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Chemist's Salaries Continue Upward

Even after climbing vigorously for a decade, salaries in the chemical profession continued to surge higher in what now seems to be an endless spiral.

In 1964 (the year for which the most recent NSF biennial survey was taken), they again reached new highs with the general median figures looking like this: bachelors, \$9,900; masters, \$10,600; and doctors, \$13,000 per annum. In 1962, comparable salaries were \$9000, \$10,000, and \$12,000, respectively. These figures, however, were reckoned only to the nearest \$1000, whereas this year's ACS comprehensive analysis was based on figures reported to the nearest \$100.

One thing the current ACS study failed to turn up was the so-called "average chemist" among the 63,000 or so on whom the National Science Foundation furnished salary and delated data. True, an over-all median salary for the group was calculated (\$11,000), but this is tantamount to saying the average person in the U.S. is a female because women outnumber men.

The main thing which takes chemists out of the averaging process is their widely different levels of academic training. Unlike medicine, dentistry, law, and possibly engineering, chemistry recognizes proficiency at three discreet degree levels and gears its system of rewards and benefits accordingly. Within these degree groups, too, salaries differ considerably, as evidenced by this compilation of ranges:

	Bachelors	Masters	Doctors
Lower 10%	\$ 6,900	\$ 7,300	\$ 8,100
Lower 25%	8,000	8,800	10,600
Median	9,900	10,600	13,000
Upper 25%	12,000	13,000	15,600
Upper 10%	15,300	16,000	19,200

Chemists and chemical engineers racked up their usual line of dissimilarities in 1964, most marked perhaps by the differences in degree distribution between the two groups:

	Chemists	Chemical Engineers
Less than B.S.	1.0%	0.7%
B.S.	41.8	62.8
M.S.	19.2	23.4
Ph.D., D.Sc.	37.5	13.1
Professional		
medical	0.6	0.0

Comparison of these figures with earlier ones reveals some noteworthy changes in the chemist population. The proportion of Ph.D. chemists, for example, has been declining steadily during the past 10 years. In 1955, there were 41% in this category. By 1960, the figure was 39.5%; and in 1962, 38.5%. Mainly balancing this decline has been the per cent growth in B.S. degree holders — from 37% in 1955 to nearly 42% last year. What the effect on the growth of chemical technology will be over the long haul because of this shifting ratio remains to be seen.

In chemical engineering, things have been more static. A glance at 1955 professional data released by the Society (C&EN, April 9, 1956, page 1731) shows virtually the same distribution as that for 1964.

Other Salary Factors

Type of employer, kind of work activity, field of chemistry, geographic locale, and sex all have an influence on chemists' salaries. The first two of these probably rank next in importance behind academic degree in pin-pointing the income of the professional chemist. And of the two, em-

ployer classification seems to weigh more since it more likely influences the chemist's type of work activity rather than the other way around.

Another reason for favoring employer classification as the second major factor in analyzing salaries is that the greatest number of chemists (two thirds in 1964) work for a single category employer — industry. While high, this is a decrease from both 1962 (69% of chemists worked in industry) and 1960 (70%).

Aside from self-employed chemists, industry continues to pay more for chemists than employers in any other category. But thanks to the efforts of Congress and to federal administrators who are anxious to make Government a more attractive place for professional employment, the Federal Government is catching up and already nearly matches industry's offers. In 1964, for example, the over-all median salary for B.S. chemists in industry was \$10,000 as against \$9800 for those in the Federal Government. This closeness was also apparent at the master's level where the salaries were \$11,200 (industry) and \$10,600 (Federal Government). For Ph.D.'s the difference was more pronounced — \$14,000 and \$12,900.

Considerably behind industry in their financial attractions for chemist employees again last year were educational institutions. Yet, high schools, colleges, and universities employed the second largest number of chemists. This employment sector is growing, too. The 19% so employed in 1964 was a gain of 2% over comparable figures for 1962. Salaries in such institutions, though, are among the lowest paid to chemists — \$6700 for bachelors, \$7400 for masters, and \$10,000 a year for doctors.

Kind of Job Important

One interesting finding of the ACS comprehensive salary studies every two years is that fewer than 50% of all chemists are involved in research and development, an activity which relates closely to the basic idea of being a chemist. Last year, the largest proportion of chemists were employed in R&D, yet they accounted for only 48.7% of the population in the profession.

However, intuition indicates that a greater percentage than this work in the laboratory. One possible reason for the low figure may be that many chemists who identify themselves to NSF as administrators or managers probably still put in time at the bench.

Chemists in teaching work remained at the 10% level during the biennium. However, the percentage of chemists involved in research in 1964 showed a 3% gain over 1962 — from 45.8%. For the same period there was a 3% drop in the management category — to 22.4% in 1964. Also down was the proportion of chemists identified as being in the marketing and production field — 14.5% of the total last year.

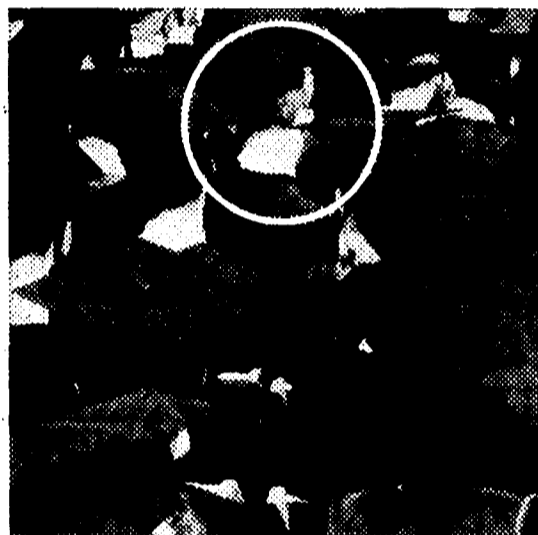
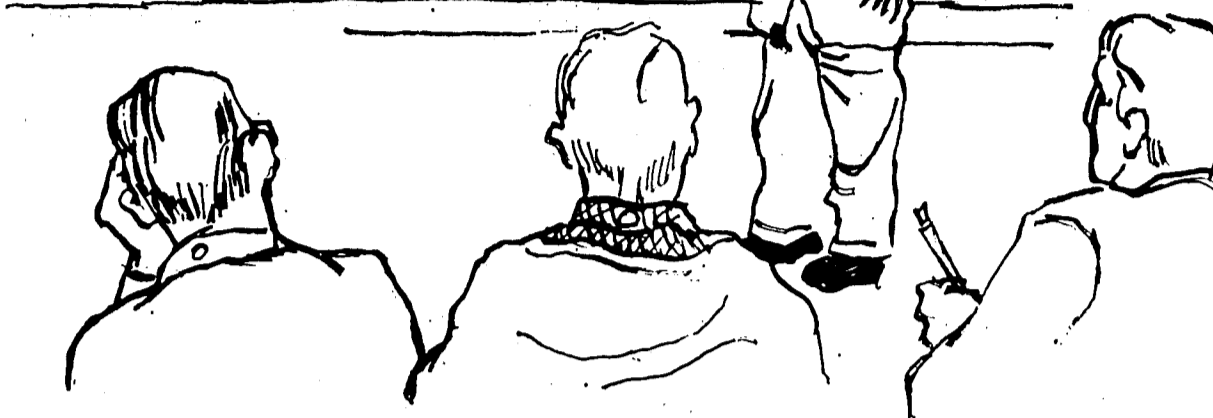
So far as salaries are concerned, chemists in management continued to receive the highest salaries of all — up to \$19,000 for Ph.D.'s with 20 or more years of

