money to found a new university. Both wanted an educational institution, free of sectarian dominance and offering wide choice of fields of study. It should be open to all able students regardless of sex, color, or creed, and offering opportunities for graduate study to train students for teaching and research.

Bitter opposition came from the established colleges, the church and the press. But in 1865 the combination of the scholarly, diplomatic White and the hard-driving, political-wise Cornell would not be denied. Ezra Cornell, always generous in using his money for education, offered to endow a new university with \$ 500,000 and contribute his extensive farm high above Cayuga Lake, between Fall and Cascadilla Creeks, as a campus site if the state would back the venture by donating its entire land grant to match his gift. Skillful diplomacy and hard work with the Legislature brought success. In 1866 a plan of organization was adopted, a charter was obtained and the new university was on its way. White insisted that it be named Cornell University, and he was elected its President. The enormous task of converting the hilly cow pasture to a great educational center lay ahead. Trustee Ezra Cornell tackled some of the practical problems while President White shouldered responsibility for academic development, a potent mix.

The exciting possibilities for the new university attracted country-wide interest and approval, as well as angry attack by church, press and rival institutions. Students clamored for admission and when Cornell University opened in 1868 its initial enrollment equaled that of the largest established institutions. It was hailed as "the most remarkable phenomenon in higher education of the post-war era."

In my next column we shall see how chemical education developed in the new University.

A. W. Laubengayer

CORNELL SOCIAL HOUR

ACS National Meeting

Wednesday, April 1, 1981

HYATT REGENCY ATLANTA

French Suite

Atlanta, Georgia

5:00 PM

ALUMNI REUNION

Chemistry Open House

Date:	Friday, June 12, 1981
Time:	1:30 PM — 4:00 PM
Place:	Baker Lab — Lobby
Hosts:	Professor A. W. Laubengayer and other faculty members
Refreshments:	Yes

Faculty Members

(Spring 1981)

A. C. Albrecht	B. Ganem	G. H. Morrison
B. A. Baird	M. J. Goldstein	E. Peters
J. M. Burlitch	E. R. Grant	R. F. Porter
B. K. Carpenter	G. G. Hammes	L. Que, Jr.
J. C. Clardy	R. Hoffmann	J. R. Rasmussen
D. B. Collum	P. L. Houston	H. A. Scheraga
W. D. Cooke	M. E. Jason *	M. J. Sienko
R. C. Fay	F. W. McLafferty	D. A. Usher
M. E. Fisher	J. E. McMurry	B. Widom
J. H. Freed	J. Meinwald	J. R. Wiesenfeld
		C. F. Wilcox

* Visiting

Emeritus Faculty

S. H. Bauer	F. A. Long
J. L. Hoard	A. W. Laubengayer
J. R. Johnson	W. T. Miller
M. L. Nichols	

CORNELL CHEMISTS

It would greatly help us in keeping better records if you would kindly inform us of any changes of address or circumstances by completing this form and mailing it to the Department of Chemistry, 122 Baker Laboratory.

NAME: _____

ADDRESS: _____

YEAR OF GRADUATION: _____

DEGREE, TITLES, APPOINTMENTS, PRESENT POSITION:

PERSONAL NEWS:

Department of Chemistry
Baker Laboratory
CORNELL UNIVERSITY
Ithaca, New York 14853
U.S.A.

FIRST CLASS