

Annual Report 1979-80

SCHOOL OF CHEMICAL SCIENCES

Biochemistry, Chemical Engineering, Chemistry

August, 1980

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\* Sections taken largely from reports of committee chairmen (or equivalent).

Summary for 1979-80

This spring President Stanley O. Ikenberry, as part of his first year in office, requested that each academic unit develop and submit to his office a concise report no more than two pages long. He also proposed that the reports should at least identify three points: the most important accomplishments of the past year, the current major issues and opportunities, and the three highest priorities for the year ahead and what can be done to address them.

The College asked that these reports be submitted to it by June 1, 1980, which was well before the material in the present report could be digested. Nonetheless, short reports were prepared by the three departments and consolidated into a School version as well. The "summary" given below is an edited, somewhat more detailed report for the School than was submitted in response to President Ikenberry's request.

\* \* \* \* \*

With the limited resources available to it, the most important accomplishment of the School for the year undoubtedly was to meet the demands placed upon it for instruction. IUs were up by 4,000, another 8% jump, to an all-time high of 58,000. Over the past decade we've gone from 44,000 to 58,000 IUs, an increase of a third. All departments have shared in the increase, bio from 5 thousand to 6; chemical engineering has tripled, from 2 to 6; and chemistry, from 37 to 46.

Although some of the increase is at the graduate level (head count up from 425 to 475), over half is attributable to the tripling in 5 years of chemical engineering undergraduate majors. The balance is largely in service teaching for other engineering, biology and ag students. However, undergraduates in the chemistry curriculum took a 50% jump this year compared to last, so there may still be further major increases in student demand in store for the School.

The increased enrollments are beginning to show up in baccalaureate degrees granted. After decades at the 160/yr level, the number jumped to 205 last year and 268 this year. MS and PhD degrees were 42 and 61, respectively, at about the level they've been for a decade. The total of 371 degrees granted will almost certainly continue to lead the nation, as we have for 13 of the preceding 15 years. Moreover, the demand for our graduates in the job market and at graduate and professional schools bears testimony to their high quality. Starting salaries in the chemical sciences continue to be among the highest available.

While our School's enrollments were increasing by a third during the decade, those of the rest of LAS decreased by nearly 15%. While our more costly share of the College IUs increased by 50%, our share of the College budget increased by a tenth as much (5%). Without the limited but essential financial help this year from the Campus and encouraging smoke signals from the College, students would again have had to be turned away from the School's courses as they were in the Spring of 1979. But this has been accomplished at the price of teaching loads which are making it impossible for us to recruit the low-cost graduate TAs who do 60% of our teaching.

External recognition of the achievements of our alumni and faculty has not yet been adversely affected by the travail of the past decade. At least 20 of our alumni were honored in major ways during the year. Among the more prominent awards, John H. Sinfelt (Chem Engr PhD 1954) received the National Medal of Science and was elected a

member of the American Academy of Arts and Sciences; Ernest L. Eliel (Chem PhD 1948) was also elected a member; Richard T. Arnold (Chem MS 1935; PhD 1937) received an honorary degree from Northwestern; Charles G. Overberger (Chem PhD 1944) received the 1979 International Award in Plastics Science and Engineering; Ernest W. Thiele (Chem Engr BS 1919) was elected to the National Academy of Engineering; David Turnbull (Chem PhD 1939) was awarded the Acta Metallurgica Gold Medal in materials science; and James D. Winefordner (Chem BS 1954; MS 1955; PhD 1958) has been selected to receive the 1980 Anachem Award in analytical chemistry.

Besides giving us pride in their achievement, our alumni support our programs in more tangible ways such as encouraging promising young students to study with us. Their financial donations this year reached an all-time high of just over \$200,000. In addition to \$20,000+ contributed to various funds of the School in the Foundation, there were two large bequests. Reynold C. Fuson, a member of our faculty in organic chemistry for 36 years, left bequests valued at about \$160,000 to the Foundation with the wish that they be used to further pure and applied chemistry at the Urbana campus. Arthur W. Sloan (Chem BA 1922) bequeathed \$25,000 to the University, the income of which is to fund the undergraduate prizes he had provided for many years via annual gifts of \$1,000.

Faculty of the School gave at least 350 invited lectures during the year throughout the world, of which more than 10 were honorary "name" or plenary lectures at international meetings. Four of our faculty (Brown, Coates, Flygare, Gumpert) are Guggenheim Fellows, more than the total elsewhere on campus. Gregorio Weber received the Rumford Medal of the American Academy of Arts and Sciences; J. C. Martin was Buck-Whitney Medalist; H. V. Malmstadt received the ISCO Award in Biochemical Instrumentation; Gary Schuster a Dreyfus Teacher-Scholar Award and John Shapley the Fresenius Award for the most promising young American Chemist under 35. Eric Oldfield, an even younger faculty member not only was awarded a USPHS five-year Career Development Award and the British Meldola Medal but also was instrumental in the School being the recipient of a \$1.4 million 4-year NSF grant for a Regional NMR Instrumentation Center.

The latter contributed appreciably to another major accomplishment of the year -- a 25% increase in external funding attributable to aggressive action by our faculty in submitting high quality proposals to federal agencies trying to help replace aging and obsolete research equipment. In contrast, State funding went up only 10%, the net effect being a drop in the State's share of our budget from 45 to 42%. Unfortunately, we have major unmet needs for which outside funds are not generally available -- direct instructional costs, laboratory construction and major remodeling, and library facilities. Noyes Lab is obsolete and unsafe; it should be replaced. Our undergraduate teaching labs in Chemistry Annex and in the old part of Roger Adams Lab require a major overhaul.


Some progress is being made in replacing recent faculty losses and in expanding chemical engineering to meet their enrollments. Among the six persons recruited during the year two are in chemical engineering and two are women, Judith Jaehning in biochemistry and Jane Fox jointly in chemistry and electrical engineering. Recruiting difficulties are compounded by the poor laboratory facilities in the old part of RAL and the hazardous and obsolete nature of Noyes Lab. More adequate funding for the School's enrollments would enable us to better meet societal needs, for example by establishing major programs in polymer chemistry and in surface chemistry and catalysis.

The biochemists have organized a new undergraduate curriculum in their discipline. The circumstances reflect the difficulties with the present college organization, which

is too large for adequate communication and too diverse to survive without it. A year ago the College modified the general education requirements (over the strong opposition of our School) for the degree programs sponsored by LAS, which include the existing undergraduate programs in biochemistry and one of the two in chemistry. The net effect on our students in these programs is a substantial decrease in the range of choices available for satisfying the requirement.

The biochemistry proposal is an effort to retain the advantages for their students of the previous requirements. Our School is relatively homogeneous, with interests and needs differing significantly from the humanities and social sciences. Each year an important issue or two arises in which we are out of step with the College. This year it was revisions in the Faculty Appeals Committee and the Honors Program. Instead of continued duplication of review channels and continued friction, we think everyone would be better off if our School were converted to "free-standing status."

In conclusion, as described above there are major issues for the School with respect to the resources, facilities and organization needed to meet its responsibilities and challenges. For the morale of our faculty and staff and for the preservation of our quality, it is essential that we make visible progress in all three areas during the coming year. It is of particular importance that the School become free-standing, a step which would, if anything, save the Campus and College funds and effort, and be acclaimed internally as demonstrating University sensitivity to the School's needs.

  
H. S. Gutowsky  
Director

August, 1980  
Urbana, Illinois

I. Academic Appointments and Activities

A. Changes

1. Losses

School

Duesler, Eileen N., Research Chemist (X-Ray Lab) and Research Associate to be with her husband, William F. Breiland, at Sandia Labs.

Biochemistry

Nystrom, Robert F., Professor, is retiring as of August 20, 1980 and moving to Florida.

Chemistry

Breiland, William F., Assistant Professor, has resigned as of August 20, 1980 to take a position at Sandia Labs.

Stucky, Galen D., Professor, who has been on leave of absence at Sandia Labs, has resigned effective August 20, 1980 to remain there.

2. Additions (non-visiting), effective in January 1980

There were two appointments, not included in the annual report for 1978-79, of persons who joined our faculty in January 1980, as listed below, both in Chemistry:

Fox, Jane, Assistant Professor (2/3 with Electrical Engineering)

Married

Degrees: BS, University of Michigan, 1973  
PhD, Harvard, 1978 (chemical physics)

For her PhD, Dr. Fox worked with Professor Alexander Dalgarno on energy degradation in CO<sub>2</sub> and on the ionization, luminosity and heating of the upper atmosphere of Mars and Venus.

Wolynes, Peter, Associate Professor

Married

Degrees: BA, Indiana University, 1971  
MA, Harvard, 1972  
PhD, Harvard, 1976 (chemical physics)

After completing his PhD with Roy Gordon at Harvard he spent a post-doctoral year at MIT with John Deutch. He joins us after four years on the Harvard faculty. His research interests are nonequilibrium statistical mechanics, especially hydrodynamics.

3. Additions (non-visiting, effective later in 1980 or in January 1981)

School

Pearce, Cedric J., Radiochemist

Married

Degrees: BSc, Southampton, 1973  
PhD, Southampton, 1977

For his PhD, Dr. Pearce worked on the biosynthesis of aminocyclitols with Professor M. Akhtar, after which he spent a postdoctoral year with Professor S. D. Gero at Gif-Sur-Yvette. He came to Illinois in January, 1978 as a Research Associate with Professor K. L. Rinehart. He fills a newly established academic/professional position in the Radioisotopes Laboratory.

Wilson, Scott R., Research Chemist (x-ray crystallography)

Married

Degrees: AB, Gettysburg College, 1974  
PhD, University of North Carolina, 1980

Dr. Wilson has just completed his PhD thesis on x-ray structural studies with Derek Hodgson of magnetically condensed substances and a variety of organic compounds. He joins us as a replacement for Eileen Duesler in the School's x-ray facility.

Biochemistry

Jaehning, Judith, Assistant Professor (effective Jan. 1981)

Single

Degrees: BS, University of Washington, 1972  
PhD, Washington University, 1977

Dr. Jaehning completed her doctoral thesis under the direction of Professor Robert Roeder in the field of eukaryotic RNA polymerases. During 1977-78 she was a postdoctoral fellow at Berkeley. From 1978 to the present, she has been a postdoctoral fellow at Stanford.

