

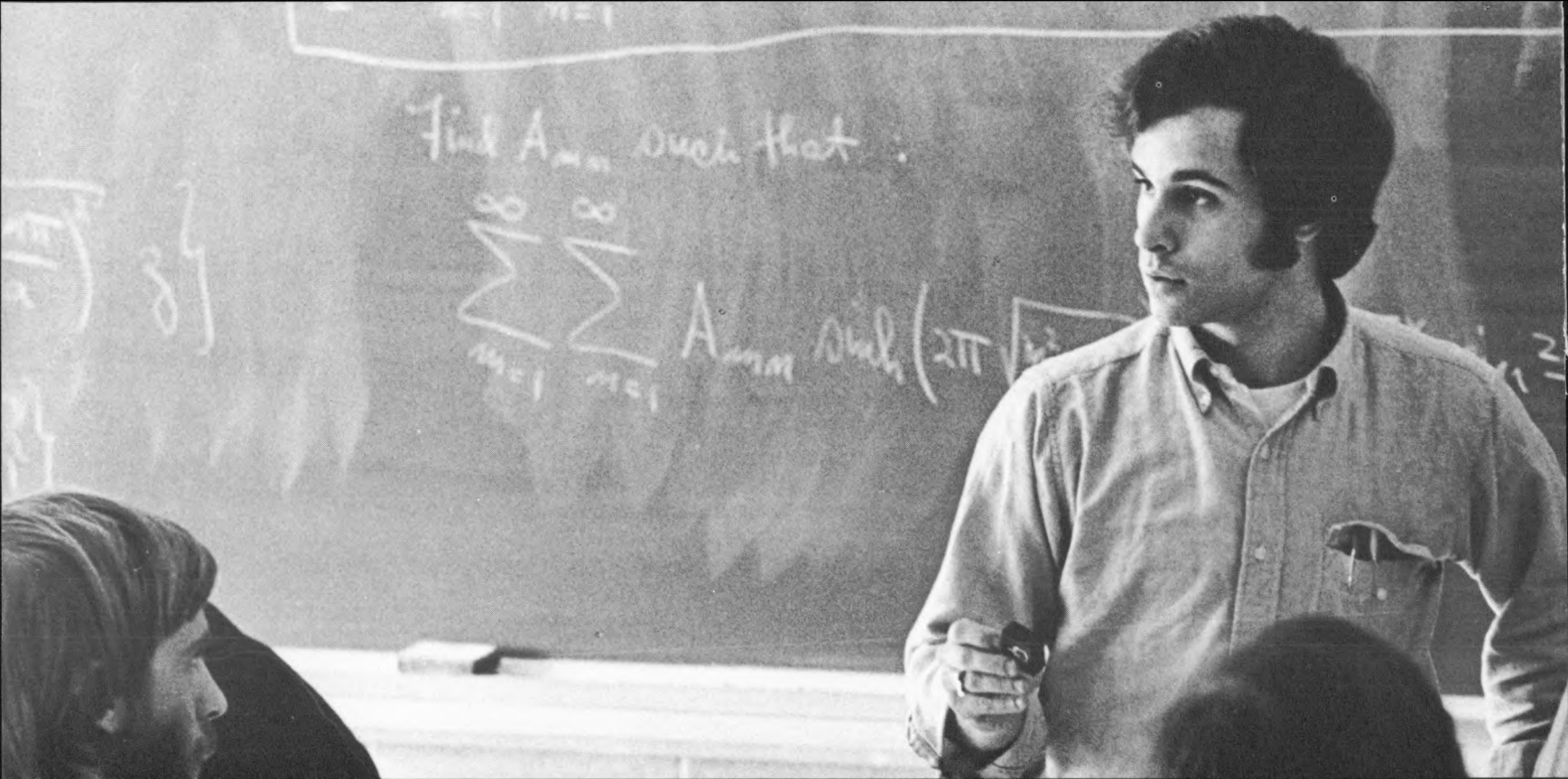
CORNELL UNIVERSITY ANNOUNCEMENTS

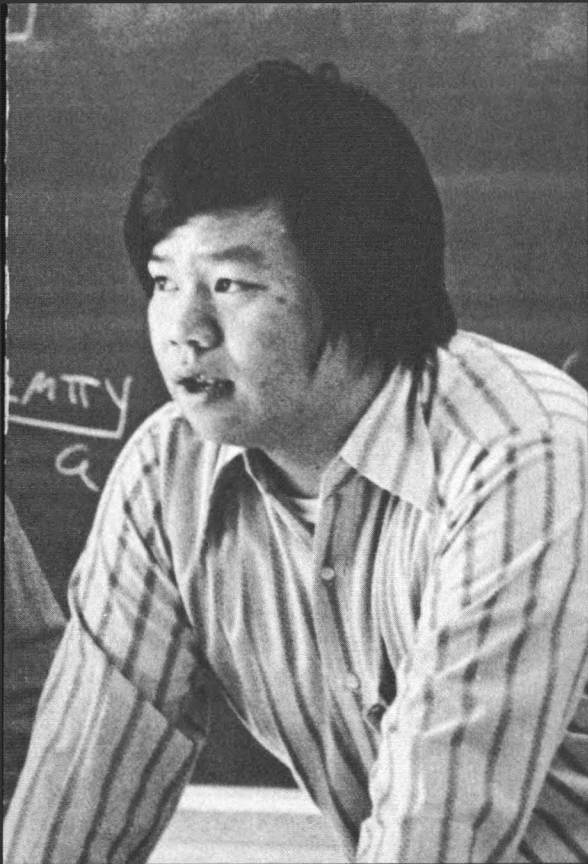


ENGINEERING AT CORNELL

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ENGINEERING AT CORNELL





What is it like to be an engineering student at Cornell?

Catalogs list courses and admission requirements, and they are a help to prospective students, but they don't convey very much about the quality of life at a college or university. Where and how would you live? Who would your friends be? What would you do for fun? These things are important, too, along with such matters as just what you would study and what possibilities you would have for a future career.

The purpose of this booklet is to give you an idea of engineering at Cornell from the viewpoint of students—freshmen through graduate students. Informal profiles are presented of students picked pretty much at random, though there was an attempt to convey the diversity of the student body. The impressions, experiences, and aspirations of these students may help you get a feeling for what Cornell can mean to you.



Born in the United States, reared in South America, and fresh from a summer's work in Mexico, Bill Dobbs had a background of varied experiences before he arrived at Cornell as a freshman in the College of Engineering.

He selected Cornell on the basis of catalog descriptions, and recalls his initial first-hand impression with pleasure. He arrived one morning at 6:45, after having traveled for twenty-four hours, only to discover that there was a mix-up in his dormitory assignment. He dumped his bags, walked around Beebe Lake, explored the Fall Creek gorge, looked at the University buildings, and by the end of the day, when he settled into Donlon Hall, "had gotten to know the campus pretty well." He liked what he found, on the campus and in the dorm, and felt he was off to a good start.

Bill's parents are United States citizens, but, because of his father's business, the family has lived mostly in South American countries. Bill spent much of his childhood in Cuba, Argentina, Venezuela, and Brazil. He attended secondary school first in Argentina and then as a boarding student at Phillips Academy in Andover, Massachusetts. He spent the last term of high school

in Brazil, earning credit for the study of Portuguese.

By a fortunate coincidence, Bill's roommate at Cornell is an engineering student with a Cuban background. He and some other Spanish-speaking students on the corridor provide Bill with the opportunity to keep up his Spanish.

Bill's plan is to combine his Cornell major, which will probably be civil engineering, with cultural anthropology. His ambition is to work on problems of development in South America, particularly in Brazil. There is great need for more housing in almost every South American country, he explains, and he feels that much of the current building is not very functional, not good structurally, not well suited to the climate, and not well adapted to the social and family needs of the occupants. Bill's opinions on this subject are based on first-hand observation, for, while he was in Mexico last summer as a photographer for an archaeological expedition, he made a

Right: *One of the first things Bill did when he arrived at Cornell was to walk around Beebe Lake, which is situated on campus and encircled by wooded paths. The 740-acre campus is noted for its natural beauty.*





"I believe that engineering practice can allow for originality and a certain amount of independence."



study of housing patterns in a village where sugarcane workers live, and of a low-cost housing project that was constructed for them.

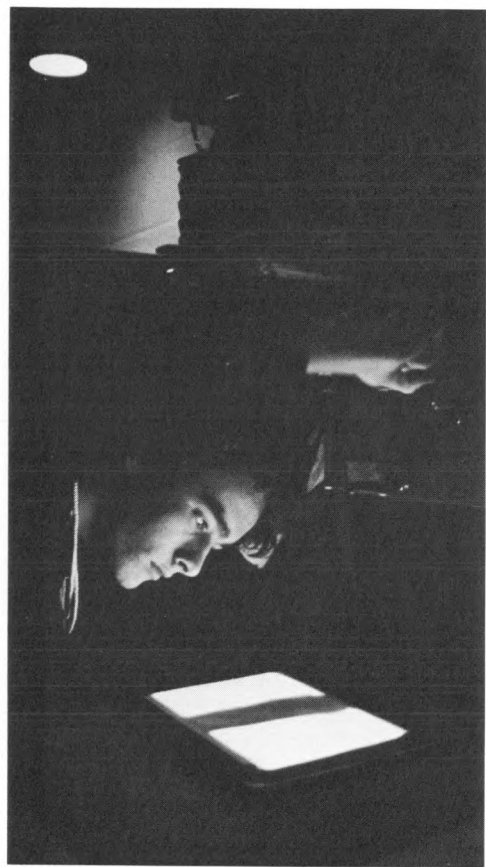
He is interested in designing houses that would take into account the customs of the people and their particular kinship relationships. One thing he learned in the Mexican community is that extended families living in single houses prefer to provide a separate kitchen for each woman who has a husband or child.