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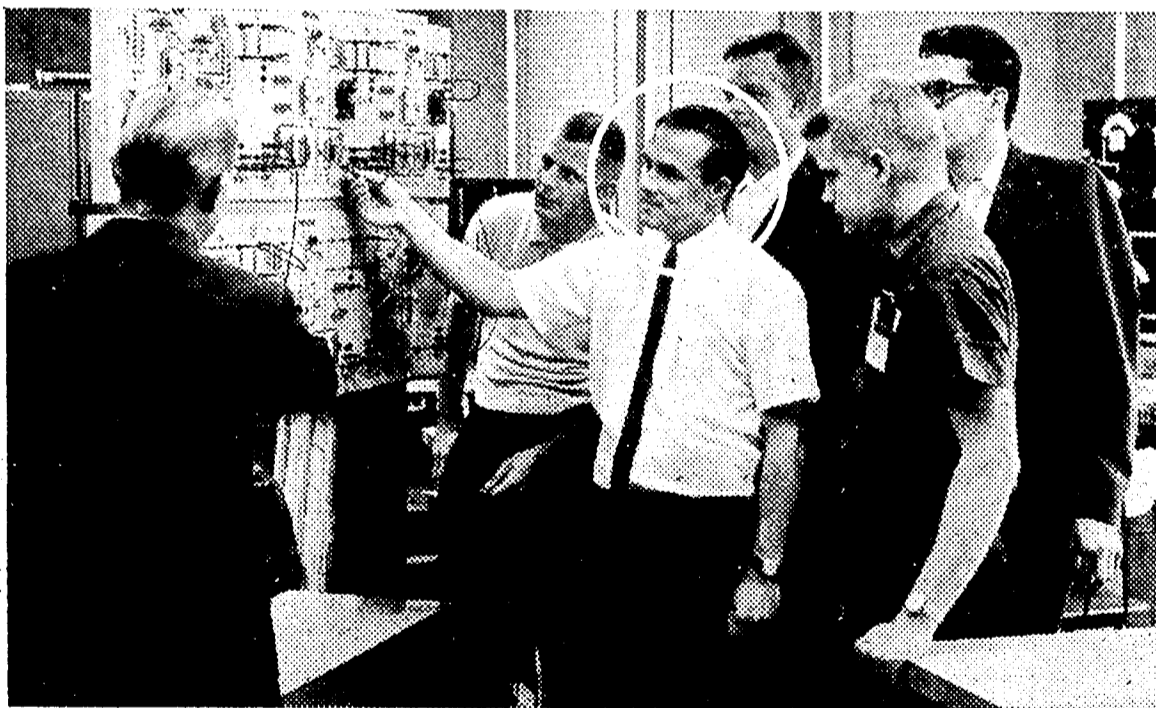
SOME TERMS IN TAYLOR'S SERIES

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S.F.



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Honor Fraternities: A Fine Tradition

Pi Tau Sigma

LEONARD SOLOMON

One of the greatest honors that an engineering student can receive is to be asked to pledge one of the school's five engineering honor fraternities.

One would think that if a student had the opportunity to associate himself with one of these fraternities, he would jump at the chance. Strangely enough, this is not the case. There seems to be a complete ignorance on the part of freshmen and sophomores as to what these fraternities try to accomplish.

The five fraternities are Tau Epsilon Pi, the National Engineering Society; Pi Tau Sigma, the National Mechanical Engineering Society; Eta Kappa Nu, the National Electrical Engineering Society; Chi Epsilon, the National Civil Engineering Honor Society; and Omega Chi Epsilon, the National Chemical Engineering Honor Society.

Pi Tau Sigma is typical of these organizations. The fraternity was founded at the University of Illinois on March 16, 1915. During the spring of 1914, Professor C. R. Harts, then Head of the Department of Mechanical Engineering at Illinois, suggested the idea of organizing an honor society of Mechanical Engineers. The idea was not pushed, however, until the following year.

By the first of the year 1915, the organization started to take definite shape and started to have a sufficient number of active members among the more responsible students to warrant the request for recognition from the university. In March, the original charter was granted, and in April, a convention was held when seven students and seven honorary members were made charter members of the Illinois Chapter. By the end of the year, the total membership is 35,000 with 77 active chapters.

The National Council of the fraternity does several things. It publishes "The Story of Pi Tau Sigma," an annual magazine called "The Condenser." It gives the "Pi Tau Sigma Gold Medal Award" to a young mechanical engineer for outstanding achievement in his profession within ten years after graduation, and the "Richards Memorial Award" to a mechanical engineer who has demonstrated outstanding achievement within a period of less than 20 years and no more than 25 years following graduation. It is also a member of the Association of College Honor Societies.

Although the national organization does perform these functions, the true life blood lies in the individual undergraduate chapters. In the CCNY Chapter, the student members catalogue student record cards, maintain a technical literature library, serve as the Mechanical Engineering Department Office, and work as graduate readers for M.E. instructors. Through its membership in Tech Council, it is active in trying to solve the problems that confront the engineering department as a whole. It will also have a tutoring program next year.

As stated in "The Condenser," the annual publication of the fraternity, "The object of this organization shall be to foster the ideals of the engineering profession, to stimulate interest in coordinate departmental activities to promote the mutual pro-

fessional welfare of its members, and to develop in students of mechanical engineering, the attributes necessary for effective leadership and the assumption of the responsibilities of a citizen in a democracy."

The aforementioned aims of the fraternity are high indeed, but they are just typical of the ideals of all five honor fraternities. To be eligible for one of these fraternities means that you have the intellectual credentials to be admitted, but to be invited to pledge means that you have the character, integrity, and honor to go along with it.

