

DEPARTMENT OF CHEMISTRY  
CORNELL UNIVERSITY  
ITHACA, NEW YORK 14850

# NEWSLETTER

Issue No. 16

March 1975

## FACULTY

This issue of the Newsletter is devoted mainly to Chairmen, past, present and future. Lauby's Recollections are devoted to Peter Debye while the Chairman's Column tells of the plans of Gordon Hammes and the announcement of a new chairman for the Department of Chemistry.

One of the faculty, Bob Hughes, is on extended leave. He has accepted an appointment by President Ford as Assistant Director of the National Science Foundation effective December 20, 1974. Bob is involved with both national and international programs.

Dee du Vigneaud suffered a stroke last July, but I am happy to report that he is making steady progress. Dee looks well and he seems to be in good spirits, but he has decided that he will retire on March 1, 1975.

## ALUMNI

The open-house for Cornell Chemists, held in conjunction with the University Reunion Program, will be held on Friday afternoon, June 13, 1975 in Baker Laboratory. Class pictures will be displayed and refreshments will be served.

## CONTINUING EDUCATION PROGRAM

This summer the department plans to present Advanced Summer Chemistry Seminars during the week of July 7 — July 11, 1975. These intensive one-week courses are designed to provide the practicing chemist with a critical review of one of three areas: Advanced Course in the Interpretation of Mass Spectra, Modern Developments in the Theory of Phase Equilibria or Biological Macromolecules. Additional information will be sent shortly.

## VISITING LECTURER

Dr. Gordon Tomkins from the University of California, San Francisco's School of Medicine will present the Biophysical—Bioorganic Chemistry Lectures during the period April 22 — May 8, 1975. The six lectures are entitled, "Molecular Biology of Control Mechanisms in Eukryotic Cells".

The Baker Lecturer next fall will be Professor D. Arigoni, Laboratorium für Organische Chemie, Eidgenössische Technische Hochschule, Zurich, Switzerland. His lectures will be presented during September and October, 1975. The title and schedule of these lectures will be published in the next issue of the Newsletter.

## Chairman's Column

This is a very special Chairman's Column for me as my term as Chairman will end this summer. Michael Fisher will take over as Chairman for a three year term. Time has passed quickly, thanks to the large amount of assistance and cooperation received from all department members — faculty, non-academic personnel and students. Considering the continually contracting funds which were characteristic of my 5.5 years as Chairman, I think things have gone along reasonably well. We have managed to complete the major portion of our building program and now have teaching and research facilities second to none. Our newly renovated teaching laboratories which opened this Fall have been a tremendous success with both students and faculty. We do hope to add our Teaching Theater sometime in the near future. Several major pieces of departmental research equipment have been purchased including a large nuclear magnetic resonance instrument, a computerized mass spectrometer, laser Raman equipment and a new computer facility (jointly with the Materials Sciences center and the Department of Physics and Applied Physics) which should begin operations this Spring. The computer facility bears special mention since it will be our newest acquisition and represents a new venture in that the facility will utilize an interdisciplinary, multiuser, on-line computer. (With all those adjectives, how can we go wrong?)

I believe the quality of our faculty has improved with the national recognition of many of our younger faculty (anyone under 40 by my definition), a major Professorial appointment, Earl Muetterties, and the addition of several promising Assistant Professors. The size of our faculty has slightly declined, and we presently have about 30 full-time faculty members, which is not a large number considering the large number of undergraduates we teach, about 3000 per term. A very serious problem is the decline of the size of our graduate program. We have dropped from a high of about 185 graduate students to about 135 students. This drop, which apparently is a nationwide phenomenon, is due to the decrease in funds available

for the support of graduate students and the present job market for our graduates. I hope we have reached the bottom of this decline as I believe we now are at about the minimum critical mass for a high quality graduate program. Surprisingly we have been able to maintain our very large postdoctoral program which involves 70-80 postdoctorals.

I must confess that a few problems linger for my successor. The general financial status of the university and of support funds for research and graduate students in chemistry does not present a cheerful picture, and of course the maintenance and improvement of the quality of the department presents an ever-continuing challenge. I want to wish Michael Fisher the best of luck, and I wish to thank all of the many chemistry department members who have been so very helpful during my term as Chairman. Next year I plan to be on sabbatical leave at the National Institutes of Health, hopefully being "rehabilitated" for my return as a full-time faculty member.