Chemical Engineering

Higdon, Jonathan J. L., Assistant Professor

Single

Degrees: BES, Johns Hopkins, 1975  
MSE, Johns Hopkins, 1975  
PhD, Cambridge University, 1978

Dr. Higdon completed his doctoral thesis under the direction of Professor James Lighthill, developing new analytical techniques for highly flexible slender bodies moving in low-Reynolds-number flow conditions. Since then he has been an NSF postdoctoral fellow at Stanford.

Larson, Richard S., Assistant Professor

Single

Degrees: BS, California Institute of Technology, 1976  
PhD, Princeton, University, 1980

Mr. Larson is completing his doctoral thesis under the direction of Professor Morton D. Kostin in the field of reaction kinetics.

Chemistry

Denmark, Scott E., Assistant Professor

Married

Degrees: SB, Massachusetts Institute of Technology, 1975  
DrSc, Eidgenossische Technische Hochschule, Zurich, 1980

Mr. Denmark is completing his doctoral thesis under the direction of Professor A. Eschenmoser in the area of organic synthesis and organic reaction mechanisms.

#### 4. Promotions

Biochemistry

Clark, John M., Jr., Associate Professor to Professor  
Uhlenbeck, Olke C., Associate Professor to Professor

Chemistry

Pirkle, William H., Associate Professor to Professor  
Oldfield, Eric, Assistant Professor to Associate Professor

#### B. Visiting Appointments\*

For the 1980 Summer Session (of individuals not here in 1979-80)

Biochemistry

Campbell, Bruce N., Jr., Visiting Lecturer from Professor of Chemistry,  
SUNY College at Potsdam

Mintel, Richard W., Visiting Lecturer (Dr. Mintel held a 1/2-time Visiting  
Lectureship, Sem II, 1979-80 in Biochemistry)

Chemistry

Gates, Stephen C., Visiting Lecturer from Assistant Professor of Chemistry,  
Illinois State University at Normal



For the 1980-81 Academic Year (unless otherwise specified)

Chemical Engineering

Spedding, P. L., Visiting Professor (1/2-time) from Associate Professor,  
University of Auckland, Auckland, New Zealand

Thomas, E. R., Visiting Assistant Professor (1/2-time) from graduate student,  
Department of Chemical Engineering, University of Illinois

Chemistry

Howlader, Nepal C., Visiting Assistant Professor (General) from Visiting  
Assistant Professor (General) 1979-80

Jones, Loretta, Visiting Assistant Professor (General) from Visiting Assistant  
Professor (General) 1979-80

Keiter, R. A., Visiting Professor (General) from Professor of Chemistry,  
Eastern Illinois University, Charleston, Illinois

Kinsey, P. (1/2-time), Visiting Professor (General) from Professor of Chemistry,  
University of Evansville, Evansville, Indiana

Lewis, D. E., Visiting Assistant Professor (Organic) from Lecturer in  
Chemistry, University of Arkansas, Fayetteville, Arkansas

Ulrich, Mary M., Visiting Assistant Professor (General) from Teaching  
Assistant (General) 1979-80

\* These are fixed term appointments, for the period indicated, not on leave from  
other positions unless so indicated.

C. Leaves and Special Appointments for 1980-81

Biochemistry

Jonas, Ana, Sem. II, sabbatical leave

Shapiro, David J., Sem. I and II, Associate Member, Center for Advanced Study

Chemistry

Drago, R. S., Sem. II, sabbatical leave

Dykstra, Clifford E., Sem. I, Fellow, Center for Advanced Study

Gennis, Robert B., Sem. I and II, sabbatical leave

Jonas, Jiri, Sem. II, sabbatical leave

Katzenellenbogen, John A., Sem. I, Associate Member, Center for Advanced Study

D. Awards and Similar Recognition During 1979-80

Biochemistry

Weber, Gregorio

Awarded Rumford Medal by American Academy of Arts and Sciences

Chemistry

Beak, Peter

Elected Fellow of AAAS

Brown, T. L.

Reilly Lecturer at Notre Dame;  
Mobay Lecturer at University of New Hampshire

Drago, Russell S.

D. C. Hill Lecturer at Duke University

Kaufmann, K. J.

Max Planck Fellow and US-Japan Energy Exchange Scholar

Leonard, Nelson J.

Alfred Burger Lecturer at University of Virginia

Malmstadt, Howard V.

ISCO Award for Outstanding Contributions in Biochemical Instrumentation

Martin, J. C.

Buck-Whitney Medalist; Elected Fellow of AAAS

Oldfield, Eric

USPHS Research Career Development Award, 1979-84

Rinehart, K. L.

Elected Fellow of AAAS; Distinguished Visiting Professor, Texas A & M University

Schuster, Gary B.

Dreyfus Teacher-Scholar Award

Shapley, John R.

Fresenius Award of Phi Lambda Upsilon

E. Invited Lectures and Meetings Attended

In addition to the items listed above, a great deal of other professional recognition has been accorded to our faculty. An important component is the giving of invited lectures at seminars, symposia, and colloquia held at other institutions or in connection with meetings of professional societies or groups. The table given below summarizes the extent of such activities. The names of our regular faculty are listed according to department, along with the numbers of lectures given and of meetings attended. Lectures and meetings outside the U.S. or Canada are given as a second digit, where appropriate and where known.

<u>Biochemistry</u>			<u>Chemical Engineering</u>		
<u>Name</u>	<u>Lect.</u>	<u>Attend.</u>	<u>Name</u>	<u>Lect.</u>	<u>Attend.</u>
Baldwin, T. O.	2	1	† Alkire, R. C.	3	4
Clark, J. M., Jr.	-	-	Drickamer, H. G.	2,5	2,3
Conrad, H. E.	-	2	† Eckert, C. A.	-,2	2,2
Glaser, M.	3	1	Hanratty, T. J.	4,2	3,1
Gumport, R. I.	-,5	3,2	McHugh, A. J.	9,2	3,1
Gunsalus, I. C.	11	6,3	Masel, R. I.	-	1
Hager, L. P.	6	4,1	Schmitz, R. A.	4,1	2,1
Jonas, Ana	5	2	Shaeiwitz, J. A.	-	1
Mangel, W. F.	1	1	Stadtherr, M. A.	1	1
Nystrom, R. F.	-	-	Westwater, J. W.	-	3
Ordal, G. W.	1	1			
Shapiro, D. J.	4	1			
Switzer, R. I.	2	1			
Uhlenbeck, Olke	2	1			
Weber, Gregorio	-,4	-,3			

Chemistry

<u>Name</u>	<u>Lect.</u>	<u>Attend.</u>	<u>Name</u>	<u>Lect.</u>	<u>Attend.</u>
Applequist, D. E.	-	1	Jonas, Jiri	8	4
Arduengo, A. J., III	2	1	† Katzenellenbogen, J.	9,1	4,2
Avery, J. P.	-	4	Kaufmann, K. J.	8,8	2
Bailar, J. C., Jr.	4,1	2,1	Leonard, N. J.	7,1	4
† Beak, Peter	8,4	2,1	McDonald, J. D.	4	2
† Belford, R. L.	4	2	† Malmstadt, H. V.	6,4	3
Breiland, W. G.	-	-	† Martin, J. C.	10,4	2
Brown, T. L.	14,1	1,2	† Melhado, Evan	1	1
Chandler, David	5,3	3,1	† Nieman, T. A.	4	7
† Coates, R. M.	8	2,1	Oldfield, Eric	3,1	3
Cook, K. D.	1	3	Paul, I. C.	3	-
Curtin, D. Y.	3	1	Pirkle, W. H.	11,3	4,1
† Dlott, Dana D.	-	-	Rauchfuss, T. B.	1	3
† Drago, R. S.	18,3	1,3	Rinehart, K. L.	12,3	7,3
Dykstra, C. E.	3	1,2	Rogers, E. P.	-	2
† Faulkner, L. R.	9,2	6,1	† Schuster, G. B.	16	3
Flygare, W. H.	6	2	Secretst, D. H.	-,4	1,2
Gennis, R. B.	-	1	Shapley, J. R.	10,1	2
Gutowsky, H. S.	2	3	Smith, S. G.	6	3
Haight, G. P., Jr.	10	4,2	Stucky, G. D.	7	3
Hendrickson, D. N.	2	2,1	Suslick, K. S.	1	2
Hummel, J. P.	-	1	Yankwich, P. E.	-	2

† These individuals also organized and chaired a symposium or similar event.

F. Other Professional Activities

Two other types of professional activities are summarized in the table given below. The first of these (Ed. Bd.) is service on the editorial boards of journals and other science-related periodicals. The second (Prof.) is membership on the wide variety of advisory panels and committees for professional societies, federal and state agencies and for other institutions; included in this category is service as an officer of a professional society. The numbers of such activities are listed for each faculty member, insofar as they are known.

<u>Biochemistry</u>			<u>Chemical Engineering</u>		
<u>Name</u>	<u>Ed. Bd.</u>	<u>Prof.</u>	<u>Name</u>	<u>Ed. Bd.</u>	<u>Prof.</u>
Baldwin, T. O.	-	1	Alkire, R. C.	2	10
Conrad, H. E.	-	1	Drickamer, H. G.	3	2
Glaser, Michael	-	1	Eckert, C. A.	-	2
Gunsalus, I. C.	6	4	Hanratty, T. J.	1	4
Hager, L. P.	-	5	McHugh, A. J.	1	-
Jonas, Ana	-	4	Masel, R. I.	-	2
Shapiro, D. J.	-	1	Schmitz, R. A.	1	3
Switzer, R. L.	3	1	Shaeiwitz, J. A.	-	3
Uhlenbeck, Olke	-	1	Stadtherr, M. A.	-	4
Weber, Gregorio	1	1	Westwater, J. W.	3	4

<u>Chemistry</u>					
Bailar, J. C., Jr.	4	-	Katzenellenbogen, J. A.	1	2
Beak, Peter	1	2	Kaufmann, K. J.	-	1
Belford, R. L.	1	1	Leonard, N. J.	1	2
Brown, T. L.	3	2	Malmstadt, H. V.	3	-
Chandler, David	3	-	Martin, J. C.	-	4
Coates, R. M.	2	2	Nieman, T. A.	-	1
Curtin, D. Y.	2	-	Paul, I. C.	1	1
Drago, R. S.	2	1	Rauchfuss, T. B.	-	1
Faulkner, L. R.	1	5	Rinehart, K. L.	3	4
Flygare, W. H.	-	7	Rogers, E. P.	-	1
Gennis, R. B.	1	-	Secretst, D. H.	2	-
Gutowsky, H. S.	-	10	Shapley, J. R.	1	-
Haight, G. P., Jr.	1	6	Stucky, G. D.	1	-
Jonas, Jiri	2	-	Yankwich, P. E.	-	1

II. Undergraduate Programs

A. Registration During 1979-80

Given in the table below is a summary, by class, of the number of undergraduate students enrolled in each of the two specialized curricula and in the several programs for S&L majors in the School. The numbers below are averages of the fall and spring enrollments.