So if you do become eligible to pledge an honor society in the coming terms, find out about it; go down to the smoker; and do your best to attain membership and continue the high traditions and goals of the organization.

Eta Kappa Nu

By NORMAN ELIAS

In the summer of 1904, Maurice L. Carr, a student of Electrical Engineering at the University of Illinois, came by an idea. He discussed it with his classmates when he returned to school for the fall term, and when they indicated their enthusiastic support, he began to put into motion his plans for the formation of a college society of electrical engineering students. Having no official recognition from the university administration, these men selected a large cottonwood tree for their meeting place. From the shade of that cottonwood tree, there emerged the beginning of The Eta Kappa Nu Association, the national electrical engineering honor society.

The ideals and aspirations established in those early days of the society are best expressed by these words from the preamble to the constitution of Eta Kappa Nu: That those in the profession of Electrical Engineering, who, by their attainment in college or in practice, have manifested a deep interest and marked ability in their chosen life work, may be brought into closer union so as to foster a spirit of liberal culture in the engineering colleges and to mark in an outstanding manner those who, as students in electrical engineering, have conferred honor on their Alma Maters by distinguished scholarship, activities, leadership and exemplary character and to aid these students to progress through association with alumni who have attained prominence. . . .

Today, Eta Kappa Nu encompasses alumni chapters in cities across the country, and college chapters in a large (and still increasing) percentage of the nation's engineering schools. The central organization performs a variety of services one of which is the quarterly publication of "The Bridge." This magazine contains timely articles on such topics as micro-electronics, lasers, etc. along with other articles of particular interest to the membership of Eta Kappa Nu.

The history of Eta Kappa Nu at the City College began twenty years ago, in February, 1946 when Beta-Pi Chapter was installed at this school as the thirty-eighth college chapter of Eta Kappa Nu. The chapter owes a special debt of gratitude to Professor Henry B. Hansteen of the Electrical Engineering department. Professor Hansteen was instrumental in the procedures which led to the installation of the chapter, and ex-

cept for a brief interlude, has served as faculty advisor over the entire twenty years since that installation. It is through his continuing interest and activity on behalf of Beta-Pi, that this chapter has become one of the best—if not absolutely the best—chapter in Eta Kappa Nu. Under his guidance, the chapter has established a variety of programs designed to further the aims of the national organization, and to make City College a better school for all of its students.

Among these projects is the slide rule instruction program.



Gabor P. Torok, H.K.N. President

Students taking their first courses in engineering begin to find the need to call upon techniques of slide rule calculations that are more involved than simple multiplication and division. In response to this need, Beta-Pi announces to the students taking their first electrical engineering course a schedule of classes in these refined operations. The classes are run by members of the chapter.

The members have also established a senior photograph service. On several occasions a graduating senior or alumnus of the Electrical Engineering Department is likely to need a recommendation from the faculty. Although written records are available, a photograph of the student is an invaluable aid in reminding the faculty member of facts that will make the recommendation valuable. Each term, the Beta-Pi chapter of Eta Kappa Nu organizes a program whereby seniors in the E.E. curriculum are photographed. The results are included along with other records kept by the E.E. department.

To stimulate high standards of scholarship, and service, the outstanding sophomore award has been instituted. Students in electrical engineering who have completed their studies at the City College just through the sophomore level are eligible for consideration. The requirements that this student must meet are very strict, and in cases where none of the candidates meet these requirements, the award is not given. This guarantees that the recipient is truly an outstanding sophomore.

Every term, the chapter invites guests to present lectures at several meetings (Beginning with this term, the program is to the general student body). Speakers are invited from industry to discuss work with which they are familiar. They present viewpoints which truly represent conditions in the field of electrical engineering and help round out

Enrollment Up 10% At Queensborough

With an enrollment that is ten times greater than it was when it officially opened its doors in September 1960, Queensborough Community College of The City University of New York began its sixth academic year admitting 3,600 day and evening students.

The tremendous surge in student admission at Queensborough is part of the national phenomenon that is taking place in two year and four year colleges across the country, according to Dr. Dumont F. Kenny, the President of the College.

"It is a very real problem to keep up with the demand at Queensborough," he said. "The economic and social pressures make it imperative for today's high school student to study for at least another two years. Queensborough is able to offer the first two years of a liberal arts baccalaureate program or a complete curriculum fitting the student for career opportunities in business or in the technologies. Given the prediction that more and more students will be coming to Queensborough over the next ten years, we must be prepared for them."

Queensborough Community College will meet the projected increase in student enrollment by 1968 with its current \$26,000,000 building program, the result of which will be a complete modern campus equipped to accommodate 14,000 day and evening students.

The corner was turned in the construction program this past August when ground was broken for a new science building to provide laboratories and classrooms for physics, chemistry and biology courses, a gymnasium and a library and administration center. This represents another stage of Queensborough's expanded cam-

pus, for which \$11,000,000 was allocated by the city, state and federal governments. The \$922,792 technology building, equipped at an additional cost of \$578,535 has been in operation since 1963. It houses the best equipped electrical and mechanical laboratories in the country. Two immediate additional facilities included in the expansion program are a large parking lot for student cars and an access road to the campus at 56th Avenue, which will be completed shortly.

A humanities building, a cafeteria and a student center will make up the final stage of the construction program. In all, seven or eight buildings will occupy the forty acre campus within the next three years.

The number of daytime divisions students admitted to Queensborough this fall semester is 1,360, and the evening division enrollment total is 2,245, with 160 of the evening students having matriculated status.

The College's day and evening divisions offer comprehensive programs that include the traditional liberal arts and general education that lead to four year institutions of higher learning, and semi-professional and technical courses that lead to jobs at the end of two years.

the education of those who are future engineers. Announcements of upcoming lectures are posted on the H.K.N. bulletin board on the second floor of Steinman Hall. Perhaps the most popular activity sponsored by the chapter was an electrical engineering senior-faculty softball game held last May. The response from both sides to H.K.N.'s institution of this event was huge. For many of the students, it was a once in a lifetime chance to tag their favorite teachers, and for the teachers, it was a chance to show their ability in a field far removed from electrical engineering. At any rate, the chapter recognizes such events as great aids in improving student-faculty cooperation. Still, the students who played last year felt cheated when they lost. This, of course, calls for a re-match which Beta-Pi hopes to announce this spring.

As a service to the school of engineering, Beta-Pi Chapter along with local chapters of the other engineering honor societies determines the class standings of all junior and senior electrical engineering students. Cataloguing (which is the technical name of this activity) is held on Saturdays during the beginning of each term. H.K.N. sends a large number of its members to the Administration Building on these days to help prepare lists such as those now posted on the upper floors of Steinman Hall. The chapter also takes advantage of these occasions to determine which students are eligible for membership. At the completion of cataloguing, those upper juniors who have taken at least eight credits of EE courses, are in the

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Crime In Streets

The recent criminal attacks made upon students at the College have created a furor well out of proportion to the incidents.