Bill decided to study engineering partly because he most liked those high school courses that were concerned with science and mathematics, especially those that involved the design and construction of apparatus. "I like to be presented with an abstract problem and then devise a design to solve it," he says. "I believe that engineering practice can allow for originality and a certain amount of independence."

Since coming to Cornell, Bill has spent most of his time on his course work and on "getting used to the University." He is hop-

Far left: An imaginary dividing line helps keep these roommates friends.

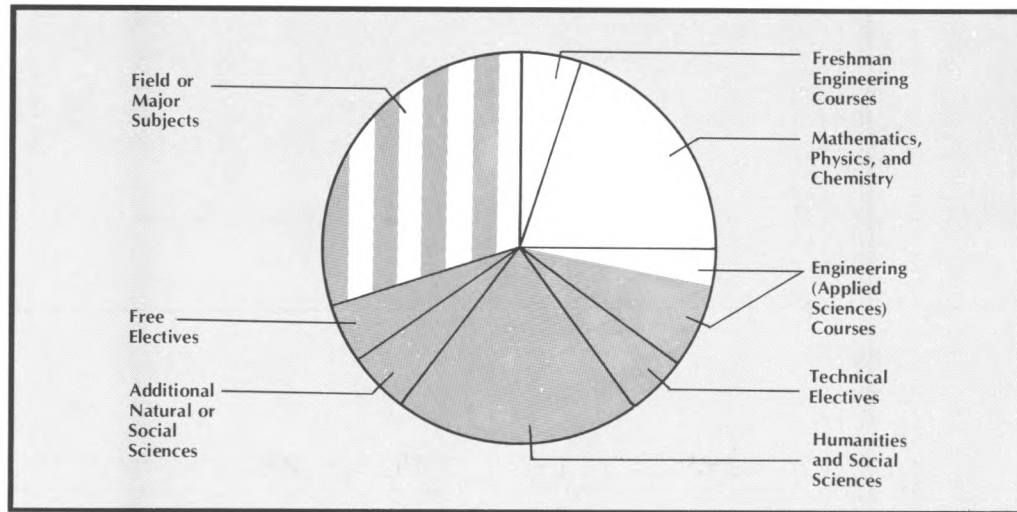
Left: Help in computer science, which all freshmen study, is offered at the computing center.





ing to follow an accelerated schedule, partly for the challenge and partly to save expenses. Because he developed good study habits in high school, he doesn't use the "panic system" of studying for exams and preparing reports.

Above: Photography is one of Bill's special interests.
Far left: He finds the North Campus darkroom well equipped and convenient.
Left: Keeping up his Spanish is easy for Bill: His roommate, Manuel Rosenfeld, is Cuban.



He says he has plenty of time for attending special events, such as concerts, though, and for enjoying the company of other students. "There are lots of people around and things going on in the dorm all the time," he says. He doesn't plan to join a fraternity and in subsequent years at Cornell may choose to share a house near campus ("so I don't have to hassle with a car") with a group of friends.

Bill Dobbs appears to be one of a

modern breed of "people-oriented" engineers who are effectively combining technical and humanistic interests.

Bill Dobbs, like all Cornell engineers, will make many course selections during his undergraduate years. The general distribution of course work is shown in the illustration above. The light areas represent required subjects, the striped areas represent work in the student's specialty field, and the dark areas represent electives.



George Dentes, FRESHMAN



Coming to Cornell to study engineering was a natural choice for George Dentes. His home is in Ithaca, his older brother and sister graduated from Cornell, and he has worked with Cornell engineers.

Even with all this familiarity, becoming a freshman at the College of Engineering let George in for some surprises. "It's a whole different world," he says. He is impressed by the amount of work required and the necessity of making a strict schedule and keeping to it, especially since he is on the freshman football team.

Right now George is living at home in Ithaca, but he has pledged a fraternity and will live in the house next year.

George's interest in engineering got a decided boost from his work for a local civil engineer during the past two summers. Helping with sanitary engineering projects, such as laying sewer and water lines, he "got a taste for engineering and liked it." He feels he acquired valuable practical experience: "I could bug the engineers all I wanted to for information." He hopes to

Left: Summer work for Thomas G. Miller, a consulting engineer in Ithaca, helped George decide to study engineering.



"It's a whole different world."

work for the same group next summer, perhaps doing more "real engineering."

Part of the reason he is attracted to civil—or possibly environmental—engineering, George feels, is that he enjoys outdoor and physical activity as well as scientific studies. In high school he played on the varsity football and baseball teams, and he hopes to continue in college sports if he can manage the demands on his time. This winter he took up skiing. He also likes to go hunting with his father, who is now retired.

George was active in student government in high school and served as president of his senior class. Academically, he was among the top students in his class and earned a New York State Regents' Scholarship as well as a scholarship from Cornell. Extremely high academic excellence is not the criterion for financial aid, however; about three-quarters of the students at the College receive such help in an amount determined by need and consisting, usually, of a "package" of scholarship, loan, and sometimes job.

This year George, like all freshmen, took Elements of Engineering Communication, which includes computer work, a new

subject for him but one that he thinks everyone should study. In the spring term he is taking Engineering Perspectives, in which each student chooses two out of about twenty half-semester "mini courses" offered by different professors in the College. Each mini course is concerned with a subject in which the professor is especially interested and active. George chose one in biomechanics and may take one in



Above: George finds his grandmother's house next door a good place to study.

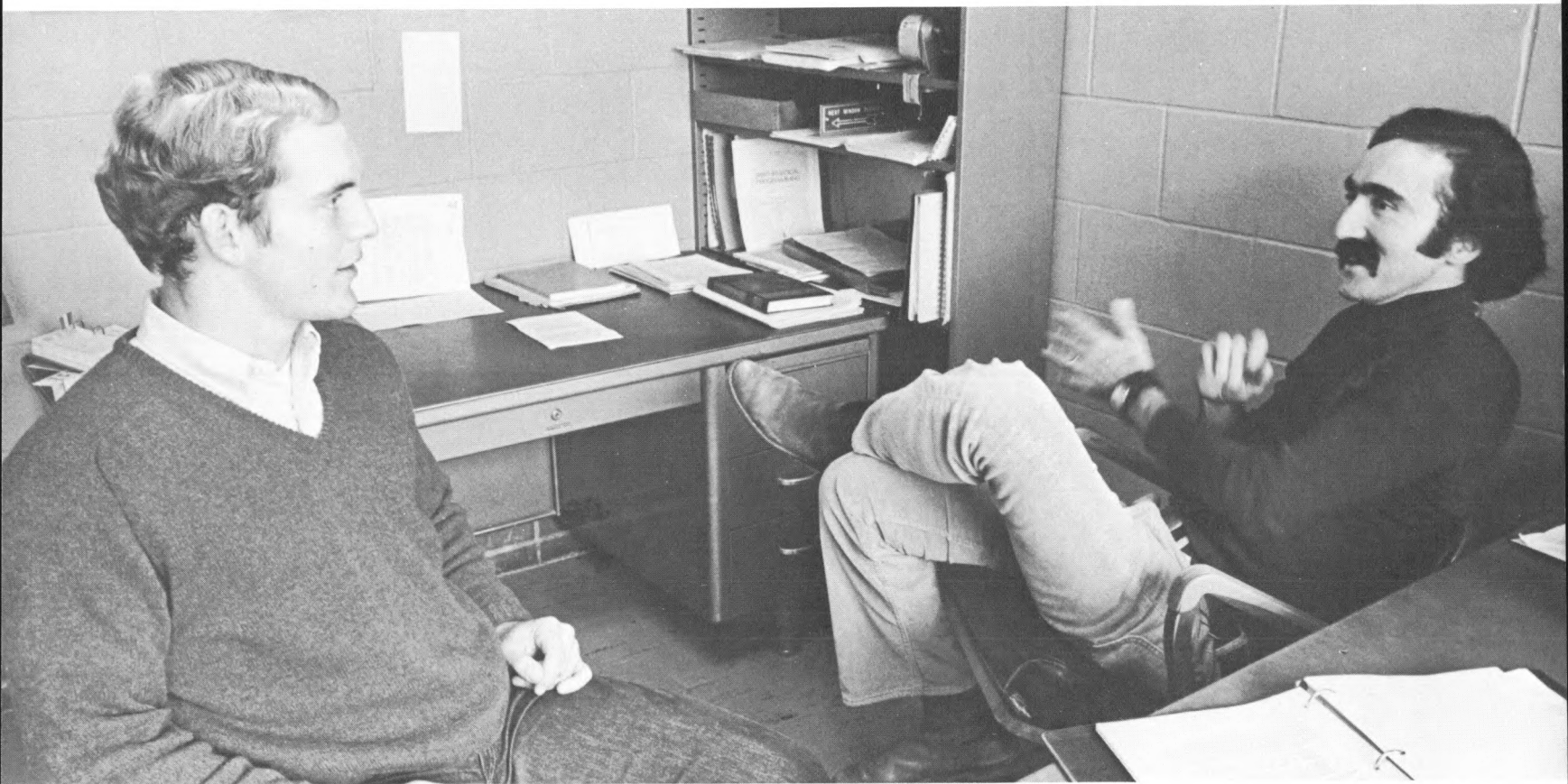
Far left: Learning can be informal, George finds.