	<u>Fr.</u>	<u>So.</u>	<u>Jr.</u>	<u>Sr.</u>	<u>Total</u>
<u>Biochemistry</u>					
32-14-06 (majors)	13	18	21	32	84
32-16-06 (premeds)	<u>27</u>	<u>22</u>	<u>30</u>	<u>25</u>	<u>104</u>
Totals	40	40	51	57	188
<u>Chemical Engineering</u>					
32-06 (curriculum)	136	98	97	178	509
<u>Chemistry</u>					
32-07 (curriculum)	78	49	42	58	227
32-14-07 (majors)	25	21	17	21	84
32-15-07 (prejournalism)	1	0	0	0	1
32-16-07 (premeds)	37	23	17	12	89
32-18-07 (prelaw)	3	1	1	0	5
32-71 (teaching)	<u>2</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>7</u>
Totals	146	95	78	94	413

B. Five-Year Enrollment Trends

Comparisons of total registrations by semester in the undergraduate programs for the past five years are given below. Of particular note is the more than 50% increase in the chemistry curriculum this year compared with recent years. The other major areas appear to have leveled off in the past two years. The net effect is that the total of undergraduate majors in the School is up by about 5%.

<u>Sem.</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
		<u>Biochemistry - S&amp;L Majors</u>			
I	196	237	213	212	204
II	168	196	199	182	172
		<u>Chemical Engineering - Curriculum</u>			
I	322	389	475	540	540
II	280	345	461	490	478
		<u>Chemistry - Curriculum</u>			
I	145	123	134	160	238
II	135	108	127	170	214
		<u>Chemistry - S&amp;L Majors &amp; Teaching</u>			
I	207	227	209	155	197
II	174	191	165	194	168
		<u>Totals - All Undergraduate Programs</u>			
I	870	976	1031	1067	1179
II	757	840	952	1036	1032

C. Degrees Granted over the Five-Year Period 1975-80

Degrees granted in the various undergraduate programs during the past five years are summarized below. Data for 1979-80 are taken from the tentative graduation lists. The most dramatic change is in chemical engineering, for which the number of graduates this year is about 140, up four-fold from the 30 to 35 range of five years ago which persisted for two or three decades preceding that. Also, degrees in the chemistry curriculum have taken a definite upturn.

<u>Mo.</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
<u>Biochemistry - BA and BS Degrees in the S&amp;L Majors</u>					
Aug.	0	3	5	3.	1
Oct.	0	1	0	0	0
Jan.	3	5	2	4	6
May	<u>31</u>	<u>22</u>	<u>26</u>	<u>28</u>	<u>39</u>
	34	31	33	35	46
<u>Chemical Engineering - BS Degrees in Curriculum</u>					
Aug.	2	3	4	2	2
Oct.	0	0	0	0	1
Jan.	19	17	14	27	40
May	<u>30</u>	<u>41</u>	<u>41</u>	<u>74</u>	<u>99</u>
	51	61	59	103	142
<u>Chemistry - BS Degrees in Curriculum</u>					
Aug.	2	4	4	4	2
Oct.	0	2	2	0	1
Jan.	4	6	5	6	9
May	<u>28</u>	<u>16</u>	<u>17</u>	<u>13</u>	<u>29</u>
	34	28	28	23	41
<u>Chemistry - BA and BS Degrees in All S&amp;L Majors</u>					
Aug.	6	5	0	1	7
Oct.	2	1	0	0	0
Jan.	5	4	9	10	8
May	<u>33</u>	<u>29</u>	<u>26</u>	<u>33</u>	<u>24*</u>
	46	29	35	44	39
<u>Totals - All Undergraduate Programs</u>					
Aug.	10	15	13	10	12
Oct.	2	4	2	0	2
Jan.	31	32	30	47	63
May	<u>122</u>	<u>108</u>	<u>110</u>	<u>148</u>	<u>191</u>
	165	159	155	205	268

\* Includes 1 teaching of chemistry

D. Undergraduate Scholarships and Awards\*

The committee determined the following awards:

Donald E. Eisele Memorial Award - (Chem Engr., Alpha Chi Sigma)	Barbara H. Dillmann
AIChE Scholarship Award (Chem Engr.) -	Paul W. Jahn
Chemical Rubber Co. Achievement Award -	Connie Jo Kline
Reynold C. Fuson Award -	Thomas J. McGarry
Worth H. Rodebush Award -	Wendy Ann Olsen
Kendall Award (Phi Lambda Upsilon) -	Wayne E. Henderson
Merck Index Award -	Christopher V. Chow
	Steve L. Bender
	Charles E. Harper
Elliott R. Alexander Award (Phi Lambda Upsilon) -	Joseph D. Augspurger
	Ann B. Fiduccia
	Zean Z. Gassman
	Paul W. Jahn
	John H. Miyazaki
	Kavitha Rao
	Richard C. Reem
	Pauline C. Ting
Phi Lambda Upsilon Cup (PLU) -	Brad Kirchofer
	Edmund G. Seebauer
	Mike H. Covinsky
	Natalie A. Gilbert
	A. Brian Robinson
	Tommy Wah Chu
Kodak Scholars Program -	Natalie A. Gilbert
	John L. Fox
	(Neil A. Carlberg, Alternate)
American Institute of Chemists -	Jane E. Vreuls
	Elizabeth J. Peters
Monsanto Sophomore Scholarship Award -	Michael H. Covinsky
Eastman Kodak Sophomore Scholarship Award -	Chris N. Velisaris

In addition, eight \$500 freshman scholarships have been awarded to high school seniors who will be entering as freshmen in the fall and plan a professional career in chemistry. Four of the scholarships are being funded from the income of the Roger Adams Fund, three by a grant from Monsanto and one as part of a general grant from Eastman Kodak Co.

The traditional Agnes Sloan Larson Awards, five \$200 prizes to sophomores in the School, based on freshman-year academic performance, have been discontinued for this year and last because of lack of funding, but they may be renewed next year (see Sect. VII). Undergraduate scholarships are provided in chemical engineering from a number of sources listed below:

Janice I. Ackerman Memorial Fund	3M Company
Air Products Company	Marathon Oil Company
Alcoa Foundation	Stauffer Chemical Company
Eastman Kodak Company	University Oil Products Company

\* Report of the committee chairman, R. L. Belford

E. Undergraduate Advising in Chemistry<sup>‡</sup>

The advising committee and the advising office assisted over 300 new students to enroll during the summer of 1979 and about 350 students to advance enroll per semester. Many inquiries (by letter, telephone, and personal visit) by prospective students were handled and several tours of facilities and class visits were arranged for visitors. The advising office continues to maintain a file of catalogs and brochures for other Illinois institutions of higher education and for graduate programs in chemical sciences throughout the country. A home study guide and presemester review course prepared and presented by Professor Elizabeth Rogers has proved to be extremely successful. Most students taking this review program have been able to place into the regular chemistry course (101) with flying colors.

F. Cooperative Education Program<sup>†</sup>

While the total number of students active in the co-op program has only grown by three this year, there was increased interest shown by companies and by students. This is evident in the following data gathered over the past two academic years.

	<u>Chemists</u>		<u>Chem Engr.</u>		<u>Total</u>	
	<u>1978-79</u>	<u>1979-80</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1978-79</u>	<u>1979-80</u>
No. requesting information	4	15	14	36	18	51
No. formal applications	2	6	14	28	16	36
No. placed	1	2	6	28	7	13
No. graduated	2	2	2	5	4	8
Plans after graduation:						
Graduate School	2	1	-	-	2	1
Industry	-	1	2	4	2	5
Undecided	-	-	-	2	-	2
No. in program						
Fall	8	8	18	21	26	29

Student awareness that there is a co-op program in the School continues to be of concern. Several methods of disseminating general information about co-op were utilized throughout the year. Contacts made via the student affiliate chapters of ACS and AIChE, on-campus co-ops speaking to general chemistry classes, inclusion of information in placement and advance enrollment announcements, and faculty referrals, all contributed to the increased number of students who inquired about the program.

In addition to the earlier employers of co-op students, there were five new companies as listed below. The numbers in parentheses are the co-op students employed by each company.

Allied Chemicals (1)  
Danville, IL

Amoco Research Center (2)  
Naperville, IL

\* Argonne National Lab (1)  
Argonne, IL

\* Hooker Chemical (2)  
Niagara Falls, NY

\* Mead Johnson (2)  
Evansville, IN

Monsanto (3)  
St. Louis, MO

<sup>‡</sup>Report of the committee chairman, R. L. Belford

<sup>†</sup>Report of R. L. Belford and the Placement and Chemistry Advising Office.



Borg-Warner Research (2)  
Des Plaines, IL

Caterpillar Tractor Co. (2)  
Peoria, IL

Dow U.S.A. (1)  
Midland, MI

Eastman Kodak (4)  
Rochester, NY

G. E. Plastics (1)  
Mt Vernon, IN

Nalco Chemicals (2)  
Oakbrook, IL

Northern Petrochemical Co. (2)  
Morris, IL

S & C. Electric (1)  
Chicago, IL

SOHIO (1)  
Cleveland, OH

Thiokol (2)  
Brigham City, UT

\*  
New

In an effort to publicize the program a large map of the U.S. has been constructed with photographs of the co-ops, their degree programs, and the location of their co-op employer. This poster is designed to recognize these students as a special group in our student body. The publicity not only is a source of pride for the co-ops, but also has been noticed by many employers and students who had not known of the co-op program.

III. Graduate Programs and Activities

A. Enrollment Trends and Degrees Granted

Graduate enrollment data for the fall semester of the past five years are summarized below. Spring semester totals are also given. Two or three students registered in absentia are included. The total graduate enrollment hit a new high of 476 last fall, largely because of continued increases in biochemistry and chemical engineering.