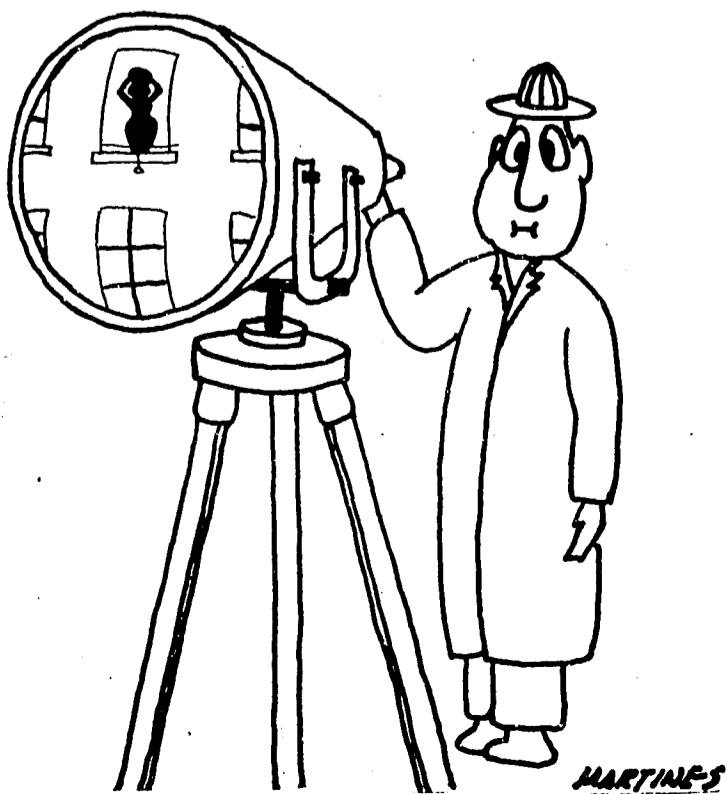
The attacks which occurred were unfortunate, but not uncommon. Muggings have become an accepted, although deplorable, fact of life in New York City. That the incidence of these attacks in the City College area has increased is apparently true, but this is still no reason for the wave of fear and anger expressed by some members of the college community.

However, it must be remembered that these attacks do represent a real threat to students, and must not be allowed to continue if it is at all feasible to stop them, and it is.

What is needed is increased police protection of the college area during evening hours. An additional patrol car or foot patrol at the North and South ends of the campus would more than likely be sufficient to control the "danger areas" between the campus and subway stations. The police have voiced a willingness to meet with demands for increased protection.

That seeking this protection will be an affront to the neighboring community as some have suggested, is absurd. The citizens in the local area are equally anxious for better protection on the streets, and fear that roaming marauders may make this their permanent territory if attacks are allowed to continue unpunished and unstopped.

No drastic measures are called for at this time, nor are they likely to be necessary in the future. Law enforcement in the present situation should be left to the police who have adequate methods for insuring safety without antagonizing anyone. The thoughtless suggestions raised from some City College sources, that police dogs be employed or bussing from subway stations to the campus be instituted, only strengthen the argument that it would be best to leave the police work to the police.



Inquiring Technographer

QUESTION: What do you think of South Campus people?

Where asked: Shepard Hall, Steinman Hall.

Mel Rabinowitz, Electrical Engineering, 507. Generally I would say that many South Campus students are too idealistic and not practical enough. They seem to think in terms of absolutes and to look down upon tech students because they consider them dull and uninterested in the "better things" in life.

Alan Posner, Pre-Med, 103. They don't deserve any thought.



Posner

Rabinowitz

Martin Leblang, Electrical Engineering, 307. I feel that the majority of South Campus students are no different than those on North Campus. Those poorly dressed students who distribute propaganda give the general public a very poor impression of students in general and give the North Campus students a bad impression of all South Campus students.

Howie Marcus, Chemical Engineering, 505. South Campus people ("Southerners") are people just like everyone else, though sometimes the boys and girls are indistinguishable from each other. Now that I am switching out of engineering I hope to learn to tell the difference down south. (Yes, I do know the difference otherwise.)



Marcus

Leblang

Steve Dick, Electrical Engineering, 507. I believe on the whole South Campus students are a good bunch although their fields of study are different from ours. It is of their own choosing and I hold nothing against them because of their choices. Many of them are extremely interesting people.

George Gottlieb, Chemical Engineering, 405. In general, South Campus people seem to take their work less seriously. Many don't seem to have more than vague notions of their objectives in life. Also, I think that if many, who spend a lot of time in protests, politics, and other extracurricular non-academic activities would spend more time in college, using it for what is needed, getting their academic educations, everyone would be a lot better off — But the girls are all right.



Dick

Gottlieb

Ida Pek, Pre-Med, 103. I don't really see a major distinction between North and South Campus students. However, I know that

Architects Emergency Committee

Since the appearance of an article in the December 7 issue of TECH NEWS, a great number of students have asked for more information about the Architects Emergency Committee. The Committee, whose office is located at 115 E. 40th Street in Manhattan aids architects and architectural graduates in finding positions. Mrs. Lyda Nelson, Executive Secretary, provides architectural firms with the names of men who have registered with the A.E.C. and in some cases arranges for interviews.

All architecture students are eligible for summer jobs. Lower-classmen will naturally have less contact with actual drawings but the committee can recommend upperclassmen for simple drafting positions. Architecture firms consider four summers' work about equal to one year's full time experience when hiring new men.

Mrs. Nelson has suggested that students get as much experience as possible in architect's offices before graduation. Even running errands will help to familiarize the student with the working of a professional office.

Salaries vary, but generally start at \$50 or \$60 per week, and rise with increased experience and ability.

Xmas Parties Planned For Local Youths

Children from Harlem will be able to attend two Christmas parties at City College this year—the first sponsored by the college's House Plan Association, a social organization, and the second at the college's chapter of Zeta Beta Tau fraternity.

House Plan Association expects to entertain 120 children in Finley Student Center, 133rd Street and Convent Avenue, (Saturday, December 18) from about 12 to 4 P.M. Each child who has been invited was asked to write a letter to Santa Claus several

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Spring

Pek

I collect most of my political literature at South Campus. The Students from South Campus seem to portray a very non-conservative image. Besides, that, the only other difference is that the boys from South Campus don't think as well as those up North.