Gordon G. Hammes

CORNELL SOCIAL HOUR

ACS Spring Meeting

Tuesday, April 8, 1975

WARWICK HOTEL

Adams Room

Philadelphia, Pennsylvania

at 5:30 PM

## Lauby's Recollections

Peter Joseph William Debye

I first met Professor Debye in 1936 when I was on sabbatical leave in Europe. Cornell was interested in getting him to come to the Chemistry Department for a term as Non-resident Baker Lecturer and I had been commissioned to see him to negotiate this matter. Debye was still at the University of Leipsig but was in the process of moving to Berlin as the Director of the Max Planck Institute where advanced research facilities were being built for him. He greeted me cordially, inquired about my own scientific interests, and agreed to come to Cornell as soon as the situation in Germany was favorable. Much disturbed by the rise of the Nazis, he hoped that in time this would subside.

Debye came to Ithaca with his son, Peter Paul, to give the Baker Lectures for the fall term of 1939-40. That fall Hitler invaded Holland and Debye, who was still a Dutch citizen having refused to take up German citizenship, became an enemy alien of the Nazis. They immediately confiscated his Berlin office, his laboratory, and the new home he had built and of which he was very proud (one feature of this home was a heated swimming pool which exploited the warmth of the water circulated to cool the huge magnet he had constructed for research). He was most upset by the loss of his very valuable and irreplaceable personal library.

Professor Debye decided to remain in the United States and Cornell invited him to join the faculty of the Department of Chemistry as its chairman. He accepted, much to our delight and to the dismay of a number of the other top-flight American universities which had been angling for this most outstanding Nobel Prize winner. When time permitted, he became an American citizen.

Debye was chairman of our Department from 1940 to 1950 and

thus had to cope with many problems occasioned by the war. As one who was at Cornell during this time and concerned in keeping up the academic training of our students as well as meeting the needs of the military units assigned to Cornell for specialized courses, I had to consult with Debye frequently. He was a most understanding and effective chairman, very good at stripping aside red tape and getting to the core of a problem. Due to his many stays at American universities before the war, he had a good knowledge of our American academic system and appreciated our commitment to good teaching at the undergraduate level as well as the importance of promoting graduate training and research. He sometimes became impatient with administrative inertia and made good use of his great prestige as a scientist of worldwide renown to force the hands of university administrators. Once in the late 40's when I asked for a sabbatical leave long overdue because of the war, Debye interrupted my recital of what I proposed to do to make myself more useful to Cornell as the regulations required. "Lauby, I wish someone would ask for a leave just because they are tired and need a rest."

Following Debye's ten-year term as Department head, he continued as Professor and became Professor Emeritus in 1952. Although retired, his scientific activity continued full-speed right up to his death in 1966, as attested by the publication of some fifty outstanding papers after 1952. His stay of twenty-six years at Cornell was by far his longest period of residence at any university or institute. We were indeed fortunate to have him in Ithaca for so extended a time.

Cornell colleagues Henri Sack, Benjamin Widom and Simon Bauer wrote a splendid memorial tribute to Professor Debye for the 1966-1967 Necrology of the Faculty of Cornell University. Because most of the readers of our Newsletter probably have not had the opportunity to read this, I am taking the liberty of reprinting portions of the tribute as part of this column, with the kind permission of the surviving authors.

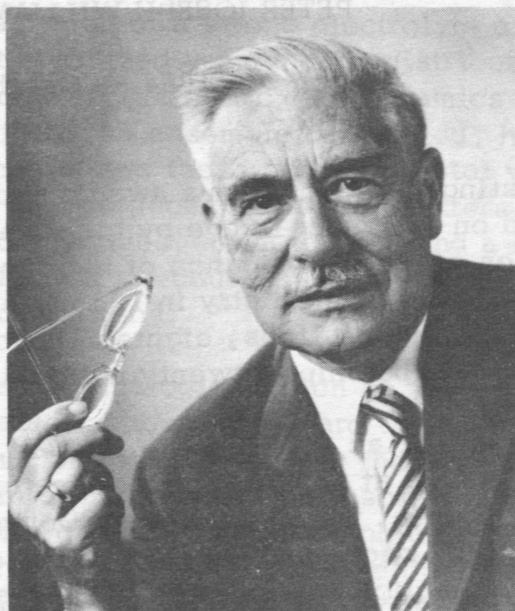


Photo of Professor Debye (circa 1960)

The bust of Peter Debye, on display in the lobby of Baker Laboratory, by Professor Victor Colby, is a memorial from friends and associates.