Total Graduate Enrollments by Department and Area\*

<u>Dept.-Area</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Biochemistry	75	84	87	85	92
Chem. Engr.	51	52	59	61	72
Analyt.	51	49	43	37	41
Biophysical	4	6	8	12	12
Inorg.	63	64	57	71	78
Org.	82	102	107	113	114
Phys.	67	59	55	55	56
Ch. Phys.	8	9	7	6	8
Undecided	9	12	16	10	1
T. of Chem.	1	2	0	0	2
Chemistry	<u>285</u>	<u>303</u>	<u>293</u>	<u>304</u>	<u>312</u>
Semester I	411	439	439	450	476
Semester II	393	389	421	429	454

\* It is estimated that the total number of graduate students in the School will be approximately 20-30 less this fall than last.

The numbers of degrees granted this year are comparable with previous years and probably reflect a steady-state total of 65+10 PhD's after the all-time high for 1969-70 (107) and the sharp drop in the succeeding year.

Summary by Department of Advanced Degrees Granted

	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Biochemistry					
MS	7	11	8	8	10
PhD	4	9	9	7	10
Chemical Engr.					
MS	15	10	16	12	14
PhD	9	7	11	10	6
Chemistry					
MS	29	31	25	29	18
†PhD	56	39	53	47	45
Total					
MS	51	52	49	49	42
PhD	69	55	73	64	61

† PhD degrees in chemical physics are included here.

Chemical engineering made a check on the time required for completion of the PhD by six students finishing in 1979-80. The times ranged from 3 yr 11 mo to 5 yr 4 mo, with an average of 4.65 yr.

Another type of analysis was made by John Hummel, chairman of the cumulative exam committee. Cumulative exams are taken by PhD candidates in all areas except chemical engineering. The overall pass rate for students completing or leaving the cumulative exam system over the past four years is 83%. Details are given in the table below.

Success Rates of Students on Cumulative Exams

<u>Group</u>	<u>Pass</u> <u>No. (%)</u>	<u>Fail</u> <u>No. (%)</u>	<u>Withdrew</u> <u>No. (%)</u>	<u>Total</u> <u>No.</u>
All Students	303(83%)	15(4.1%)	48(13%)	366
Males	236(85%)	12(4.3%)	31(11%)	279
Females	67(77%)	3(3.5%)	17(20%)	87
Minority	2(33%)	1(17%)	3(50%)	6
Foreign*	11(69%)	2(12%)	3(19%)	16

\*Defined as foreign citizens that were admitted from foreign undergraduate schools. Foreign citizens doing undergrad work in the U.S. are not included.

B. Graduate Student Recruitment and Admissions<sup>†</sup>

Biochemistry--Initial inquiries increased significantly during this recruiting year (405 plus 42 medical scholars program inquiries compared to 257 inquiries received for the previous year). This did not result in the hoped for increase in completed applications (53 compared to approximately 50 in 1978-79). Thirty-six offers were made and 10 have accepted; 3 offers are pending. Eleven students accepted for admission visited and, of these, 4 accepted. The acceptance rate is down from last year when 19 accepted. However, we continue to receive applications and hope to increase the final total to at least 15.

Chemical Engineering--Twenty-six graduate students entered from August 1979 to June 1980. The August 1980 group will be 15 resulting from the following:

Number of inquiries = 240 U.S. + 511 foreign	= 751
Completed applications	= 136
Offers made	= 48
Offers accepted = 11 U.S. + 4 foreign	= 15
Amount of 12-month support for 1980-81	= \$6200 to \$8000

Chemistry--In spite of the fact that the number of inquiries about graduate work in the Department of Chemistry was up 12% this past year, most of the other statistics were down significantly. The number of applications was down 4% and the number of offers made was down 9%. A total of 51 acceptances were received from the 155 offers that were made. The resulting acceptance rate of 33% is down considerably from the 43% rate for last year which was about average for the recent past. (Inorganic and physical chemistry were the areas that were affected most.) The class size of 51 is the smallest in recent years (last year it was 74) and is well below the average size for the past seven years (69). About the only statistic that is up significantly is the average gpa of the incoming group. It is up to 4.63 after being significantly lower (4.52 and 4.51) for the past two years. This may be an indication that a significantly harder-nosed approach was taken in evaluating applicants this past year.

<sup>†</sup>Taken from reports of the departments.

It appears that the drop in applications and acceptance rate reflects a smaller number of students interested in graduate work in chemistry nationally. Other schools felt the pinch last year and responded by more actively competing for new students. We will have to meet this competition next year by adopting a more intense recruiting program with greater involvement by a wider group of faculty members.

School--Students entering in June and projected for August, 1980, and the totals for each of the four years preceding are summarized in the table below for the School as a whole. The total entering in Chemistry is a new low for recent years.

Graduate Student Acceptance of Admission Offers\*

<u>Dept.-Area</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>
Biochemistry	19	20	15	21	12
Chemical Engr.	20	19	26	20	16
Analyt.	11	2	10	11	8
Inorg.	16	8	18	12	6
Org.	38	22	28	21	20
Phys.	17	19	13	19	6
Ch. Phys.	3	-	-	-	1
Undecided	9	9	9	14	10
T. of Chem.	2	-	-	-	-
Chemistry	<u>96</u>	<u>60</u>	<u>78</u>	<u>77</u>	<u>51</u>
Total	135	96	119	118	79

\* The 1976-80 figures are actual enrollments, including students entering in February. The 1980-81 data are projections and do not include January admissions. Biophysical students are listed under physical, organic and biochemistry; and chemical physics students usually appear initially under physical.

C. Fellowship and Traineeship Support

1. Fellowship and Traineeship Support - These nonassistantship appointments seem to have reached a steady-state of about 100, after dropping for a decade after the high of 197 in 1967-68. Many of the earlier federal graduate student support programs (NDEA, NSF and NIH) have either been cut back sharply or eliminated. Most unrestricted, industrial grant-in-aid funds continue to be committed for student support to offset the impact of the reductions in federal funding. A synopsis of the numbers of students supported by the various programs is given in the table below for the past five years.

<u>Type of Appointment</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Natl. Science Foundation					
National Fellow	6	6	9	5	7
Trainee	3	10	4	1	0
U.S. Public Health Serv.					
Trainee	<u>49</u>	<u>28</u>	<u>25</u>	<u>24</u>	<u>26</u>
	58	44	38	30	33
Institutional Fellowships					
University	19	25	25	25	23
Industrial - Dept.	33	41	40	43	52
Other	<u>4</u>	<u>7</u>	<u>1</u>	<u>1</u>	<u>-</u>
Total	114	117	104	99	108

The distribution of these appointments among the three departments in 1979-80 is given in the next table. It's virtually the same as for last year except for an increase of 9 industrial fellowships in chemistry.

<u>Department</u>	<u>NSF</u>	<u>NIH</u>	<u>Univ.</u>	<u>Indust.</u>	<u>Total</u>
Biochemistry	0	22	2	0	24
Chemical Engr.	4	0	5	16	25
Chemistry	<u>3</u>	<u>4</u>	<u>16</u>	<u>36</u>	<u>59</u>
	7	26	23	52	108

Also, it is noteworthy that Robert S. Glass was awarded the Colin G. Fink Summer Fellowship of the Electrochemical Society.

2. Industrial Support - A synopsis is given below of the industrial donors who have made "unrestricted" grants during 1979-80 to support graduate fellowships and/or research in one of the departments. The list does not include the smaller undergraduate scholarship grants nor industrial grants and contracts to support a particular faculty member's research. The amounts received total about \$80,000 for Chemical Engineering as compared to \$70,000 for the preceding year, and \$150,000 for Chemistry compared to \$120,000 for the preceding year. Most of these funds are being used for graduate fellowships and start-up costs of new faculty. However, in order to "stretch" the fellowships, most are augmented by quarter-time assistantships which provide tuition and fee waivers.

Biochemistry

None

Chemical Engineering

Allied Chemical Company	*Minnesota Mining & Manufacturing
American Oil Company	Mobay Chemical Corporation
Atlantic Richfield	Mobil Foundation
*CPC International	Monsanto Foundation
Dow Chemical Company	Shell Oil Company
*DuPont Company	Standard Oil of California
Exxon Education Foundation	Stauffer Chemical Company
General Electric Foundation	Universal Oil

Chemistry

Atlantic Richfield	*Minnesota Mining & Manufacturing
Conoco	Mobay
Dow Chemical	Mobil Oil
*DuPont Company	*Monsanto Foundation
Eastman Kodak	Owens Corning
Exxon	Proctor & Gamble
Eli Lilly & Company	Rohm & Haas
Lubrizol	Sohio
Merck	Union Carbide

\* Departmental grants-in-aid that can be used for purposes other than graduate fellowships.

Industrial and other private support of the research of particular faculty members or of a particular program is also noteworthy. In biochemistry, it totaled \$10,000 from the Illinois Heart Association. In chemical engineering, it totaled \$110,000 in 1979-80 from General Foods, IBM, Mobil Foundation, National Steel, Phillips Petroleum, and Standard Oil. In chemistry, it was \$295,000 from American Chemical Society, Dreyfus Foundation, American Heart Association, Exxon, Illinois Heart Association, Research Corporation, and A. P. Sloan Foundation.

#### D. Postdoctorates

Given below is a five-year synopsis of the numbers of postdoctorates in each department. The numbers fluctuate appreciably during the year as individuals come and go almost at random, so the figures given are the total numbers appointed at some time during each year. After a steady state of 60 for the previous four years, there was a large jump to 76 this year reflecting increased availability of federal funds.

<u>Department</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Biochemistry	16	16	22	16	26
Chemical Engr.	1	2	2	2	-
Chemistry	<u>44</u>	<u>44</u>	<u>38</u>	<u>39</u>	<u>50</u>
Total	61	62	62	57	76

#### E. Special Lectures, Seminars and Activities During 1979-80

A number and variety of activities related to the graduate research programs of the School took place during the year. They are enumerated below, starting with the three name lectureships sponsored by the School, the John C. Bailar, Ada Doisy and W. A. Noyes lectures.