Al Spring, Civil Engineering, 506. I think South Campus people are confused. They're trying to find themselves. They rebel against conformity, yet they conform to their society, which consists of dirty clothes, beards and anything weird. And this they think is a change for the better. Funny part is that as soon as they get out of college they do conform to the society. Therefore I think they're faking it.

Peace Corps Needs Many Engineers

Peace Corps representatives, the City College campus week, reported that fifty-seventy students took the placement examination.

Many volunteers have second thoughts about joining the movement, and drop out before shortly after beginning the training period. Other prospective volunteers are rejected on the basis of mental attitudes, unsatisfactory references (a minimum of ten is required) or for failure to complete successfully the training. An average of twenty-five percent of those filing questionnaires and taking the exam will eventually see overseas field work, a visiting recruiter stated.

The test given at City College is administered regularly by the Civil Service testing board. The next scheduled examination is Jan. 15, 1966 at the News Building at 220 E. 42 St. in Room 501. It is usually offered the second Saturday of each month.

The exam is not to eliminate prospective volunteers but to filter their aptitudes. Language skills are of primary importance.

Recruiters showed particular interest in engineering students. Their technical training would be "invaluable even on unrelated tasks." Engineers and science majors are needed, one Peace Corps worker asserted, to teach technical subjects, work on construction, plan power plants, and work on other projects where their training will be of use.



RON WALSH (C.E.) of the '60 Bethlehem "Loop" Course is field engineer for important construction projects. He's typical of young men on the move at Bethlehem Steel.

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Corps Field Of Biology Studies Effects Of Space Travel On The Human Body

By FRANCINE COURNOIS

One of the new fields of science created by the space age is bioastronautics, the study of man in space. How man will react to long periods of time spent in space travel and how he will react once back on earth are problems with which scientists all over the world are now being faced.

For a long time much of the research concerned with space travel focused only on the technical aspects of the problem. Soon it became apparent that if man was to undertake space flight, a stronger emphasis would have to be placed on the biology of man in space.

Two weeks ago, Doctor B. M. Wagner, head of pathology at Lower Fifth Avenue Hospital, lectured on the growing field of bioastronautics to members of the Caduceus Society at the City College. An expert in the field, Dr. Wagner outlined the biological problems that must be overcome before long journeys in space will be safe for man.

Most variations in the normal functioning of the human body are caused by the lack of gravity in space. A change in blood pressure is one of the more obvious effects of this lack of gravity. Ordinarily the heart must push the blood up through the body against the force of gravity. In space the force needed to pump the blood decreases considerably. Blood pressure drops and the body becomes deconditioned.

Wagner explained that there is a point in time beyond which this deconditioning will become permanent and man will not be able to readjust to conditions on earth. There is no way of calculating just when this will occur and so this problem has become one of immediate concern.

Human beings and all living organisms have very sensitive balances. To describe just how they work Dr. Wagner explained what happens to a bird when one of the sensitive balances of its body is tampered with. During the months before migration birds will store just enough fat to enable them to fly to their destination. An experiment was performed in which a number of birds were kept indoors in a warmer environment than that outside. As a consequence the birds did not store enough fat for the journey and were extremely confused when they could not reach their destination.

Living organisms are known to have "time clocks." This means that the organism is adjusted to the 24-hour night-day cycle. The human body, for example, secretes adrenatin twice a 24-hour period. In space the normal 24-hour cycle is upset and changes in the body take place. It remains to be seen just how these changes will effect our astronauts in the long run.

Another problem caused by weightlessness is the lack of proper exercise. When we walk and move on earth we are fighting so against the force of gravity. Since there is no such force in space the body does not get the exercise it needs to keep in proper condition. Biologists fear that over long periods of time the muscles will atrophy and the bones become calcified.

Our astronauts have thus far experienced no serious changes in their biological make-up, though space flight has had some minor affects. Almost all the astronauts lost weight once back on earth and many had changes in the white blood count. Just what this will mean in terms of longer flights has not yet been determined.

Also desirable in space would be a "shirt sleeve" atmosphere. This would be an atmosphere in which man could walk around in plain clothes and without masks. It would mean the creation of an ecological, or self-sufficient, system. Oxygen would be supplied by chlorella plants, which would also be used for food. At present we are not capable of producing a shirt sleeve atmosphere. Such a system would involve a tremendous amount of weight and we have no rockets powerful enough to boost the enormous amount of material required into space. Russia, however, with far more powerful rockets, is currently capable of producing a congenial atmosphere in space.

It has been suggested that man be replaced by computers as space explorers. Both computers and monkeys have been proven capable of maneuvering space capsules. Neither, however, is capable of sophisticated thought. A series of tests were run in which various emergency situations were created. The results showed that the computer was likely to make fatal mistakes in a far larger percentage of the situations than an intelligent and well-trained pilot. Man is essential to space flight, and the difficulties he will encounter in space are of immediate concern to those involved in the space program.

Eta Kappa Nu

(Continued from Page 3)

top fourth of their class, have a B+2 average overall, along with those seniors who are in the top third of their class and have at least a B average in their electrical engineering courses, and those graduate students who, having completed at least 15 credits of electrical engineering graduate courses, have either a B+4 average or have passed a First Doctorate Examination (these men) are notified of their eligibility for membership.

A long standing tradition has been Beta-Pi's free tutoring service. Students having difficulty in courses related to the engineering curriculum are invited to apply for tutoring.

Despite the serious nature of most of its activities, the members of Beta-Pi chapter, still find time for less formal functions. At the end of each term there is a fairwell get together held on campus. Here, the graduating members get a final opportunity to greet their brothers in a social atmosphere.

This and other social events are enjoyed by all those who participate, and the experience gained in operating any such activities can be of benefit to the entire chapter membership. The lives of all will call for the exercising of organization and leadership abilities which cannot be taught in a classroom or from a book. A guiding principle in the operation of the Beta-Pi Chapter of Eta Kappa Nu has been the establishment of an active organization which offers its members an opportunity to develop these vitally important abilities, and the desire to take advantage of this opportunity is considered a prerequisite for election to membership in the Eta Kappa Nu Association. It is with this principle in mind, that the chapter maintains all of the programs which have been outlined.

For these activities, Beta-Pi Chapter has received nation-wide recognition from the Eta Kappa Nu Association. The chapter's display case, on the sixth floor of Steinman Hall, is filled with awards won since its installation. This year, for the third consecutive year, the Beta-Pi Chapter has won the award for best chapter of H.K.N. in the eastern region of the United States (four regional awards are presented each year; the winner in each region is the recipient of the highest recognition that is given to a chapter by the national organization. The tradition that these awards represent, is one which the chapter continues to strive to maintain. Through these efforts, this chapter at City College seeks to set an example for the chapters at all of the other schools and seeks to keep the goal of eligibility for membership in the Beta-Pi Chapter of the Eta Kappa Nu Association as a stimulus for higher achievement by the entire electrical engineering student body of the City College of the City University of New York.