Left: George is on the freshman football team. Checking out equipment for practice is part of his regular fall routine.

an aspect of electrical engineering. Others are on such topics as space propulsion systems, fire and urban heat islands, fresh water for the future, computer appreciation, energy and the environment, cultivation of cells in the service of man, and waiting and what can be done about it.

Even though he is fairly certain of the kind of work he wants to do after graduation, George appreciates the flexibility of the Cornell engineering curriculum. He likes the idea of acquiring a good basic background while taking time to look at different engineering fields, perhaps think about other kinds of work, and make up his mind for sure. He plans to talk with his adviser about taking some business courses in preparation for the possibility of joining a consulting firm or taking a job with a large corporation.

An important aspect of a Cornell education, George feels, is the opportunity to branch out into many areas of learning or to concentrate on almost any specialty. To him, founder Ezra Cornell's well-known description of the University as "an institution where any person can find instruction in any study" still has great significance after more than a century.





As a Cornell freshman engineer, George Dentes is enrolled in the Division of Basic Studies, preparing for specialized work in the junior and senior years. Part of the freshman program consists of courses required for all students; these include basic courses in calculus for engineers, chemistry, and physics. Freshmen also take Elements of Engineering Communication (computer work, design, and graphics) and Engineering Perspectives, the so-called "mini courses," an offering unique to Cornell.

The rest of the freshman curriculum consists of elective courses in liberal studies and natural or social sciences. Out of the hundreds that are available in the various colleges of the University, George chose Geological Science, which he feels fits in well with his civil engineering interest, Economics of Agricultural Geography, Modern Economic Society, and Introduction to Psychology.

Far left: One of the first people a freshman engineer meets is his faculty adviser. George's adviser is Louis J. Billera.

Left: Knowledge of geological science will be useful in civil engineering, George feels. Rock identification is a part of his freshman course work.



Raymond Chestnut-Stewart, SOPHOMORE

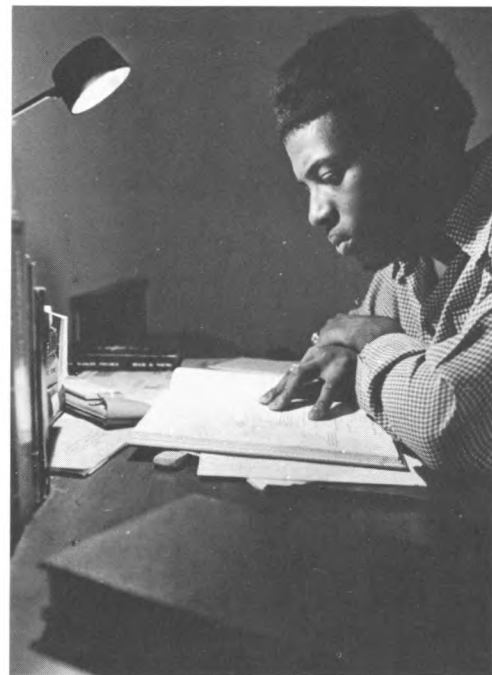
Early in his sophomore year, Raymond Chestnut-Stewart decided that he would like to develop a career as an engineering consultant in building construction, and he is now shaping his education toward that end.

Several circumstances influenced his decision. One was a discussion he had with a friend who is studying architecture; the idea of combining architectural and structural engineering skills in a business enterprise appealed to both of them. Another influence was a sophomore core science course in the mechanics of solids that included an introduction to stress analysis,

an important aspect of the design of structures. Raymond was also impressed by his week-long visit to the General Electric plant in Schenectady, arranged for him as part of the College's Mini Co-op Program for minority-group students. There he observed how plant engineers use stress analysis to solve practical problems.

His present plan is to work out a five-year program culminating in a Master of Engineering degree, and to include a number of business and economics courses in his curriculum. He may try to earn a master's degree in business also.

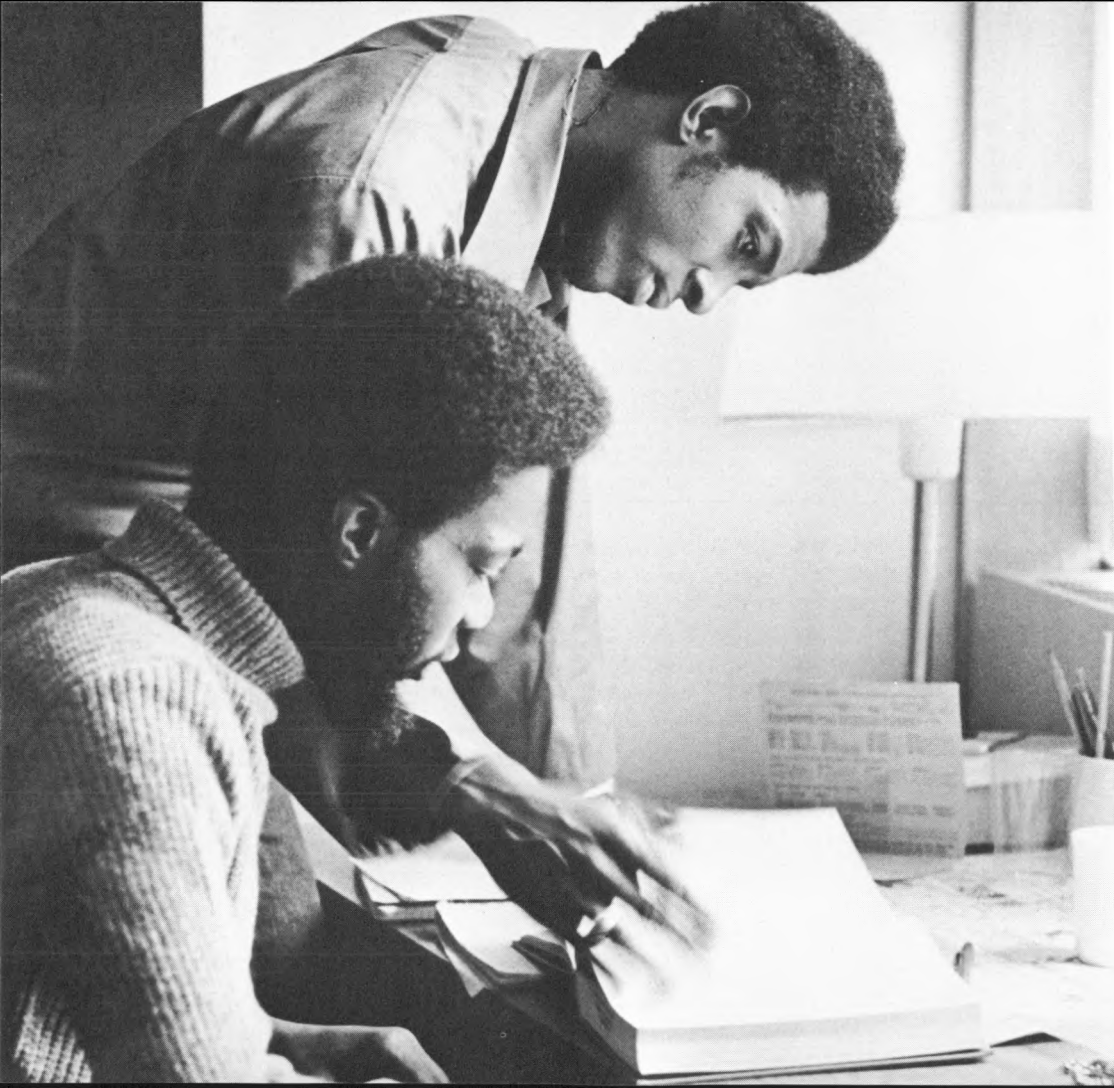
Raymond feels he was well prepared for college at his high school, Brooklyn Technical, which not only offers a specialized program for students from all over New York City, but also has a good counseling service. Raymond qualified for admission on the basis of an entrance examination. At this school, each student chooses a major field after he has completed a two-year basic studies program (a plan similar to the one at the Cornell College of Engineering, Raymond observes). He picked aeronautical engineering, and built an air foil—part of an aircraft wing—as a project. He began to think of a



Above: Raymond studies either in the library or at home in the apartment he shares with two other students.

Left: He finds the engineering library especially useful. The Cornell library system includes two large central facilities and a number of specialized libraries.





"I always liked to take things apart to see how they work."