1. John C. Bailar, Jr., Lecture

Alan M. Sargeson, Australian National University, March 17 and 18,  
"Organic Synthesis Using Metal Complexes" and "Caged Metal Ions:  
Synthesis and Reactivity"

2. Ada Doisy Lecture in Biochemistry

Charles Yanofsky, Stanford University, April 30, "Regulatory Diversity  
in E. Coli"

3. W. A. Noyes Lecture (30th)

Robert E. Olson, St. Louis University Medical Center, March 26,  
"Current Issues in Clinical Nutrition Viewed by a Biochemist"

4. Sherwin-Williams Seminars

George M. Whitesides, MIT, April 10, "Mechanism of the Thermal De-  
composition of Pt Compounds" and April 11, "Organic Surface Chemistry"

5. Alpha Chi Sigma Krug Lecture

Melvin Calvin, University of California at Berkeley, March 3,  
"Synthetic Chloroplasts"

6. Wednesday Night at the Lab ("popular" lectures organized by Alpha Chi Sigma, supported by funds from DuPont)

Lowell P. Hager, University of Illinois, November 14, "A Biochemist's View of Cancer"

C. M. Wayman, University of Illinois, November 28, "Alloys with a Memory"

John J. Powers, University of Georgia, February 20, "How Safe Are Our Foods?"

Paul E. Blatz, University of Missouri, March 19, "The Chemistry of Vision"

Richard W. Henderson, Francis Marion College, April 30, "Sherlock Holmes Makes Mistakes"

7. Local ACS Section Lectures

Speakers included Keith O. Hodgson of Stanford (Structure of Proteins by XAFS), Ralph N. Adams of University of Kansas (Electrochemistry of Brains), Cheves Walling of Utah (Metal-Ion Peroxide Reactions), Harry Wasserman of Yale (Synthesis of Lactams and Lactones), Philip Pechukas of Columbia (Transition State Theory), and Stephen J. Benkovic of Penn State (Purine Biosynthesis).

8. W. C. Rose Lecture in Biochemistry and Nutrition

Hector F. LeLuca, University of Wisconsin, was chosen by the Nutrition Foundation to give the 2nd lecture honoring W. C. Rose. He spoke at the University of California at San Diego on January 7.

9. Special School Seminars

P. Thomas Carroll, University of Pennsylvania, December 7, "Professors, Patrons, and PhDs: Chemistry at Illinois, 1894-1926"

Derek A. Davenport, Purdue University, April 15, "From Genesis to the Book of Revelations: General Chemistry Texts Written in America(n)"

10. Visiting Speakers in Seminars

The number and variety of seminars by visiting scientists continued at last year's high level. There were at least 130 such visitors, sixteen of whom were from other countries. Talks were distributed among the various areas as follows, where the first number gives the talks by U.S. visitors and the second by foreign visitors: Biochemistry (32,2), Chemical Engineering (11,0) and in Chemistry--Analytical (12,1), Inorganic (14,4) Organic (22,5) and Physical (23,4).

11. "Marvel" Collection of Research Chemicals

Primarily through the efforts of Professors A. J. Arduengo and Gary Schuster, the task of cataloguing and organizing the large collection of organic chemical research samples which have accumulated over the years has been essentially completed. The resulting data have been rendered accessible to computer searching by a sophisticated search program which makes it possible to search for particular structural features in compounds in the collection.

12. Phi Lambda Upsilon Congress

The 26th triennial National Congress of Phi Lambda Upsilon was hosted on the campus June 2-5 this spring by our Alpha Chapter. The ceremonies at the banquet included presentation of the society's Fresenius Award to John R. Shapley of our faculty.

13. Index of Electrochemical Literature

During the winter, an index to 12,062 articles on electro-organic synthesis published from 1801 through 1975 was completed in the Department of Chemical Engineering. Professor Sherlock Swann began the project in 1934 by making notes on index cards and organizing them in boxes. Professor Richard C. Alkire joined him in 1976 and brought in the use of computers to analyze and organize the entries. Students helped with some 25,000 hours of work. The 1,000 page book is sponsored by the Electrochemical Society and is being printed by Port City Press, Baltimore. Computerization of the lists was supported by 15 chemical firms and the U.S. Department of Energy.

14. Fuson Awards

In organic chemistry the Fuson bequest has been used (see Sec. VII) to institute a continuing series of Fuson Awards for graduate students in that area. These awards are given to defray the expenses of students who attend National ACS Meetings to present papers on their research results. The awards are made on the basis of a competition in which entries are judged on the basis of submitted abstracts of proposed talks. The four awards made this year went to Paula Roach, Ronald Michalak, Steven Schmidt, and Stephen Harper.



#### IV. Instructional Program

##### A. Curricular Matters

##### 1. Courses and Curricula Committee\*

Both the Curriculum in Chemistry (BS) and the Field of Concentration in Chemistry (Sciences and Letters Curriculum) have been revised in minor ways during the year.

The principal change in the Curriculum in Chemistry has been to broaden the 12-hour "technical electives" requirement to include 200- and 300-level courses in chemical engineering. Other engineering courses are still not regularly allowed. It was felt that chemical engineering courses, in the present marketplace, would enhance the effectiveness and attractiveness of our graduates who go into industry.

The Field of Concentration has been changed to read 30 hours of chemistry in total, instead of the former 20 hours beyond general chemistry. There is no net change for undergraduates who take our Chem 107-108-109-110 sequence (10 hours), but those who take 102-108-122 will now have to take an additional 19 hours beyond these, where formerly they had to take only 17 more hours, since 122 counted toward the field of concentration. The new arrangement is more equitable.

The change in the field of concentration was prompted in part by a decision to divide Chem 122 into two courses, 122 and 123. The former will serve primarily students from outside the School, while the latter is intended for students in the SOCS curricula. Chem 122 will become an easier, lower-level course, so it would be especially inappropriate to have it count as a field course in chemistry, and it will not be so allowed (Chem 123 will take its place).

There have been only minor changes in the graduate curricula. The PhD requirements for analytical chemistry majors have been revised to conform to the pattern adopted a year earlier for inorganic chemistry, namely that one of the three outside or "minor" units of course work may be taken inside the major if the research advisor approves. A similar proposal for physical majors is under consideration by the Committee at the time of this writing. Another change was the abolition of the foreign-language requirement for inorganic majors, leaving only organic, analytical, and biochemistry with foreign language requirements for the PhD.

There was one graduate course revision, namely conversion of Chem 421 from a one-unit course to a variable-credit course, one unit for those who take the lab and one half unit for those who do not.

The accreditation examiner for the Engineering Council for Professional Development criticized the chemical engineering curriculum in 1977 as not having enough engineering design. During the 1979-80 school year, the fraction of engineering design was increased significantly in most of the courses. The previous year (1978-79) saw the formal revision of 3 old courses and the introduction of 3 new courses to give greater emphasis to engineering design. It is anticipated that these changes will be reviewed with favor during the next visit by ECPD (now called ABET) in the fall of 1980.

\* Report of the committee chairman (D. E. Applequist), except for last three paragraphs the first of which is adapted from the chemical engineering annual report.

Also, it is noteworthy that we have tested in our instructional program for the first time the use of minicomputer, stand-alone Plato terminals with programs translated to this medium by Professor Stanley Smith. A series of programs used in Chemistry 181 this spring won acceptance from the students in the course comparable to that of the same programs used on the large central computer version of Plato in prior semesters.

Moreover, organic chemistry has offered for the first time a new core sequence of three graduate-level courses which are required for all their graduate student majors - a course in methods of determining structures, a course in mechanistic and physical-organic chemistry, and a course in synthetic and natural products chemistry.

## 2. General Chemistry Program<sup>†</sup>

The main thrust of the general chemistry program continues to be providing introductory college chemistry for approximately 3000 nonchemistry majors per semester. In view of the success of the video tapes in Chem 101 and 102B, a major effort is currently underway to make tapes for 102P, a second semester course intended for engineering students, which is especially large in the spring semester (~1100 students this year). Because of the large numbers there is a definite need to convert the course from its traditional format to the more manageable video-tape system. In a related project, a video-tape file of various lecture demonstrations is being prepared to allow their use in individual classrooms by lecturers or TAs.

The summer review session, which was started in 1978, continues to grow. The goals of this program are 1) to allow some students who would ordinarily be required to take Chem 100 to start with Chem 101 instead; and 2) to strengthen the chances of success for students who marginally qualify for Chem 101. Last summer 389 students participated in the program: 111 students whose placement scores were too low to qualify for Chem 101; 206 students with marginal Chem 101 qualifying placement scores; and 72 students who participated at the recommendation of their advisors.

To provide extra assistance for students who need it, a TIPS program, which involves diagnostic quizzes, has been introduced into Chem 102P along with a weekly course-wide help session. Computer techniques for handling grade data, which was pioneered in 102P, have now been applied to the other large courses.

In order to improve the effectiveness of the general chemistry laboratory operation, each storekeeper position has been reclassified to physical science technical assistant. This change is in keeping with the increased responsibilities that the employees in these positions have been given for the management and supervision of the noninstructional aspects of the lab courses. This should improve the continuity, economy, safety and general educational effectiveness of these courses.

The full-time Steno III position in the general chemistry office was reclassified to technical editor to reflect the responsibilities of the person in that position toward the preparation of lab manuals and TV syllabi.

Visitors continue to show interest in the program. During the year Erwin Boschmann from Indiana University-Purdue University at Indianapolis and Takeshi Waki from the University of Tokushima in Tokushima, Japan, each spent approximately a month observing its operations.

<sup>†</sup> Report largely by G. P. Haight, Jr.

Professional Activities - Professor Haight has been serving the ACS as a member of the Education Commission and the Science Commission. He continues to give many invited talks on various aspects of chemical education.

The annual articulation conference for high school teachers was held in conjunction with Engineering Open House and the Spring meeting of the Illinois Association of Chemistry Teachers (Gil Haight, President) with Elizabeth Rogers in charge. Gil Haight spoke on the use of demonstrations in teaching redox chemistry. Michael Plewa, from the Institute of Environmental Studies at the University of Illinois, presented a talk on mutagens in the environment.

Gil Haight and Steve Zumdahl attended the 1980 meeting of the Forum for Directors of General Chemistry Programs held in June at Purdue University.

Several staff members attended the 6th Biennial Chemical Education Conference, June 22-26, at Rochester Institute of Technology in Rochester, New York.

Gil Haight and Loretta Jones presented a workshop on the use of video tapes in the classroom at the Northeast Regional ACS meeting at Potsdam, New York, in late June.

Elizabeth Rogers has coauthored (with W. H. Brown of Beloit College) a chemistry text for students in the health sciences entitled GENERAL, ORGANIC AND BIOCHEMISTRY published by Willard Grant Press.

Steve Zumdahl has written a book on solving equilibrium and thermodynamics problems entitled GENERAL CHEMISTRY PROBLEM SOLVING II published by Spring Dale Publishing Co.