CLUB NOTES

International Students Club will hold elections and see French films in S113. Everyone invited. December 23, 1965—12:30 P.M.

What Does South Campus Think Of The Engineer?

By DAVID BIEGEL, Epsilon Nu Gamma Fraternity

Engineers are too often stereotyped as dull, cautious, uncultured people who are interested in their own world of engineering and nothing else. In order to find out to what extent the City College student agreed with this stereotype, Epsilon Nu Gamma, a social fraternity of engineering students, decided to take a survey.

This survey was taken during the first week of November, 1965. One hundred Bachelor of Arts students, fifty male and fifty female, took part in the survey. The survey consisted of two columns of antonyms, twenty-three words in each column. (See sample below.) These pairs of words represented character traits. There were five spaces, numbered one through five between every pair of words. The student answering the survey had to check one of these five spaces of each pair of words. Space number one indicated strong preference for the left hand column and space number five indicated a strong preference for the right hand column. Spaces two, three and four were intermediary values. For example consider the first pair of words. (See sheet). If the student thinks that engineers are moderately intelligent, he checks column two. If he thinks they are very unintelligent, he checks column five, etc.

The results of all the hundred students were then put together and computed into three averages: total average, the average of all hundred students taking the survey; male average, average of the fifty male students completing the survey; female average, average results of the fifty female students taking part in the survey. The theoretical range of results is from 1.0 to 5.0, although in actuality the results ranged from 2.2 to 3.8. The closer the rating to 1.0 or 5.0, the more significant is the trait.

The most significant traits that appeared were: intelligent (2.2), dexterous (2.5), strong-willed (2.3), energetic (2.3), optimistic (2.5), conformist (2.5), impulsive (3.7), serious (2.3) and not active extra-curricularly (3.5). These were the only ones out of the twenty-three traits on the survey which, according to the results, were significant. A significant trait has to vary substantially from 3.0, the intermediary value.

It is interesting to note that the survey showed that engineers are only slightly dull (3.2), slightly shy (3.1) and slightly unathletic (3.1), traits that are often included in the stereotype of engineers.

Students answering the survey were also asked to make any comments about engineers that they wanted to. The following are some of those comments:

"dull, average run of the mill people," "quite a bunch of fairies," "they're stupid," "they're afraid to move a muscle when it comes to an controversial question for fear of jeopardizing their future," "engineers are a nice group," "they are an ignorant lot as a whole, they don't know what life is all about and chances are they never will," "exciting, interesting, intelligent and sincere people," "money hungry," "I don't understand why all engineers like to talk about cars, engineering, courses, jobs and sex. There are other things in life."

ENGINEERS ARE:

	Male	Total	Female	
Intelligent	2.2	2.2	2.1	Unintelligent
Extrovert	3.2	3.0	3.0	Introvert
Forward	3.1	3.1	3.1	Shy
Good Dresser	3.2	3.1	3.1	Bad Dresser
Sensitive	3.2	3.2	3.2	Insensitive
Interesting	3.4	3.2	3.1	Dull
Artistic	3.2	3.2	3.2	Inartistic
Dexterous	2.5	2.5	2.5	Clumsy
Strong-willed	2.5	2.3	2.1	Weak-willed
Energetic	2.2	2.3	2.7	Lazy
Optimistic	2.4	2.5	2.6	Pessimistic
Liberal-minded	3.3	3.4	3.0	Conservative
Liberal	3.4	3.4	3.3	Conservative
(Politically)				
Conformist	2.5	2.5	2.5	Non-Conformist
Impulsive	3.8	3.7	3.5	Cautious
Confident	2.6	2.7	2.6	Insecure
Athletically	3.0	3.1	3.1	Unathletic
Inclined				
Cultured	3.4	3.4	3.3	Uncultured
Serious	2.4	2.3	2.3	Happy-Go-Lucky
Active				Not Active
Extra-curricularly	3.6	3.5	3.3	Extra-curricularly
Oversexed	3.1	3.1	3.0	Undersexed
Creative	3.5	3.3	3.4	Mechanical
Emotional	3.5	3.3	3.0	Unemotional

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Book Review

Use of Computers in Biology and Medicine by Dr. Robert S. Ledley, President, National Biomedical Research Foundation, assisted by James Bruce Wilson, National Biomedical Research Foundation. 966 pages plus index; 529 illustrations; 6¾ x 9¼; McGraw-Hill; \$29.50. Publication date: August, 1965.

"Use of Computers in Biology and Medicine" is based on a survey — sponsored by the Medical Sciences Division of the National Academy of Sciences, National Research Council — of past, present, and proposed applications of

(Continued on Page 7)

Navy...

(Continued from Page 1)

Ordinarily there is a wait of one to two months between the time you express a desire to sign up for the program and the beginning of processing. It is only in the case of January graduates that an attempt will be made to speed up processing.

Engineering applicants selected for training leading to a commission in the Navy Civil Engineering Corps will also attend Officer Candidate School at Newport. Upon graduation from the school they will be commissioned and sent to Port Hueneme, California for training with the Civil Engineering Corps.

All Engineering majors will be considered for the program, and if accepted, all will have Engineering jobs. However, there is no guarantee of assignment to any specific field of engineering.

See Dr. Harry Meisel (Student Life) in Room 119 Finley for the preliminary questionnaire to notify the Navy of your desire to apply for the Officer Candidate School, or call the U.S. Navy Recruitment Station at 620-6486 for further information.

Omega Psi Phi

(Continued from Page 1)

slight problem. In New York, it is organized on a city-wide basis. At CCNY it is not an independent fraternity, but receives part of its membership from other colleges. This may cause a slight "loyalty" problem in athletic competition, but it is not expected to be a serious one.

Omega Psi Phi performs numerous services, among which are tutoring, sponsoring essay writing contests with prizes awarded, checking into price frauds, and supporting civil rights movements. The white fraternities are much less involved in social services.

Parties...

(Continued from Page 4)

weeks ago. The individual houses, about 70 in all, "adopted" one or two children each and attempted to answer the letters to Santa by accumulating requested gifts for distribution at the party. In addition to meeting Santa Claus, the children will play games and be entertained by a magician, Paul Blake, a graduate of the college.

Zeta Beta Tau's party will be held Thursday (December 23) from 4 to 6 P.M. at the fraternity's chapter house, 16 Hamilton Terrace. Invitations have been extended to 150 youngsters. Each child will receive a Christmas stocking filled with toys donated by toy companies and department stores.