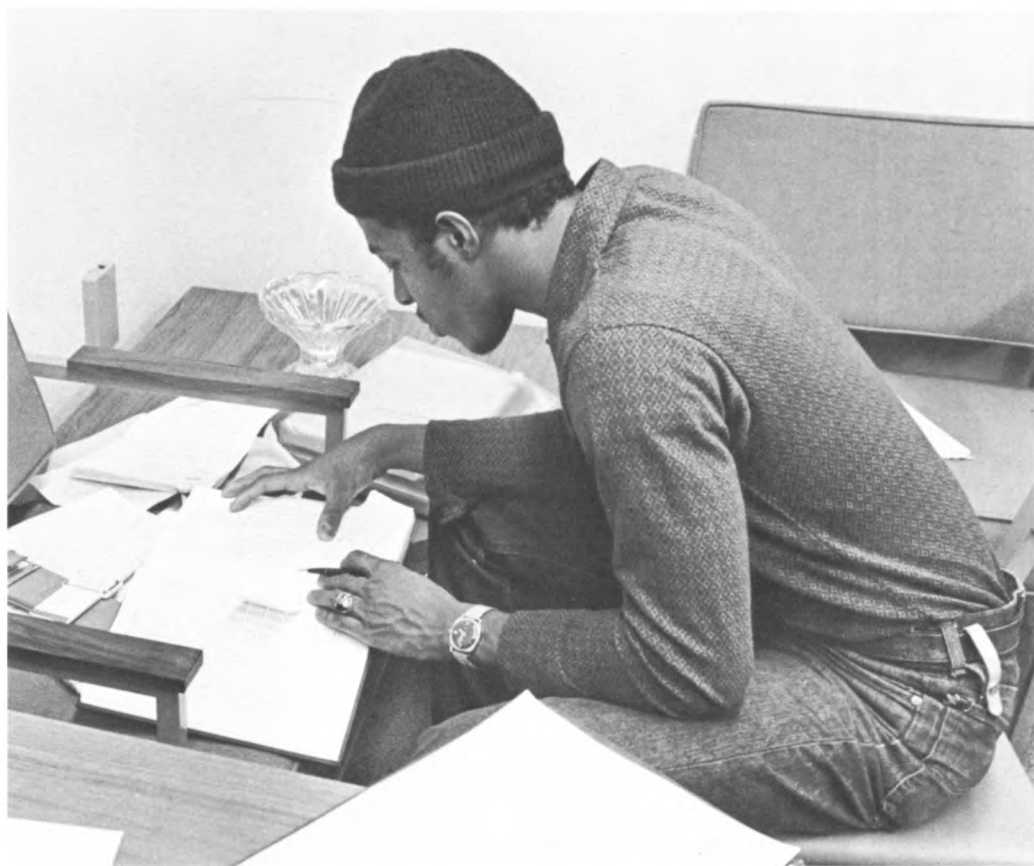


Far left: Raymond's work-study job for the College is as an adviser in a special program for freshman minority students. Part-time jobs are often part of the financial-aid "package" of scholarship, loan, and employment that is offered on the basis of need. Raymond serves as a tutor during the regular academic year, and this summer he will assist in a "pre-frosh" study program for minority engineering students who will be matriculating at the College in the fall.

Left: His classes are mostly on the engineering quad-rangle, but the walk across campus to the physics building is also a familiar one for Raymond.

Above: Physics laboratory involves group experiments.

Right: The Learning Skills Center, in the chemical engineering building, is a good place to do the calculations for physics problems, Raymond finds. Among the facilities available there is a desk calculator.





career in mechanical or civil engineering.

Raymond's special interest in science and engineering goes "way back" to elementary school years. "I always liked to take things apart to see how they work," he recalls. He has tended to do things on his own, perhaps partly because his parents are dead and he was reared by a sister.

He still likes to do things on his own and at college prefers individual projects to group activities. He enjoys photography and is working on a pictorial account of Ujamaa, a residential college where many blacks live. He also took pictures for an article on the Cornell College of Engineering program for minority students that appeared in the nationally distributed magazine *Engineering: Cornell Quarterly*. Another hobby is listening to old jazz and blues records, and he goes to jazz concerts on campus. He took some judo classes in high school and enjoys attending judo and karate tournaments at Cornell.

During his freshman year, Raymond lived on campus in Clara Dickson Hall. This year he shares an apartment on Ithaca's West Hill with two other students, one an archaeology major and one an engineer. The men "try not to cook," according to

Raymond, but they do make a point of sitting down together for real meals on weekends. Sometimes girls come as dinner guests and help with the meal preparation.

The courses that Raymond has enjoyed most so far have been in physics, mathematics, thermodynamics, and mechanics. He also enjoyed an expository writing course that he took, "just for myself," as one of his liberal studies electives. He feels that writing can help a person understand himself.

Cornell has a good engineering school, Raymond believes, and he has found that it offers him the opportunity to follow his individual pursuits and arrange a curriculum to suit his special needs.

As a sophomore, Raymond Chestnut-Stewart is finishing up his work in the Division of Basic Studies. In addition to taking mathematics and physics each term, sophomores choose two liberal studies

courses and four engineering core science courses.

Raymond chose writing and economics as liberal studies. His engineering core sciences are in thermodynamics, probability, mechanics of solids, and dynamics. Other core science courses are in systems analysis and design, statistics, computers and programming, electrical systems, electrical and mechanical properties of materials, applied physics, applied mechanics, mass and energy balances, physical chemistry, and organic chemistry.



Left: An experiment in nuclear magnetic resonance is carried out by Raymond's laboratory group in Physics III, part of the required sequence of physics courses.

Right: Bowling class gives Raymond a break from academic studies. Recreational bowling is among the many activities available at Cornell's student unions.



Richard Oppelt, SOPHOMORE

Richard Oppelt is a sophomore engineer who regards himself as an average student and wonders why we picked him to write about. "I'm not the brilliant type who can breeze through classes and be a campus leader too," he says. "I need eight hours of sleep, and time to study, goof off, see a girl, just live."

Nevertheless, Richard has a good academic record and finds himself involved in plenty of activities at Cornell. He participates in intramural football and volleyball ("we were the freshman dorm champs") and has entered the intramural track and cross-country meets. He is a member of a fraternity and, like all the brothers, helps reduce expenses by working at the house. He is treasurer this year (making use of summer work experience in his father's business office), helps wait table, and participates in weekend sessions for fixing things around the house. To Richard, fraternity life offers a homelike environment and, at the same time, a chance to meet and live with students enrolled in the various colleges and interested in different subjects. Richard feels, in fact, that "the main point of Cornell is that it offers so much and has such diversity." It provides

a good atmosphere for an engineering student, he believes, because "an engineer can't isolate himself — not in real life, and not here."

Richard believes he can combine his wish to work with other people and his interest in science and business in an engineering career. The field he is planning to enter as an upperclassman is materials engineering. He has had a continuing interest in the use of materials to meet specific problems, and thinks that perhaps his growing up in the industrial city of Cleveland had something to do with it. "I grew up quite conscious of steel making and of the importance of steel as a material in manufacturing," he explains.

Of course, as a sophomore Richard is not yet committed to a special field of study and, though he is rather sure he will choose materials science and engineering, he thinks the Cornell plan of concentrating on basic studies for two years and then

Right: Richard plays on his fraternity's intramural football team. At Cornell there are almost a thousand men's intramural teams in more than twenty different sports, and a growing number of women's teams. Teams may be formed by social groups, organizations, dormitory residents, or individuals.





"... an engineer can't isolate himself — not in real life, and not here."



choosing a major subject is a very good one. He also likes the freshman "mini courses" that are designed to introduce undergraduate engineers to various specialty fields. Richard took Professor Eraldus Scala's mini course, Materials and Structures for Space Propulsion Systems, and finds that it gave him an insight into the field of materials engineering that will help him in making his final decision.

He plans to take more business courses as electives, and might consider work in materials sales or business management with a company that markets and develops materials. He has come to the conclusion already that there is not enough time in a four-year program to learn everything he will need to know, and so he plans to "cap it off" with a fifth year of study, probably in Cornell's Master of Engineering degree program, but perhaps in business school.

In his college and career decisions, Richard may be influenced to some extent by the experiences of his brother, who graduated from the College of Engineering at Cornell in 1969, completed a Master of Engineering degree program in civil engineering, and is now working with the pub-



Far left: A favorite place of study for Richard is the library in the mathematics building.

Left: Richard takes a turn as "light bulb man" at the fraternity house.

Above: A walk across the pedestrian suspension bridge over Fall Creek Gorge is Richard's favorite route from the house to classes. Gorges, waterfalls, and wooded hills are characteristic of the region around Ithaca.





Above: One of Richard's duties at his fraternity house is to serve as treasurer. More than fifty fraternities and sororities provide housing for Cornell students. Most freshmen and many sophomores and upperclassmen live in University housing, which includes co-ed as well as segregated dorms, and some small living units. Other options include cooperatives and private apartments.

Left: In training for intramural cross-country running, Richard jogs past the University golf course.

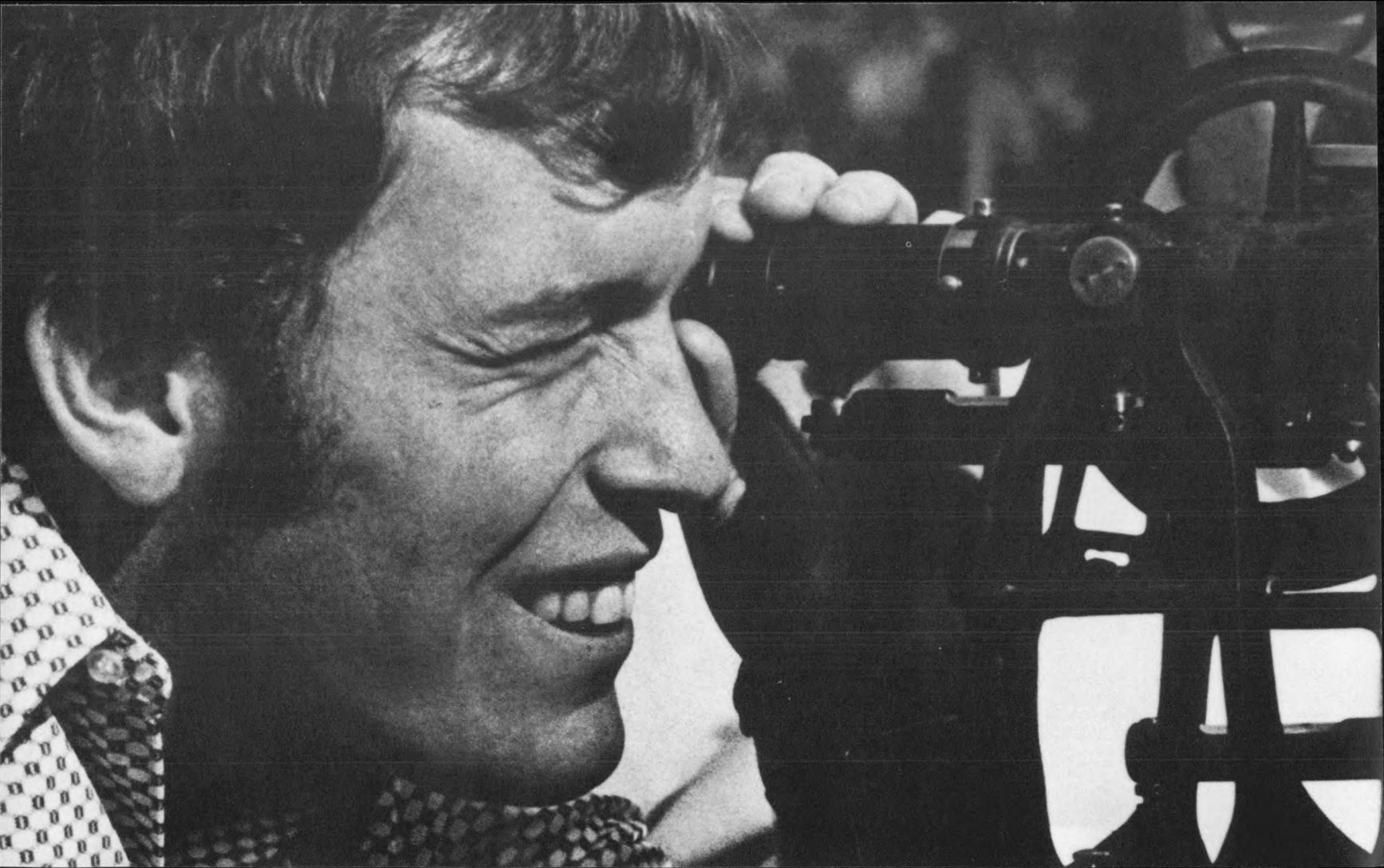
Right: It's back to the library for study.