## PETER JOSEPH WILLIAM DEBYE

March 24, 1884 — October 2, 1966

A listing of the numerous awards and honors which have been bestowed on Professor Debye by his scientific peers will convey some impression of the significance of his contributions. He was awarded the Nobel Prize in Chemistry in 1936. In addition, he received fourteen medals and citations, eighteen honorary degrees, and was elected to membership of twenty national academies.

In science, as in art, there is style. Debye's theories, his ways of looking at physical phenomena and of expressing his understanding of them, were as uniquely Debye's as a painting is unmistakably an El Greco or a van Gogh. The essential element of his style was simplicity, which for Debye was not merely a technique; it was an earnest conviction. He knew that physical phenomena must have simple explanations; he took complexity to be lack of understanding. If a theory was not yet simple then it was not yet right — it was unfinished and imperfect. To achieve simplicity one must identify the essentials and isolate them from the irrelevancies. To recognize the essentials, to express them clearly and pictorially, and then to pursue their consequences with superb technical facility was Debye's style.

A scientist verifies that he has recognized and isolated the essentials by constructing a model — a hypothetical system which consists of abstractions of physical entities and of the laws which govern their behavior. If the consequences of the model correlate well with measurements made on the real physical system, then it provides an "explanation" of the phenomenon. A successful model has no redundant elements and in the minds of scientists becomes the embodiment of the very physical system it illustrates. It permits visualization of the phenomenon in its starkest simplicity, unencumbered by irrelevancies. In the role of a master model-builder, Debye has left an indelible mark on physical science. One cannot now



consider an aqueous solution of a strong electrolyte as anything other than a somewhat organized yet dynamic distribution of small, charged spheres in a uniform dielectric; the dynamics of a crystal are accountable in terms of an ensemble of coupled, harmonic oscillators, and at low temperatures the important crystal vibrations are those of a continuum; an amorphous structure scatters light as would plane traveling ultrasonic waves. These ideas and a host of others, each of breathtaking audacity because of its simplicity, burst upon science as sudden illuminations.

The illustrations and analogies which so enlivened Debye's lectures are unforgettable. Those who heard them can no longer think of density fluctuations without seeing the tiny stick he asked us to imagine thrown into the medium to measure spatial correlations, and we cannot think of a dipole without seeing a cigar. (In a photograph of Debye, which is now famous because of the cigar he is shown holding, a plus sign was dubbed in at one end and a minus sign at the other.) These two homely examples of Debye's models point up another aspect of his style in his approach to model-making. Models may be either physical or mathematical; Debye's were physical. Though he had mathematical abilities of the highest level . . . , he had a deep distrust of overly mathematical theories, and dismissed as "mere mathematics" any explanation of a physical phenomenon that lacked a concrete, visualizable basis.

Debye reached scientific maturity at exactly the right time and place. Thoroughly grounded in (indeed, one of the great masters of) the classical disciplines of mechanics and electrodynamics, he also knew their basic limitations. When quantum mechanics was discovered, he was ready; in fact, he promoted its development and made some of its important early applications. Thus, through a receptivity that was genius in itself, and a lucky accident of time and place, Debye was to be one of the first to combine in a single intellect a knowledge of classical mechanics, electrodynamics, thermodynamics, statistical mechanics, and quantum mechanics. He had all the materials for his models, and he used them as would a great artist — each step simple, spare, and incisive. It was a unique experience

to observe how Debye immediately recognized the basic components of a new problem and their relations to known phenomena in other areas. When he read a publication, its essentials were immediately incorporated as a constituent element in his overall picture of the physical world. This explains, in part, his phenomenal memory of everything he had read or heard. It may prove that he was one of the last of the great natural philosophers, who recognize no boundaries between the various portions of science. At the same time, he was among the first in the twentieth century to demonstrate the artificiality of the historical boundary between physics and chemistry.