#### B. Overall Registration

Comparisons of total instructional units, and, separately, of those in General Chemistry are given below on a semester basis for the 1975-80 period. IUs for this year were up by 8% from the previous year, to a new all-time high of 57,739, the equivalent of nearly 2,000 full-time students. About half of the increase is attributable to an "unplanned" 4% increase in campus undergraduate enrollments to over 26,000. Perhaps a quarter was due to our limiting enrollments the previous spring (1979) by about 1200 IUs, and the balance reflects further shifts of student interests to courses in chemistry and chemical engineering.

<u>Semester</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
	<u>Total Instructional Units in All Courses</u> *				
I	24,955	25,638	26,683	27,872	29,781
II	<u>24,631</u>	<u>24,407</u>	<u>27,268</u>	<u>25,530</u>	<u>27,958</u>
Total	49,586	50,045	53,951	53,402	57,739
	<u>Instructional Units in General Chemistry</u>				
I	10,426	11,689	12,006	12,193	13,024
II	<u>11,497</u>	<u>11,473</u>	<u>13,016</u>	<u>10,440</u>	<u>12,341</u>
Total	21,923	23,162	25,022	22,633	25,365

\* An instructional unit is a student semester credit hour or equivalent (one graduate unit equals four semester hours).

C. TA Teaching Loads

The ratio of total IUs to FTE TAs employed is a reasonably good indicator of teaching loads for TAs. It doesn't reflect changes in faculty size; however, the latter have been small compared with changes in IUs and FTE TAs. In any event, summarized below is a five-year history of FTE TAs and of IUs/FTE.

<u>Semester</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
	<u>Graduate Teaching Assistants Employed</u>				
I	92.10	97.45	98.12	102.80	110.91
II	94.19	93.61	101.82	96.01	105.51
Average	93.14	95.53	99.97	99.41	108.21

Ratio of Total Instructional Units to FTE Teaching Assistants

I	271	263	272	271	269
II	262	261	268	266	265
Average	267	262	270	269	267

It is seen that the ratio has been quite uniform over the past 5 years, ranging from 261 to 272 (+ 2%) over the 10 semesters, with the yearly average ranging only from 262 to 270 (+ 1.5%). However, the current ratio is up about 10% from the 250+ figure in the late '60s and early '70s.

D. Teaching Evaluation and Awards \*

The instructional evaluation forms in use for the previous six years were used again in 1979-80. The new scoring system employed by the Office of Instructional Resources continues to work smoothly. The SOCS is by far their largest customer, since we are the only academic unit which solicits forms and submits them for scoring. For the rest of the campus, individual instructors submit their own requests for forms and their own requests for scoring. The results for SOCS are shown below:

Top Twenty Percent of Faculty Instructors, 1979-80

<u>Form FL (lecture)</u>	<u>Semester I</u>	<u>Semester II</u>
100-level	Chem 107 Zumdahl	Chem 108 Zumdahl
200- and 300-level	336 Martin	346 Gennis
	Bio 350 Conrad	339 Rinehart
	Chem 348 Flygare 336 Leonard	344 Kaufmann
400-level	407 Suslick	432 Katzenellenbogen
	433 Katzenellenbogen	442 Chandler
<u>Form FB (laboratory)</u>	<u>Semester II</u>	
100-level	109 Zumdahl	110 Zumdahl
300- and 400-level	322 Faulkner	422 Faulkner
	Ch E 374 Westwater	Bio 355 White
	Chem 421 Nieman	Chem 404 Rauchfuss
		338 Leonard 337 Appleyquist

\* Reports submitted by D. E. Appleyquist, chairman of the ad hoc committee.

Based on nominations by the Committee, the Kodak-du Pont teaching awards for 1979 were presented on August 16 to faculty members Joseph Deck (chemistry), Robert Gennis (chemistry), and Steven Zumdahl (chemistry). Teaching assistants receiving awards at the same time were Robert Driggs (chemistry), Rick Gdanski (chemistry), and Amy Cheng (biochemistry).

## V. Services and Facilities

### A. Chemistry Library\*

The chemistry library is in the process of completing its expansion into an additional room on the first floor of Noyes Laboratory. It is hoped that this will help relieve the present shortage of space both in terms of journal- and bookshelves and desk space available to library users.

The library committee has engaged in discussion of certain problems which have concerned a number of members of the faculty. Among these have been the extensive use by undergraduate students of the library as a study hall (leaving no space for "legitimate" library users at certain peak hours), lending of journals and "Annual Review-type" volumes, and the handling of new journals. Although because of campus library regulations there are difficulties in implementing changes which have been suggested it may be hoped that some improvement can be made in these areas.

Due to the Chemistry Library expansion project and shortage of staff during this past year there has been little progress in the Chemistry Library. The expansion project is almost completed. The new shelving needs to be installed and the books shifted. Both the additional shelving space and seating area will be more than welcome.

The Chemistry Library was not completely staffed this year until March 1, 1980 when we filled a clerk's position and filled the position for a professional assistant. The latter position was created by the conversion of graduate assistant positions. The Library continues to lose ground in terms of hourly student employees. The minimum wage continues to increase for these employees while the amount budgeted remains the same.

While the budget for monographic publications this past year has been adequate, there have been serious problems with the periodical and serial budget. We were only able to add four new journal titles to the Library's collection this year without discontinuing a number of subscriptions to titles we already have. The outlook for next year's material budget is even more bleak.

The librarian has been involved in two separate weeding programs this year. The first was extensive weeding in the chemistry, biochemistry and chemical engineering sections of the main library stacks. The purpose of this was to identify little used materials to go into storage and to eliminate extensive collections of duplicate copies. The second project has been judicious weeding of the Chemistry collection to identify materials for transfer to the main library stacks. For the most part the material which was transferred included earlier editions of elementary texts, material outside the areas in which Chemistry collects, and a few older volumes of journals dealing with timely topics; e.g. Chemical Marketing Reporter. This type of weeding will have to continue in the future if we are to provide adequate housing for new materials.

Use of the Chemistry Library remains high, especially the reserve book collection. In addition, the use of LCS (Library Circulation System) for both circulation and reference has increased to the point that a second terminal is being installed in the Chemistry Library. We continue to do an average of one online search a day of the various databases, particularly Chemical Abstracts.

\* The first two paragraphs are the report of D. Y. Curtin, the committee chairman, while the subsequent material is the report of the chemistry librarian, Lucille Wert.

B. Placement Office \*

Recruiting - As noted in the table below, it has been an incredibly active recruiting year. The number of candidates actively interviewing increased and the companies responded by adding approximately 33 additional schedules to accommodate the demand by students to interview. Still an increasingly large number of resumes of candidates who were not able to schedule interviews was sent to the companies. Reports from the candidates indicate that several were contacted and offered plant trips on the basis of the resume alone.

The following composite data (Fall and Spring) compare the current year with the two immediately past:

	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Employer Visits Scheduled	211	214	237
Cancellations	19	22	27
Employer Visits Completed	192	192	210
Number of Employer Days	364	309	425
Total Student Interviews	3059	3631	4868
Resumes Sent (Overflow)	186	324	806
Average Interviews/Employer per day	8.4	11.8	11.4

As in the past, schedules are cancelled typically for one of the following reasons: An insufficient number of candidates show interest in the company and/or position, or, the company has a decreased need for candidates and cancels the campus visit.

The PLATO system for signups, designed by Dr. Karl Wieggers, made dealing with the increased volume of employers and candidates possible. Thanks go again to Stan Smith, not only for the use of his equipment, but also for his support and assistance throughout the busy seasons.

Workshops - The traditional pre-recruiting workshops, jointly sponsored with Phi Lambda Upsilon, were held in Fall and Spring semesters. Representatives from Amoco Research Center, 3M, Dow U.S.A., and Shell Companies discussed strategies in interviewing, plant trips, and decision-making.

For the first time, a specific seminar on decision-making "The Right Company - It's your Decision" was presented by Alex Vogel, Dow U.S.A. in late November. The response was excellent and plans are being made to offer this seminar at the end of each recruiting season.

Placement Data for BS Students - The following data were collected from several sources. They reflect information reported by baccalaureate graduates from August 1979 through May 1980, and the (incomplete) totals are usually less than the number actually graduating. The main change from previous years is a more or less across the board 50% increase in numbers of graduates.

<u>Baccalaureate Graduates</u>	<u>Biochem.</u>	<u>Chem.</u>	<u>Chem. Engr.</u>
Employed	7	19	96
Graduate/Professional School	20	25	16
No Definite Information	5	8	13
Seeking Employment	8	4	14
Seeking Graduate School	2	3	2
Other	<u>2</u>	<u>2</u>	<u>2</u>
Totals	44	61	143

\* Report of Rebecca Simon, except for last paragraph of Section.

Starting Salaries - Given below is a synopsis of industrial starting salaries offered to the various categories of our graduates. The original data were tabulated separately for men and women; however, there were no significant systematic differences so only the totals are given here. Not included in the summary are two academic offers to postdoctorals, both at \$17,000 for the academic year.

	<u>No. Offers</u>	<u>High</u>	<u>Low</u>	<u>Average</u>	
<u>BS Degree</u>					
Biochemistry	8	1550/mo	875/mo	1260/mo	
Chemical Engineering	375	2000	1200	1760	
Chemistry	42	2000	1000	1490	
<u>MS Degree</u>					
Chemical Engineering	19	2225	1810	2110	
Chemistry	15	2040	1550	1750	
<u>PhD Degree</u>					
Biochemistry	1	2090	2090	2090	
Chemical Engineering	14	2580	2400	2480	
Analytical	37	2550	2000	2320	
Inorganic	50	2550	2080	2300	
Organic	48	2630	1670	2280	
Physical	7	2660	2250	2360	
Chemistry	142	2630	1670	2300	
<u>Postdoctorals</u>					
	13	2880	2080	2380	

Placement Director - Rebecca Simon, director of our placement activities, has been chosen president-elect of the National Association of Academic Affairs Administrators.

C. Shops and Service Facilities\*

Personnel - Two personnel changes affecting our service facilities were mentioned in Sec. I. A.: the replacement of Professor R. F. Nystrom, who has headed up the Radioisotopes Lab for more than 30 years and is retiring, with an academic/professional Radiochemist, Cedric J. Pearce; and the replacement of Eileen Duesler, Spectroscopist in the x-ray facility, with Scott Wilson. In addition two Assistant Spectroscopists have been appointed to the NMR Lab, Dennis Warrenfelts as a replacement for A. U. Momin, and Suzanne Volk to a new position in the Regional NMR Facility (see below); while a third, Kenneth M. Broga, has replaced Joseph Wrona (non-academic), who has retired.