lic health service in Cincinnati in the area of solid-waste disposal. He feels that his "continuing fascination with engineering" will lead to an interesting career and a useful life.

Richard Oppelt is planning to enter the Field Program in Materials Science and Engineering in his junior year. Required of all students in this Program are courses on the structure and properties of materials, on the macro- and micro-processing of materials, on thermodynamics of condensed systems, and on kinetics, diffusion, and phase transformations. A feature of the senior-year program is a series of lectures on topics of current interest in the field of materials. Laboratory experience is also provided. In the junior year the students have the option of participating in a research project supervised by a faculty member, and in the senior year they take a materials laboratory course.

Individual course selections enable a student in materials science and engineering to adapt the program to his individual needs. For his electives, Richard thinks he will choose mostly business subjects that will help him prepare for a job in industry.



"I saw the George Washington Bridge out of the back window of a car at the age of three and have been fascinated by structures ever since," comments Paul Burmeister, who is, understandably, majoring in structural engineering. "As I grew up, the only thing I ever wanted to do was to build bridges and dams."

Paul says that what he would most like to do professionally is design and see built a large suspension bridge. But he would also like to be involved in the engineering of many kinds of structures — small and large buildings, and small and large bridges. Perhaps his career will be with an engineering consulting firm or an architectural firm. An ideal job, Paul feels, is that of engineering designer Fazlur Khan, whose hallmark is "the design of buildings to look like what they are," and who has designed many innovative structures, such as the Sears Tower and the John Hancock Building in Chicago.

Paul has many interests and activities outside of this central one, though. He participates in many intramural sports, enjoys an active social life, and has several part-time jobs to help with college expenses (he also has several scholarships). One of his jobs is conducting tours of the campus

for prospective engineering students and their parents; another is seasonal gardening for retired engineering dean and emeritus professor Solomon Cady Hollister, who is Paul's adviser. Paul found out about that job from a bulletin board notice. He enjoys the job partly because it gives him extra opportunities to talk with Dean Hollister, who, Paul says, "is one of the fathers of modern civil engineering."

Paul spent two years on the Cornell wrestling team, but has given it up recently because of other demands on his time. He found, though, that participating in a physically demanding sport can enhance the effectiveness of study periods. "Often freshmen feel they can't go out for a sport if they haven't been great at it in high school, but this is not necessarily so," Paul says.

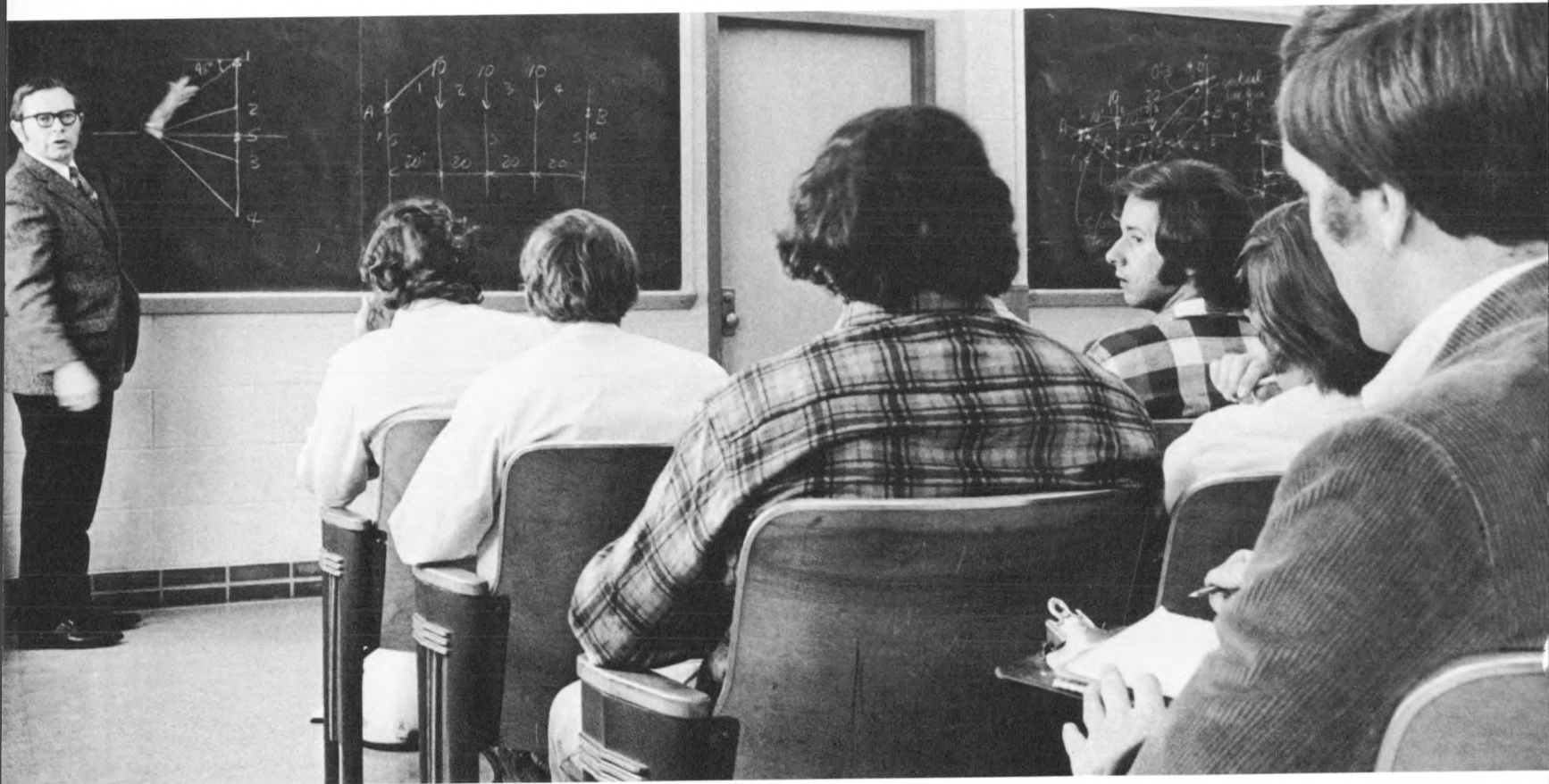
An aspect of Cornell life that is important to Paul is his fraternity. He believes that fraternity living encourages maturity because "in a house you must adapt to the other people, whereas in a dorm you can just move out." In most fraternities these days, he says, the men do everything except, usually, the cooking. Paul's fraternity brothers put a new roof on the house last year, and they are now installing an intercom

system. Paul thoroughly enjoys the many parties and group activities the fraternity has, and the guest speakers it invites.