Although Debye was considered a theoretical physical chemist, for many years he occupied chairs in experimental physics. And this was not an empty title. Almost unique among theoreticians, he was not only vitally interested in explaining experimental results and suggesting new experiments to test a theory, but he participated actively by giving practical advice, designing new laboratory techniques, and following the day-to-day progress of his experimental co-workers. Indeed, many of his theories were tested and confirmed by his associates in his own "institute". He did not withhold his interest nor avoid involvement with practical applications. A number of his investigations actually started from industrial problems that came to his attention. It is thus not surprising that he was much sought after as a consultant. Were one to attempt to delineate his field of activity it would be the determination of molecular structure in its most general sense, in that he started with the underlying postulate that the geometry of molecules, the force fields around them, and their interaction with the radiation field in which they were immersed, determined the physical and chemical properties of matter.

For decades Professor P. J. W. Debye graciously received many visitors, among them scholars, students, and historians of science who came to pay their respects, to discuss, to learn, sometimes to dispute, but often simply to establish contact with a great intellect and to gain wisdom. To questions as to how he selected problems for investigation his reply was that he worked only on

those problems which interested him and which he could solve; as to how he partitioned his time, he said that he devoted all his efforts to a single problem until it was resolved. He thoroughly enjoyed his scientific pursuits but balanced this with full appreciation of physical well-being. He stressed the importance of giving students enough time to think seriously about their assignments, and he frequently talked of the importance of generating and living in intellectually stimulating surroundings which could lead to scholarship and scientific discovery. He believed that the intense preoccupation of serious scientists with a problem generates an atmosphere which is pregnant with ideas, which goads the imagination of those who are immersed in it to the discovery of principles of the physical world.

With the departing of Debye the world has lost one of the few "total" scientists; total in his devotion to his task, total in the breadth of his interest; total in the mastery of his discipline, and total in his human simplicity and straightforwardness.

Henri Sack, Benjamin Widom, Simon H. Bauer

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Such a vigorous and very human individualist as Debye naturally generated an abundance of anecdotes and a sampling of these will serve to keep his memory green. His chubby body surmounted by a handsome massive head was a familiar figure as he walked from Baker to the Domecon Cafeteria, later to the Statler Faculty Club, for luncheon. Many of his colleagues and research associates would join him for informal conversation. While smoking after lunch he would point out the blue color of his cigar smoke. Why? This was when he was developing his light-scattering studies.

Professor Sack, from a long association as student and colleague of Debye's, remarked that his strongest personal image of Debye was that he was a truly happy man, living a full life of scientific activity, enjoying a happy home and with an absorbing

interest in his hobbies of gardening and fishing which he shared with Mrs. Debye. He grew, under artificial light, Alpine plants from seed obtained from Switzerland and had a fine library about Alpines. His collection of cacti was noteworthy.

Harry Bush, in charge of the Department machine shop, skillfully fabricated many of the pieces of equipment Debye required. The two often went on fishing expeditions and Harry was reputed to be the only person who ever addressed Debye as Peter. Harry constructed a famous collapsible aluminum rowboat for Debye's use, so constructed that it's fore and aft sections could be disconnected and nested together for fitting into the trunk of Debye's car. He usually returned all fish caught to the water. One of the younger professors tells of inviting the Debyes for dinner on a Friday, planning to have a fine roast of beef because Debye was known to be especially fond of it. Belatedly remembering that the Debyes were Catholics, the hosts hurriedly rounded up some fish as a substitute, only to find out later that Debye hated to eat fish and had no reservation about eating meat on Friday.