Chemists' Salaries...

(Continued from Page 2)

experience. Teaching, on the other hand, produced among the lowest salaries in the profession. Not readily known, though, is the total amount of supplementary income received by many teachers for their outside consulting activities. Unofficial reports sometimes peg these fairly high. Thus, at least for some teaching chemists, academic and industrial salaries may be on a par.

What's Your Line?

Probably one of the earliest decisions made by the budding chemist concerns the field of chemistry in which he chooses to specialize. While sometimes made casually at the undergraduate level, it's the kind of choice that ultimately can have a fairly sig-

nificant effect upon the chemist's annual salary. For many years, organic chemistry has attracted the greatest number of people. More than two fifths of the total chemist population can be found in this field. In 1964, nearly 43% were so classified. And the choice proved to be a fairly good one, since salaries in the organic field were on a par with, if not higher than, all others.

Yet, there is some indication of a drop in the popularity of organic chemistry. The percentage of all chemists who are organic chemists dropped 2% from 1962 to 1964. This drop has to be balanced against the findings of the 1965 ACS starting salary survey, which showed a 10% rise in the number of M.S. and Ph.D. graduates in the organic field (C&EN,

Oct. 18, page 84). Perhaps these differences may be a normal cycling which will average out over the long haul.

A different relationship was observed for the field of inorganic chemistry where, in 1965, graduate appeared to choose this field less often than did those graduates of a year ago. On the other hand, the entire field of inorganic chemistry in 1964 showed a 2% gain — up to 9.2%, according to the ACS-NSF study.

Salary differences among the major fields of chemistry were most marked in 1964 at the B.S. and M.S. levels; some fields offered as much as \$2500 a year more than others. This pattern was less obvious for Ph.D.'s whose salaries in the various chemical fields tended to cluster closely around the over-all median of \$13,000 a year.

In addition to organic chem-

istry, physical and, to a limited extent, agricultural and food chemistry also paid well last year. Biochemistry, though, was the poorest paying field of all. In part, its generally low salary levels may be due to the inherent character of the specialty, namely, its close alliance with biological science — because in biology, salaries most often are not as high as those in chemistry. Another major factor may be the high concentration of women working in biochemistry. Women's salaries consistently are below those of men.

Somewhat related to the salary picture is the relative youth of chemists in the different chemical fields. Over-all, an examination of the age grouping provided by NSF shows pretty much what might be expected of Chemists with advanced degrees

(Continued on Page 8)



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and, to a limited extent, cultural and for paid well last year though, was the field of all. low salary level to the inherent specialty those alliance with — because of the continuing fight for free tuition. This past term's ally, coming in the middle of the mayoralty election, saw participation of the two candidates, Democrat Abraham me and Republican John Lindsey. After the rally, pro-chestistry. Work, resignations, voluntary retirements, reinstatements followed in quick succession, all based on free tuition for City University. The coming year may be the Waterloo free tuition, but the City College student body is firmly free tuition. OUR POSITION, NO TUITION!

Our Position No Tuition!

The pictures on this page are a reminder for the coming year of the continuing fight for free tuition. This past term's ally, coming in the middle of the mayoralty election, saw participation of the two candidates, Democrat Abraham me and Republican John Lindsey. After the rally, pro-chestistry. Work, resignations, voluntary retirements, reinstatements followed in quick succession, all based on free tuition for City University. The coming year may be the Waterloo free tuition, but the City College student body is firmly free tuition. OUR POSITION, NO TUITION!



COLLEGE PRES.: A few days after this speech for free tuition, President Gallagher, along with other City University officials, came out with a proposal for tuition in the City University. Later the President rescinded his backing of this proposal, but the student body was shocked at his change in position on this important matter.



THE LOSER: There must be a loser in every election, and Abraham Beame was the loser in this one. However, the City College Alumnus made a strong pitch for free tuition at the rally. As far as free tuition was concerned, there was no difference between the two candidates.



THE MARCH: Banners flying, signs showing, the student body moves from the South Lawn to the North Campus Quadrangle, with President Gallagher and various student officers leading the way.



STUDENT PRES.: S. G. President Carl Weitzman emphasizes a point in his free tuition speech. Firmly committed to free tuition, Weitzman saw his free tuition campaign for this past term fall short of expectations. Let us remember not to be discouraged this year and continue our fight for free tuition.



THE WINNER: The November 3rd elections would show this man the new mayor of New York. Here, John Lindsey commits himself to Free Tuition for the City University. This year will show the strength of his commitment.

Book Review

(Continued from Page 6)
computers to indicate the great capabilities of computers in biology and medicine, and to illustrate in a concrete fashion ideas and methods for solving various problems utilizing computers. The book, designed to serve as a semi-handbook, is an attempt to assist in bridging the technical gap that frequently exists between the biological researcher's training and experience, and the knowledge he needs to use computers.

The twenty-four chapters of the book are divided into four parts. Part 1 comprises a general, non-technical summary and discussion of the material contained in the other three parts. Part 2 deals with the programming of digital computers, the use of analog computers, and related topics; the programming techniques considered are applicable to all types of computers and there is an extensive consideration of automatic programming languages. Part 3, the survey, describes the actual application of computers in biomedical science. Part 4 covers technical, mathematical, and other concepts that are often needed when using computers.

The author believes that the greatest use of computers will be in biomedical science, since biomedical research almost invariably involves large masses of data, or many related factors, or both, and the current emphasis on the bio-physical and physiochemical basis of biological systems is bringing a large portion of biomedical science to a point where complicated mathematical manipulations and mass data

(Continued on Page 8)



JIM ANTHONY
(I.E.) of the '60 Bethlehem "Loop" Course is engaged in operations research in the Industrial Engineering Department of the nation's largest steel plant. He's typical of young men on the move at Bethlehem Steel.

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Chemists' Salaries...

(Continued from Page 6)

tend to be older than chemists with B.S. degrees.

Over-all, the median age for B.S. chemists was in the 35-39 year group. A closer look, though, shows that physical chemistry and biochemistry somehow accounted for a greater proportion of younger people than most other fields. Among bachelors, for example, the median age group was in the 25-29 years age bracket for these two fields. In part, this relative youth may account for the somewhat lower salaries paid to biochemists. Yet, this reasoning doesn't seem to hold for the better paying field of physical chemistry. One conclusion might be that biochemistry tends to attract younger unmarried females whereas physical chemistry attracts and holds onto the bright young men.