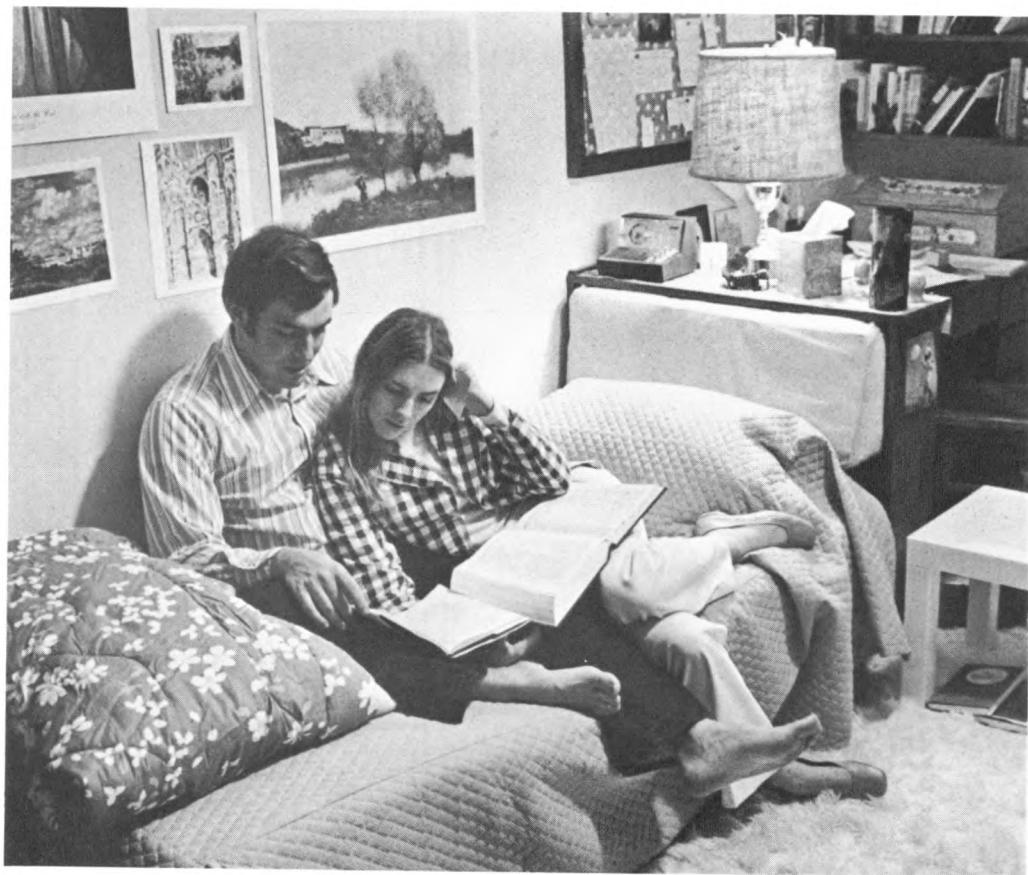
Paul's interest in engineering was encouraged by his father, a mechanical-drawing teacher in Newburgh, New York. Paul



Above: Paul relaxes in the comfortable and attractive browsing room in the engineering library. Also available in the various engineering buildings are lounges for informal gathering and relaxation as well as for meetings and coffee hours.



... the only thing I ever wanted to do was to build bridges and dams."



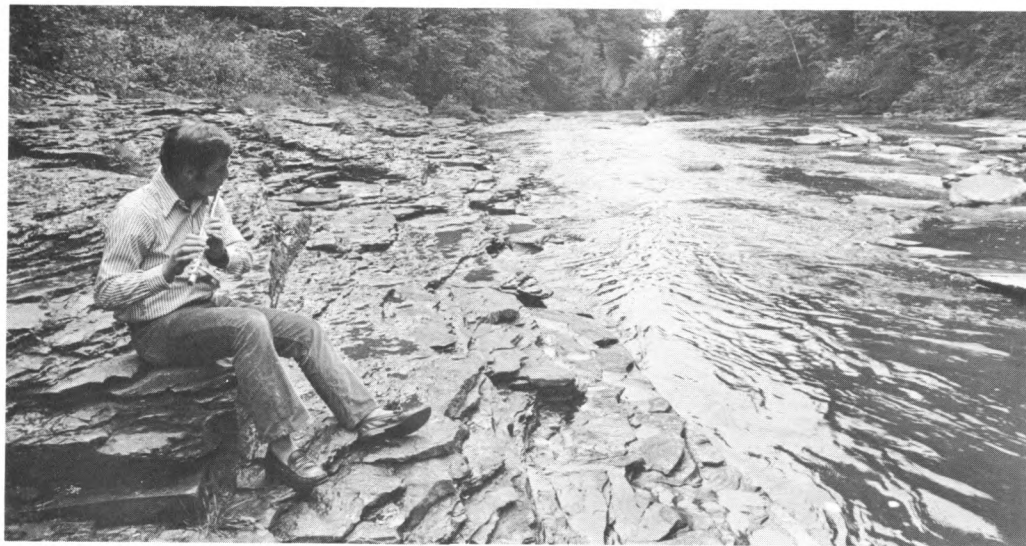
came to Cornell partly because he became somewhat familiar with it through his sister, who was a student here. He visited her, liked the campus, and had a good time. Most important, though, was the fact that Cornell has "one of the best structures departments in the country." He considers Professor William McGuire's book on steel structures "almost a handbook," and the new series on structural engineering by Professors Richard N. White, Peter Gergeley, and Robert Sexsmith the most clearly written texts he has ever encountered.

One of Paul's laboratory courses this year includes surveying, a venerable skill that he says is still highly useful for civil engineers. "In designing a bridge," Paul says, "I will need to know how wide a river is, and the relative heights on each side. I could determine this now with the skills I have learned."

Far left: Paul's favorite course is one in structures taught by Professor Richard N. White. This is the engineering area in which Paul plans to work.

Left: Since Paul's girl friend is a Wells College student, he makes frequent trips to Aurora, on Cayuga's east shore. In fact, he won his fraternity's "Roads Scholarship" for the greatest number of hours on the road.





Above: Fall Creek Gorge invites time out for quiet relaxation. Paul likes to go there once in a while and play his flute.

Far left: A part-time job for Paul is conducting tours of the campus and engineering buildings for prospective students and their parents. This corridor overlooks the large test bay for structural components. The Engineering Admissions office encourages interested young people to visit the campus and talk with students and staff and faculty members of the College.

Left: Gardening for Dean Hollister was a warm-weather job of Paul's.

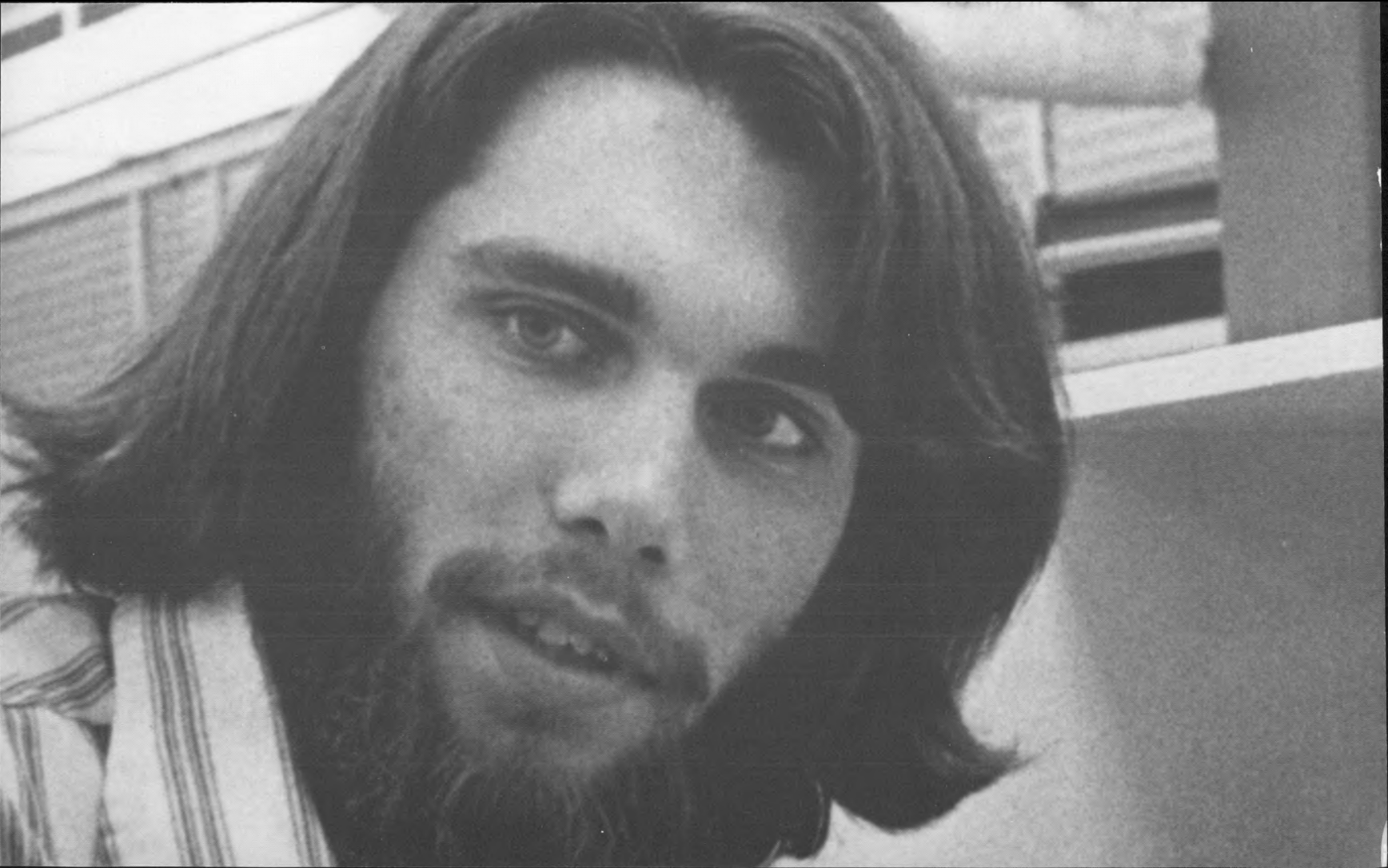


After his graduation next year, Paul hopes to continue his structural engineering studies in the integrated fifth-year Master of Engineering degree program at Cornell.

In preparation for a career as a structural engineer, Paul Burmeister is enrolled in the upperclass Field Program in Civil and Environmental Engineering.