Debye had a wonderful sense of humor, often saying "I come from Maastricht, a part of the country where people are jolly." He heartily enjoyed parties and those held in his home, usually on his birthdays, were indeed jolly. He was fond of dancing and would nimbly whirl his partner through a fast German waltz, proud of never getting dizzy as did we lesser mortals. The highlight of his parties always came when he happily popped the corks of the numerous bottles of champagne. Shortly after Debye arrived in Ithaca we took him on a picnic on Bald Hill above Brooktondale. The fine view of the neighboring valleys and hills charmed him and he relished the steak broiled over a wood fire. Later we sang many old songs and Debye told us that he had sung in a boy's choir as a youngster. He knew many American songs and sang "Daisy, Daisy, Give Me Your Answer True" in Dutch for us.

Big black cigars were his constant companions and one could follow his travels around the corridors of Baker by the smell of the

pungent smoke left behind. It was a great blow when later his doctor banned smoking because of a heart condition. Debye was an ardent reader of detective stories. I recall coming across him returning to Ithaca on the evening Lehigh Valley train from New York. He was deep in a paperback and said that he usually read two on each trip. The long shelves on one wall of his office were filled with these mystery stories and he was generous in allowing faculty, office staff, and research associates to borrow them. He would never travel by air until forced to by the discontinuance of passenger trains.

Debye concentrated on the current problem which interested him. A research associate told of Debye arriving at the laboratory one morning to greet his collaborators with "Vell, do you know what happened last night? I worked out that problem. Very simple. All parts fell into place." (He was fluent in English but never mastered W.) A young faculty member asked Debye "How is it you have been able to make all these discoveries?" "Vell, I tell you. I think of a problem. Then I think how I would solve it experimentally. If it is going to need complicated and expensive new equipment, I don't do it. Three or four years later someone else will have built the equipment. Then I do the experiments." A visitor meeting him after twenty years said, "You haven't changed a bit!" "Vell, vy should I?" He was never pompous but he resented when someone wasted his time. One time when the American Chemical Society was evaluating chemistry departments, the visiting inspector was introduced to Debye. The latter stuck his thumbs in his belt, "Vell, inspect me."

Debye was a strong believer in the value of seminars and conferences. His own contributions to scientific meetings were noteworthy. He would sit back and listen attentively to the talks and let others advance questions. Finally he would rise. Impatient with those who had lost themselves and the audience in detailed speculation, he would begin. "Look here, this is really so simple," and proceed to clarify the matter. A visitor asked permission to attend a seminar at which one of Debye's research associates was to speak. Debye, after remarking that the man was uninvited, said "O.K., sit in the corner and keep quiet." But the visitor interrupted frequently.

Debye stood it just so long and then pointed out the irrelevance of the remarks. The visitor replied lamely that he was trying to supplement what was being reported. Debye returned, "Ve don't need your supplement".

Debye's lectures were always a joy to attend. Although they appeared to be spontaneous, he always had prepared them thoroughly. He delighted in presenting illuminating and ingenious demonstrations, and the multicolored slides he used for presenting graphs were beautifully done. He wore glasses and in lecturing or in conversation, frequently took them off to wave in emphasizing his remarks.

I am indebted to many for furnishing stories about this colorful scientific genius who contributed so much to the Cornell scene. There are surely more reminiscences which some of you can add to my collection. I will be particularly pleased to receive any informal pictures which can be copied. The original can be returned, if desired.

A. W. Laubengayer

## Faculty Members

( Spring Term 1975 )

A. C. Albrecht	B. Ganem	E. L. Muetterties
J. T. Bartis	M. J. Goldstein	R. F. Porter
S. H. Bauer	G. G. Hammes	H. A. Scheraga
C. A. Brown	R. Hoffmann	F. R. Scholer
J. M. Burlitch	R. E. Hughes	A. G. Schultz
W. D. Cooke	F. A. Long	M. F. Semmelhack
V. du Vigneaud	G. M. Loudon	M. J. Sienko
E. L. Elson	H. C. Mattraw	D. A. Usher
R. C. Fay	F. W. McLafferty	H. Van Wart
M. E. Fisher	J. Meinwald	B. Widom
J. H. Freed	W. T. Miller	J. R. Wiesenfeld
	G. H. Morrison	C. F. Wilcox

## Emeritus Faculty

A. T. Blomquist	J. R. Johnson
J. L. Hoard	A. W. Laubengayer
M. I. Nichols	

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