Instrumentation, New and Proposed - A major advance in NMR instrumentation at the School is taking shape as the result of the award of a grant from the NSF to establish a Midwest NMR Facility in Urbana. Two superconducting instruments will be acquired, one operating at 250 MHz with a wide bore magnet, the second at 500 MHz with a two inch bore magnet. In addition, a complete 360 MHz instrument for routine <sup>1</sup>H/<sup>13</sup>C operating will be purchased. The currently operating NMR instruments in the Molecular Spectroscopy Laboratory will also serve as part of the Regional NMR Facility. The director of the new facility is Professor Eric Oldfield.

\* Mainly from the report of the committee chairman, R. L. Switzer.



SOCs personnel joined with faculty from Physics and Biophysics in a successful grant proposal to the NSF instrumentation program for a new EPR spectrometer and data processing equipment. The details of the equipment to be purchased and its location are yet to be established, but it is anticipated that the next instrument will be especially suited for EPR spectroscopy of biological samples and will be equipped with an Oxford cryostat, which enables temperatures as low as 2 K to be attained.

Two pending proposals for new instrumentation have been submitted in the past year by groups from within SOCS -- a proposal for a Fourier transform IR spectrometer and data processing equipment and a proposal for a VAX (or equivalent) minicomputer for theoretical studies in chemistry. SOCS personnel, together with other researchers, are applicants for an Interdisciplinary Laser Laboratory to be housed in the Materials Research Laboratory. (Favorable word has just been received re the FT IR.)

#### D. Safety Activities<sup>\*</sup>

Though no formal meetings were held during the year, the Safety Committee wishes to report the actions and concerns under its supervision.

Chemical Waste Clean-Up - There were two regular chemical clean-ups in which waste chemicals were packaged and disposed of. Thirty drums of waste were collected on October 18, 1979, and sixteen drums April 8-10, 1980. Cope Hubert directed this operation and had help from students of the analytical, biochemistry, general, inorganic, organic, and physical areas as well as from part-time employees.

Toxic, pyrophoric, explosive, and unknown materials can now be disposed of. The materials are first stored in a small room located at the northeast end of Davenport Hall. Then at periodic intervals the materials are taken to the South Farms and burned in an Air Curtain Destructor under the supervision of Cope Hubert and the university's Division of Environmental Health and Safety.

Safety - Miss Jean Sheets of the Division of Environmental Health and Safety presented a safety movie made by Fischer Scientific entitled "28 Grams of Prevention." This film seems to be an effective introduction to safety in the chemical laboratory and was shown at the orientation meeting for new graduate students in August. In addition, Dr. Nelson Slavik presented a lecture on laboratory safety. Finally, Fire Department personnel presented a film and demonstration showing the proper use of ABC, BC, and C fire extinguishers and air masks.

Eye-wash stations were tested on a routine basis, and the safety showers in all School facilities were checked once during the year.

The organic chemists have instituted a new laboratory safety program which for the first time has been able to encourage a set of laboratory safety practices comparable to those commonly encountered in industrial chemical laboratories. The assignment of teaching assistants to inspect laboratories and enforce safety regulations has made it possible to provide the continuing control in the safety program which has been missing in the past.

\* Report of the committee chairman, R. F. Nystrom, except for the third paragraph under safety.

Accidents - A review of the accidental injury reports filed during the year indicated that there were two serious accidents. One occurred in 37 Noyes Lab on January 16, 1980. Roger Willing was flame-cleaning ceramic insulators with two propane torches at a work bench. Presumably some volatile solvents stored in the room caught fire and the room was enveloped in flames. Mr. Willing was badly burned. The other took place in 157 Noyes Lab on April 11, 1980. Allen Sault, an undergraduate research student, probably accidentally prepared mercury fulminate, which exploded. He suffered severe cuts around the left eye.

A summary of all reported accidents is given below; the totals for the preceding two years are 52 and 39 (1978-79):

1. Cuts, bodily injury, and thermal burns

Cuts	16
Bodily injury	3
Thermal burns	4
Total	23

2. Chemical burns

Acids	2
Alkali	2
Chemical burns to eyes	4
Total	8

3. Miscellaneous

Total	<u>5</u>
	36

Fires - During the reported period there were thirty-four fire calls (compared with 24 the year before), including the serious fire on January 16, 1980 in 37 Noyes Lab described under accidents. One person was burned badly and extensive damage resulted (~\$10,000). The 34 calls included 12 chemical fires, 2 electrical fires, 5 explosions, 6 gas odors and 9 miscellaneous. The foam device located in the volatile storage room in RAL was checked three times during the year by the Fire Department. It was also checked monthly by School personnel.

E. Building and Space \*

The remodeling and renovation work completed during 1979-80 involved the expenditure of about \$100,000 which is comparable to the previous year's level. The major projects involved the completion of the installation of a liquid nitrogen storage tank near Noyes Lab, the completion of the library expansion project on the first floor of Noyes, the renovation of 47 Noyes Lab to house the new regional nmr center, the completion of a research lab for Biochemistry in 491 Roger Adams Lab (previously animal room space), and the conversion of part of 209 Noyes Lab into a classroom. The latter project was done in order to obtain the release of a classroom in Roger Adams Lab (room 193) for use as office space for graduate students in Chemical Engineering, a reflection of the space pressures being generated by the enrollment increases experienced by that department.

\* Report of the committee chairman, J. P. Hummel (both E and F).

The major space problems facing the School at this time are the need to provide additional space to accommodate the expanded staff required in chemical engineering and the quality of space in several areas, particularly research space in Noyes Lab and animal room space in RAL. Little help has been received from the campus towards meeting these deficiencies and we have had to chip away at them slowly using primarily School resources. Since remodeling funds were deleted from the 1980-81 capital budget, we are basically in a holding pattern as far as any extensive improvements are concerned.

In addition to the lack of significant funding, there is one other problem that has continued to be a source of frustration. That is the slow response and high costs of the O and M Division, particularly when certain types of work are involved (electrical, refrigeration, ventilation, and project engineering). We are currently reviewing this situation and plan to try some new approaches next year to try to make the system more responsive. Since this is a campus-wide problem, it is not clear how much progress we will be able to make.

#### F. Dispensing of Supplies<sup>\*</sup>

In addition to the normal supervision of the School's dispensing stations, the primary concern of the supplies committee during this past year has been the continuing stores inventory reduction program that was begun in 1978-79. A general report made to the Campus on its status indicates that continued progress has been made but that because of inflation more refinements are needed in the accounting procedures to accurately determine the amount of real reduction that has been achieved. These program improvements are expected to be in place next year.

Probably the most significant statistic generated is that during the year the ratio of total inventory value to yearly issues in the entire system has decreased by about 10%. This corresponds to a reduction of about 1 1/2 months in the average stock turn-around time. Unfortunately, this progress is primarily due to large improvements in two stations and is not characteristic of the supplies system as a whole. Thus, besides giving attention to an improved accounting program next year, considerable attention will have to be given to bringing the program along in those stations that have lagged behind to date.

One by-product of the greater interest in inventory levels has been a recognition of the need to maximize the benefits available from the inventory on hand and the importance of minimizing financial losses that occur because items may be charged out at prices that are significantly lower than their replacement costs during times of rapid inflation. If such losses are significant, they can effectively devour any surpluses generated by selling off stock as part of the inventory reduction program. Unfortunately, we do not know how serious this problem really is but, with some additional programming, the stores accounting system should be able to tell us. It is, however, thought to be a significant problem by several storekeepers. If that thought is confirmed, we will have to give attention to improved procedures to keep prices up-to-date and possibly even to anticipate reorder prices in setting up the charge-out price schedule. More detailed attention will be given to this problem during the coming year.

The next biennial compliance audit of the University's operations is being done by a different auditing firm during the coming year. Indications are that there will be continued pressure upon the University (and us) to reduce its storeroom inventories and to enlarge the record keeping associated with their operation.

VI. Administration

A. Affirmative Action Program\*

Our efforts to increase the numbers of minority students and women in the School have continued in much the same pattern as before. In chemistry there has been a slow and steady increase in the fraction of such undergraduates. However, the percentages in biochemistry and chemical engineering appear to have leveled off. The breakdown at the undergraduate level for the past three years is:

	<u>Total</u>			<u>Women</u>			<u>Minority members<sup>a</sup></u>		
	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Chemistry	291	319	374	59	78	90	25	28	40
Chem. Engr.	461	490	482	84	83	76	na	51	59
Biochem.	199	182	161	52	50	40	na	18	24

<sup>a</sup>Blacks, Asians and Spanish surnames. na - not available.

At the graduate level the fraction of women continues to increase. This may be seen by comparing the composition given below of the incoming class (27%) with that of all current graduate students (20%). Especially noteworthy is the fact that 1/3 of the entering chem engineers are women.

	<u>Total</u>	<u>Women</u>	<u>Minority members</u>
Present enrollment	453	90 (20%)	12
Entering in 1980-81			
Chem. Eng.	15	5	0
Biochem.	8	3	0
Chemistry	<u>47</u>	<u>11</u>	<u>2</u>
Total	70	19 (27%)	2

Our recruitment of minority graduate students has continued as in the past by contacting 40 predominantly black colleges by letter and by telephone to encourage applications from minority students. A number of potential applicants were contacted by personal letter, and members of our faculty visited two of these schools: Dr. Hager gave a seminar at Tougaloo College in Jackson, Mississippi and Dr. Arduengo visited Norfolk State University. The success of our minority recruitment has not been as satisfactory as we would wish and alternative plans will be formulated in the coming year.

B. Financial Support

1. State Support - The School received an add-on of \$150,000 to its recurring state budget for the year. However, enrollments took another jump so again we had to call upon the campus administration for emergency funds to provide additional TAs to accommodate the increase. Part of the emergency help was a recurring addition of \$25,000 to our TA line.

\* Report of J. A. Katzenellenbogen, the chairman of the School's Affirmative Action Committee.

As promised earlier, a second add-on of \$150,000 was made to the FY 81 recurring state budget of the School. Unfortunately, the enrollments projected for the coming year are at about the all-time high of this year. Therefore, the add-on will go largely towards funding on a recurring basis the 8% increase in enrollments that occurred last fall. Little progress will be made on relieving our accumulated deficiencies.