Engineers, of course, continue to be paid best in the spectrum of chemical specialists. Their over-all salaries in 1964 were higher than those for almost all other types of chemists. A comparison of chemists' and chemical engineers' median salaries last year, for example, shapes up like this:

	Chemical Chemists	Engineers
Bachelors	\$ 9,900	\$10,000
Masters	10,600	11,700
Doctors	13,000	14,400

An interesting side observation is that the median age group for Ph.D. chemical engineers (45-49 years) is higher than for any field of chemistry. This may have some strong implications regarding the training needs for doctors in the engineering field.

Women's Salaries Low

The proportion of women practicing chemical science rose 2% between 1962 and 1964 and last year they accounted for 7% of the chemist population. Taken as a separate factor, a chemist's sex probably is a major determinant in setting the kind of salary pattern that follows him throughout his chemistry career. And the

pattern is not a particularly generous one for women. Despite fair employment laws and changing standards concerning the treatment of female employees, women chemists' salaries, the ACS finds, are consistently lower than for men — much lower. Over-all, a comparison of 1964 median salaries for the two sexes is as follows:

	Men	Women
Bachelors	\$10,000	\$7,100
Masters	10,900	7,600
Doctors	13,000	9,700

Thus, on the average, men were paid approximately \$3000 a year more than women, the same kind of situation that existed in the ACS comprehensive salary studies of 1962 and 1960. Just how long this kind of differential can go on before more equalization occurs may soon be a matter for serious concern by employers and others responsible for setting salaries. There have been some signs that the Federal Government's practice of not making any salary distinction in the sexes has spread to industrial employers. But as yet, the results of any such change in philosophy are not readily apparent from the NSF data supplied to the ACS.

Within the various fields of chemistry, some fields seem to have a much greater attraction for women than others, and some pay more than others. But these are not necessarily the same fields. For example, last year the highest proportion of women chemists worked in biochemistry. They accounted for 31% of all B.S. degree people in the field. Yet, salaries for biochemists were on the low side. Analytical, organic, physical, and agricultural and food chemistry accounted for lesser numbers of women in 1964, although these fields paid somewhat better — up to \$11,600 a year for women Ph.D.'s in agricultural and food chemistry, for example.

East Is West and North Is South

Probably the least influential of all factors likely to affect chem-

ists' salaries is the geographical locale in which they work. In the main, 1964 salaries for chemists tended to vary little from one end of the country to the other. The major differences in salary were between the most populous region and the least populous region in terms of chemist density. The Middle Atlantic States accounted for 28.4% of the chemist population last year. In these three states of New Jersey, New York and Pennsylvania, salaries tended to be somewhat higher than most anywhere else. The Mountain States throughout the Rockies, however, accounted for only 3% of the chemist population. And correspondingly, salaries there were slightly on the low side.

Because of the general uniformity of chemists' salaries throughout the country, it is not likely that choice of job based on salary in a given geographic locale is apt to be very important for many chemists. Aside from purely personal factors, it is more likely that such ancillary expense items as cost of living and commuting count more in a decision to stay or move on.

Basis for the Study

As in 1960 and 1962, data for this professional and economic analysis of the chemical profession were accumulated by the ACS for the National Register of Scientific and Technical Personnel, a program of the National Science Foundation. The National Register was set up to furnish the Government with a comprehensive registration of U.S. scientists for statistical and technical mobilization purposes.

Respondents to the 1964 Register were asked to list their salary to the nearest \$100 along with other important information about their training and employment. These data were analyzed in a preliminary way last February by the Society (C&EN, Feb. 8, page 60). Since then NSF has furnished the ACS with a more comprehensive array of statistics on a total of 63,053 chemists, including 6578 in chemical engineering specialties. Of this total

Steinman Sports New Lab For Electronic Research

A magneto hydrodynamics laboratory exclusively devoted to graduate research became operational November 10 with the activation of a powerful plasma flux unit, the lab's major component.

Housed in Steinman Hall's "Optical Tooling Lab" (205), the new laboratory has already attracted several outside visitors.

According to Professor Norman C. Jen (C.E.), who is in charge of the facility, the plasma flux unit and its auxiliary equipment have cost \$48,000. The flux unit alone uses 200 kw, 1000 amp at full power, more power than all the rest of Steinman combined.

Two Ph.D. candidates and a post-graduate research fellow are working with Dr. Jen on a project aimed at achieving greater understanding of plasma turbulence. Very little work has been done in this field in this country, but Dr. Jen pointed out that the Soviet Union has been active in the field for the past two years.

Plasma turbulence is composed of kinetic turbulence, which behaves according to ordinary fluid mechanics, and of magnetic turbulence, which is due to the motion of electrons and conforms to Maxwell's Equations.

Funds for the lab and its operation have thus far been provided by The City University. Dr.

52,162 furnished information on their salaries for this report; 51,554 listed their academic degrees, and 60,850 supplied data on their geographic location. All replies were anonymous.

A major observation based on a review of the findings of the NSF data is the obvious one—salaries continued to rise, reaching new high levels last year. By 1966, they might be another \$1000 a year higher on the average.

Over-all, the shape of the chemical profession looked good in 1964. Salaries were up and unemployment was down. And even among the unemployed segment (averaging 3%) there were many retirees. Thus this figure likely is in line with that turned up in recent ACS starting salary surveys — close to 1%. Hopefully, these conditions have continued through 1965, and they will still be evident in 1966 when the next NSF collection of data is made.

Jen hopes to acquire private support soon.

Work on the facility began three years ago and culminated with the November 10 demonstration. Dr. Jen and his assistants are still making improvements and additions in the equipment.

Book Review

(Continued from Page 7)

reduction and analysis are absolute prerequisites for further progress. Dr. Ledley says, "The advantage in the use of computers for such purposes is not derived merely from the fact that a computer can perform complex mathematical and logical operations rapidly, but rather from the observation that the electronic computer makes feasible solutions to problems that could not otherwise be approached."

In addition to being abundantly illustrated, "Use of Computers in Biology and Medicine" includes extensive cross-references among the computer programming chapters, the biomedical application chapters, and the mathematical chapters, thus enabling the reader to begin at any place in the book and be referred to all necessary prerequisite material. Part I includes a comprehensive, annotated bibliography of the most important texts in those aspects of mathematics and physics that occur most frequently in the use of computers in biology and medicine, since only concepts are presented in the mathematical chapters.

Dr. Robert S. Ledley is author of "Digital Computer and Control Engineering" (McGraw-Hill 1964) as well as numerous papers in the fields of computer aided medical diagnoses, logical design of digital computers, information retrieval methods, and bio-physics. Further information on Ledley's "Use of Computers in Biology and Medicine" may be obtained from the McGraw-Hill Book Information Service, 3 West 41st Street, New York, New York 10036.

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