This year Paul's curriculum includes civil and environmental engineering courses in structures, fluid mechanics, soil mechanics, highway design, engineering economics, and environmental systems analysis. His electives are in personal investment management, creative writing, and technology and society.

His senior courses will be all electives, some in his main area of interest — structures — and some in other, unspecified subjects. Paul is thinking about taking some courses in the field of business management and in foundation engineering, and perhaps an additional computer programming course.



STEVEN BECKWITH, JUNIOR

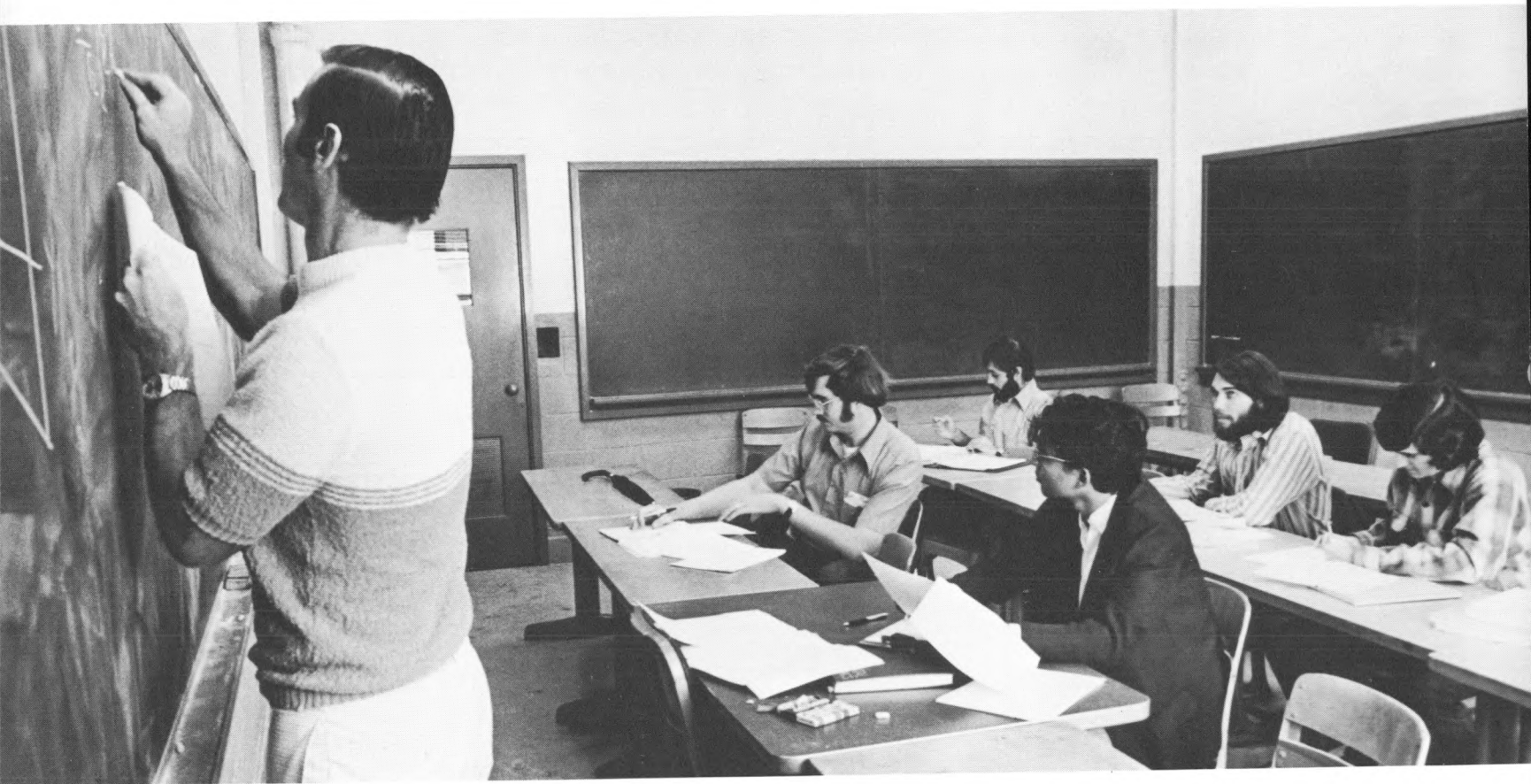
Since his greatest interest is in physics, Steven Beckwith decided to specialize in engineering physics, a Field Program that generally prepares students for graduate work in various branches of applied science.

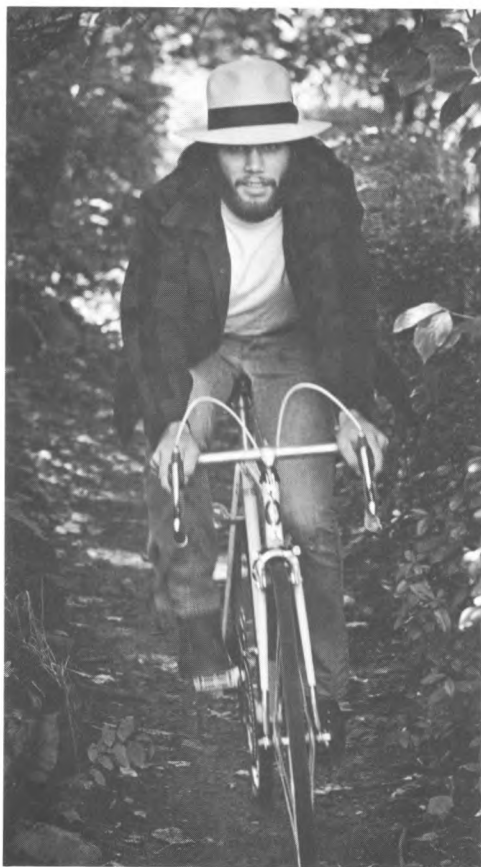
He would like to have a career in research or teaching, but recognizes that there are also advantages to working in industry. "A lot depends on the particular field I concentrate on," he says, "and also on the job situation when I finish school." He is especially interested in solid state or statistical physics, but still has time to make a definite decision.

One of the reasons Steven came to Cornell is that he felt there would be a cosmopolitan and stimulating atmosphere, with people from many backgrounds working in a variety of fields of great interest to them, and he feels that this expectation has been realized. He also imagined that attending a big university might mean sitting anonymously in huge classrooms and never getting to talk with the professors, but it hasn't been that way. When he took intro-

Right: Steven finds his professors quite willing to provide extra help outside of class.







There is the opportunity here for a student to do whatever he really wants to."

ductory physics with Professor Robert Pohl, for instance, Steven found that Pohl was always glad to stay and talk after class. This year Steven took a course in which only five students were enrolled — Space Flight Mechanics, taught by Professor Terry Alfrend — and found he enjoys the intimacy of small classes, such as this, which are more usual in the junior and senior years. It is even possible, especially during the upperclass years, to undertake individual work for academic credit. Steven is earning credit for a project in plasma physics, in which he has developed a computer simulation of electron orbits in a toroidal field.

An important aspect of his Cornell experience, Steven says, is his part-time and summer work for applied physics professor Arthur Kuckes, whom he had for sophomore courses in electromagnetism and elec-

trodynamic. Kuckes is directing a geophysics project and Steven is helping with the data analysis. This gives him an opportunity to gain experience in computer programming and acquire a feeling for what research is like, with its mundane aspects as well as its excitement. He has also held part-time jobs as a computer operator in the University's Office of Computer Services and as a teaching assistant in the engineering Learning Center for beginning students of computer science.

Steven has been impressed by the College's advising and counseling services. He appreciated receiving special informational

Far left: *The intimacy of small classes, such as this one in space flight mechanics, appeals to Steven.*

Left: *Peddalling to classes from his apartment near the campus takes Steven along the edge of Beebe Lake.*

Right: *Playing his guitar is relaxing for Steven. He also likes to read — novels, mostly, and outside reading suggested for various courses.*





Far left: Steven regards his part-time and summer job with an applied physics professor as an important part of his education.

Left: Still pedalling, Steven passes Uris Library, Cornell's main undergraduate library. The bell tower, lighted at night, is a familiar landmark on the "Hill."

Below: Buttermilk Falls is one of three state parks in the Ithaca area.

Right: Steven says he "discovered" physics after he began his college work and was able to get a feel for different areas of study related to engineering. He appreciates the opportunity to explore a variety of subjects in his elective courses, too. Last year, for instance, he took a philosophy course in symbolic logic.



brochures and newsletters during his underclass years, and as an upperclassman he feels he is receiving excellent guidance from his professors. He speaks especially of Professor Trevor Cuykendall, whom he has found always accessible and helpful.

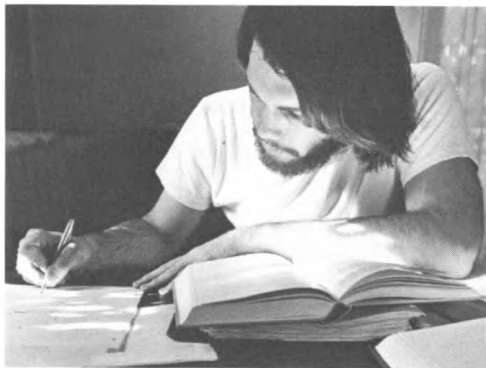
Steven finds time at Cornell for some nonacademic activities also. A devotee of classical music and jazz, he often attends University concerts, has a stereo at his apartment, and sometimes "fools around" with his guitar. He thought about going out for the swim team at Cornell, as he had in high school, but decided to forgo this so as to have more time for his studies: a matter of priorities. He skis in the wintertime, though, and plays squash when he can.