Of the new recurring funds for the coming year, \$50K has been allocated for TAs, \$15K to the expense category in the School operating budget and \$85K for 4 new faculty and academic/professional lines, two in chemical engineering (\$42K) and two (\$43K) in chemistry, which have shared the enrollment increases.

On the other hand, the School had to absorb a \$13.5K cut in its recurring budget and \$20,000 in non-recurring funds, both imposed by the College to meet campus levies. The former was met by transferring an academic/professional from state to ICR funds while the latter was charged directly to ICR funds.

2. Outside Support - Fortunately, some of our state-related budgetary problems were alleviated by a 25% increase in outside funding. Even allowing for \$333K in two major NSF awards for purchase of the VAX computer and establishing the Regional NMR facility, and for 10% inflation, there was a 10% increase in constant dollars. The sources and amounts of funds are summarized below for the past 6 years. Included in the totals are 63 NIH grants, 57 NSF, 10 MRL (4 DOE and 6 NSF), 2 DOE, 3 ONR, 1 AFOSR, 112 gifts and grants from private sources and 15 from the Research Board.

SOURCES OF OUTSIDE RESEARCH SUPPORT EXPENDITURES

Six Year Synopsis

	1974-75*	1975-76*	1976-77*	1977-78*	1978-79*	1979-80 <sup>1</sup>
NIH Research Grants	1,686	2,036	2,149	2,420	2,585	2,809
NIH Training Grants	272	323	282	367	317	368
NIH Postdoctoral Allowances	---	---	15	17	15	7
TOTAL NIH	1,958	2,359	2,446	2,804	2,917	3,184
Environmental Protection	65	---	---	---	---	---
National Science Foundation	1,364	1,426	1,552	1,502	1,558	2,474 <sup>2</sup>
MRL (ERDA/DOE)	77	67	136	283	285	322
MRL (NSF)	175	130	122	192	180	214
MRL (AFOSR)	78	46	32	---	---	---
Army Research Office	57	20	5	---	---	---
Department of Energy	---	---	---	30	51	72
Air Force Office of Scientific Research	22	29	35	37	39	50
Office of Naval Research	48	23	61	107	87	111
TOTAL U.S. GOVERNMENT:	3,844	4,100	4,389	4,955	5,117	6,427
Grants from Private Sources	232	314	425	451	482	563
Graduate Research Board**	208	187	180	238	417	541
GRAND TOTAL:	4,284	4,601	4,994	5,644	6,016	7,531

NOTES: The data are given in thousands of dollars.

\*Projections based on first ten (10) months actual expenditures.

\*\*Includes computer allocation.

<sup>1</sup>Projections based on first nine (9) months actual expenditures.

<sup>2</sup>\$333,000 of increase over 1978-79 represents major awards for VAX computer purchase and Regional Instrumentation Facilities Grant

The increased outside support has been helpful in a variety of ways. For example, the large increase in postdoctoral appointments is a probable consequence. As usual though, any major change has side effects and this one is no exception. For several years the balance between TAs available and TAs needed has become increasingly precarious because of our increasing enrollments. We have depended upon using an appreciable number of advanced students (mainly 3rd year) as TAs (usually 1/4 TA + 1/4 RA), for whom the thesis advisor has not had enough funds for 1/2 RA support. The increased support available has reduced this source of supply, contributing to a major problem for next year.

#### C. Headship of Chemical Engineering

After 18 years as Head of Chemical Engineering, Jim Westwater is returning to normal faculty life at the end of the year. Jim joined our faculty in 1948 and became head of the then division of chemical engineering in 1962. Upon reorganization of our operations as a School in 1970, Jim became head of the Department of Chemical Engineering established at that time.

On January, the Director of the School appointed a search committee for a replacement, with W. J. Hall (Civil Engineering) as chairman, and T. J. Hanratty, A. J. McHugh and J. A. Shaeiwitz of chemical engineering as members, along with J. C. Martin of chemistry. They recommended C. A. Eckert as the new head and he will take office at the beginning of the 1980-81 academic year.

VII. Alumni

A. Activities and Bequests\*

The annual Alumni Newsletter will be sent to about 7,000 alumni and friends. This letter always brings a good response, both in letters from the recipients and in gifts to the School.

Contributions by alumni to the various funds of the School during the previous year are given below along with the fund balances as of March 31, 1980.

	<u>Contributions</u>	<u>Balance</u>
Illini Chemists Funds	\$ 2,817	\$ 1,059
Roger Adams Fund	6,685	167,094
C. S. Marvel Fund	2,323	19,572
John and Florence Bailar Fund	1,311	25,543
R. C. Fuson Fund	5,405	55,140
L. F. Audrieth Fund	530	1,499
W. H. Rodebush Fund	<u>1,201</u>	<u>12,800</u>
Totals	\$20,272	\$282,707

The usual Tuesday luncheon was held at the Fall ACS meeting in Washington and a social hour (with "free" drinks and hor d'oeuvres) at the Spring meeting in Houston. Both were well attended and highly successful.

Reynold C. Fuson, a member of our faculty in organic chemistry from 1927 to 1963, died August 4, 1979 at the age of 84. He received his chemistry degrees from Montana (1920), Berkeley (1921) and Minnesota (1924). At Illinois, he supervised 76 undergraduate research students, 154 doctoral candidates, and 15 postdoctoral fellows. He published 285 papers in the period of 1926 to 1961. He authored or coauthored five textbooks, including "The Systematic Identification of Organic Compounds." He originated the principle of vinylogy, elucidated the conjugate addition of Grignard reagents to unsaturated carbonyl compounds, and in his work on sterically hindered aromatic compounds discovered stable eneols and enediols. Fuson's stature as a research scientist was of the first rank, yet his deepest interest was always in teaching and the welfare of his students. In support of these interests he left bequests valued at about \$160,000 to the University of Illinois Foundation with the wish that they be used to further pure and applied chemistry at the Urbana campus. Similar bequests were made to the Universities of Montana and Nevada.

Arthur W. Sloan (BA, 1922) has for many years given us an annual gift of \$1,000 for undergraduate prizes. The funds have been used for five \$200 awards to the sophomore majors in chemistry making the best academic records as freshmen. He died on June 17, 1980 bequeathing \$25,000 to the University, the income of which "is to be presented, as in the past, as the Arthur W. Sloan Prize or Prizes to persons (and in amounts) selected in the sole discretion of the Department."

B. Awards\*

Of the awards and other major professional recognitions to our alumni and former faculty during the past year, the following have come to our attention:

\* From material supplied largely by J. C. Bailar, chairman of the Alumni Affairs .

Richard T. Arnold (MS, 1935; PhD, 1937), now Professor of Chemistry at Southern Illinois University, was given an honorary Doctor of Science degree by Northwestern University in June, 1979.

Irving Bengelsdorf (BS, 1943) has been elected an honorary Fellow of the Society for Technical Communication, which is the world's largest professional organization for technical writers, editors, and others in the field of technical communications. Bengelsdorf was a member of the Los Angeles Times and is now Director of Science Communication at Cal Tech. He also writes a science news column for the Los Angeles Herald Examiner.

R. C. Brasted (PhD, 1942), Professor of Chemistry at the University of Minnesota, has received the 1979 College Teacher of the Year Award, sponsored by the Minnesota Section of the ACS. Awardees are chosen from all of the colleges and universities in Minnesota.

Ellis V. Brown (BS, 1930), Professor Emeritus at the University of Kentucky, has been selected by the Kentucky Academy of Sciences for its Distinguished Scientist of the Year Award.

Elias J. Corey (staff, 1951-59), now Professor at Harvard, has received the 1980 John G. Kirkwood Award, sponsored by the Chemistry Department at Yale and the New Haven Section of the ACS. This award recognizes Corey's outstanding contributions in organic synthesis.

Ernest L. Eliel (PhD, 1948), W. R. Kenan, Jr. Professor of Chemistry at the University of North Carolina was elected to membership in the American Academy of Arts and Sciences.

Y. Y. Hsu (MS, 1957; PhD, chem engr, 1958), Senior Reactor Engineer with the Nuclear Regulatory Commission received the Heat Transfer Memorial Award from the American Society of Mechanical Engineers.

Jack S. Kampmeier (PhD, 1960), Professor of Chemistry at the University of Rochester, has been awarded a Senior Fulbright-Hays Research Scholarship.

Thomas W. Koenig (PhD, 1963), Professor of Chemistry at the University of Oregon, has been granted a Guggenheim Fellowship.

Charles G. Overberger (PhD, 1944), Vice President for Research at the University of Michigan, and Professor of Chemistry, has received the 1979 International Award in Plastics Science and Engineering, the most prestigious honor given by the Society of Plastics Engineers.

Dr. Max Peters (staff, 1951-62 and formerly Head of our Department of Chemical Engineering), now Professor of Chemical Engineering at the University of Colorado, was chosen to receive the American Institute of Chemical Engineers top teaching award for 1979.

Robert L. Pigford (MS, 1940; PhD, chem engr, 1942), University Professor of Chemical Engineering at the University of Delaware, has received its first Francis Alison Faculty Award (\$5,000) as the most outstanding faculty member at the University.



C. C. Price (staff, 1937-44) Professor of Chemistry at the University of Pennsylvania has retired from the faculty in order to devote more time to ending the threat of nuclear war. He has also received an honorary Doctor's degree this year from the Philadelphia College of Pharmacy and Science.

Lionel M. Raff (PhD, 1962), Regents Professor of Chemistry at Oklahoma State has received the Oklahoma Chemist Award, given by five ACS sections in Oklahoma, for his research in kinetics.

John H. Sinfelt (PhD, chem engr, 1954) Senior Research Advisor at Exxon, has been elected to the American Academy of Arts and Sciences and has received the National Medal of Science from President Carter.

Harry H. Sisler (PhD, 1939), Distinguished Service Professor at the University of Florida, has received the 1979 James Flack Norris Award for outstanding contributions to the teaching of chemistry. This award is given by the Northeastern Section of the ACS.

Ernest W. Thiele (BS, chem engr, 1919), formerly with Standard Oil of Indiana and now retired, was elected to the National Academy of Engineering.

David Turnbull (PhD, 1939), Gordon McKay Professor of Applied Physics at Harvard, was awarded the 1979 Acta Metallurgica Gold Medal for "demonstrated ability and leadership in materials research."

James D. Winefordner (BS, 1954; MS, 1955; PhD, 1958), Graduate Research Professor of Chemistry at the University of Florida has been selected to receive the 1980 Anachem Award in analytical chemistry.