As a freshman, Steven lived in University Halls, and as a sophomore, in one of the new high-rise North Campus residence halls. This year he is sharing an apartment in a house near the campus with an engineering physics senior. He likes this arrangement partly because they can cook and eat at irregular hours.

"I like to do things on my own," Steven says. "There is the opportunity here for a student to do whatever he really wants to."

Because he wants to become a physicist, or perhaps an engineer in an area of applied physics, Steven Beckwith entered the upperclass Field Program in Engineering Physics. The curriculum is, of course, heavy in mathematics and physics, including courses in electromagnetism, electrodynamics, quantum mechanics, the mechanics of particles and of continua, statistical thermodynamics, statistical physics, and experimental physics.

But there is room in the schedule for electives, too. Steven, for example, has taken courses in anthropology, philosophy, German, and theoretical mathematics. There is also opportunity for individual research.





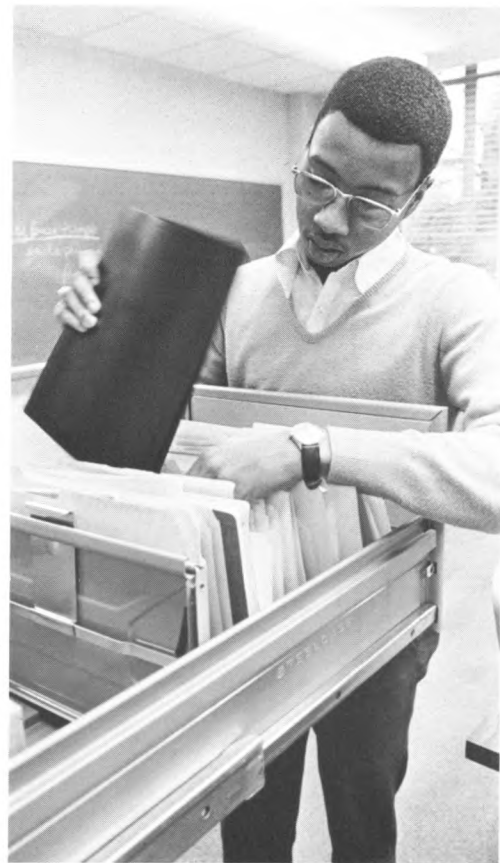
Black-owned and operated business can become a significant institution in the United States, Conrad Kenley believes, and he is preparing to participate in its development by studying industrial engineering, operations research, and business. His plan is to complete his undergraduate engineering program, using electives for enrollment in business school courses during his senior year, continue in the fifth-year Master of Engineering program in industrial engineering, and then perhaps study for a Master of Business Administration degree. "I believe that the combination of engineering and business is the best preparation for the kind of career I want," he says.

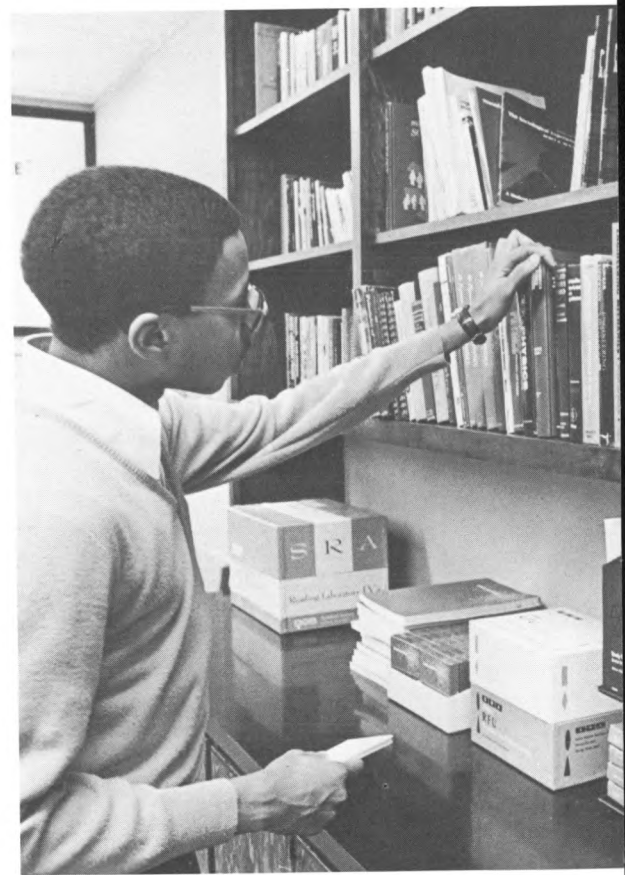
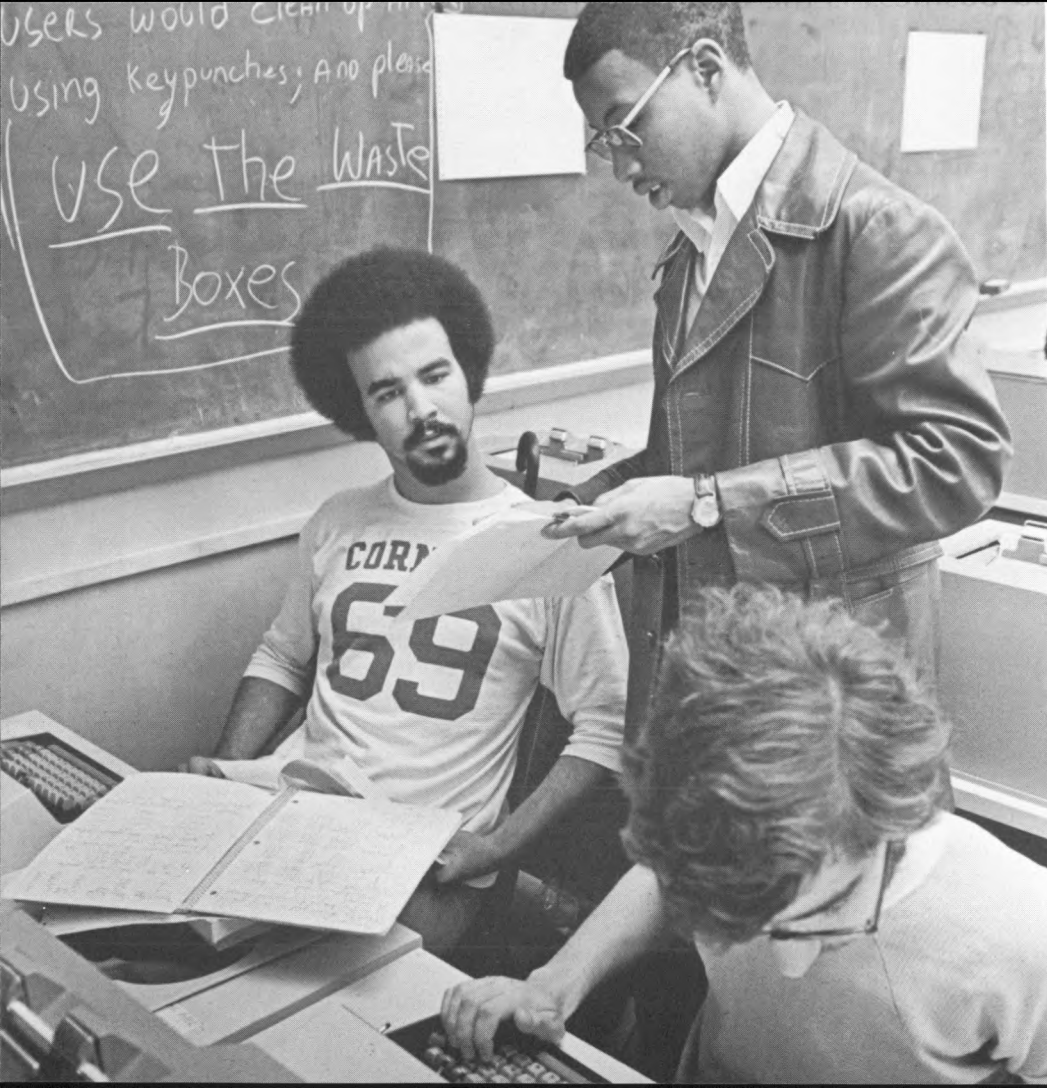
An important part of Conrad's education is his participation in the Engineering Cooperative Program. He is in his first year as a Co-op student and has completed one assignment so far with his sponsoring company, Eastman Kodak in Rochester. On this first assignment he worked in the area of cost analysis and efficiency studies, and feels he acquired valuable experience in day-to-day and long-term management that can be applied to a large or small business. A company representative working with a Co-op student tries to plan the student's

work assignments in terms of his previous experience and his individual interests, Conrad explains. In subsequent work periods, his supervisor plans to expose him to a variety of plant activities; he expects to work for a month or so in assembly-line production, for example.

Conrad's fundamental interest in science developed from an early age. He grew up in New York City, reared by his mother as an only child, and attended a special technical high school there. He was editor of the student newspaper, participated in student government and the Afro-American Society, and played on the handball team. During the summers he participated in voter-registration campaigns and served as a day-camp counselor with the Neighborhood Youth Corps.

At Cornell Conrad is active in COSEP, the University's program for minority-group students. He has a part-time job in the Engineering Admissions Office helping to coordinate the COSEP tutorial and advising services, and another part-time job in a recently established Learning Skills Center in one of the engineering buildings. His special project at the Center is to help organize and run a central reference service





the kind of career I want."

for minority-group engineering students. It is similar to a fraternity file system, Conrad says, and includes notes and old exams, as well as copies of required and recommended books for engineering courses. Both of these jobs are part of the College Work-Study Plan, which allows for up to fifteen hours a week of paid employment for students.

Another aspect of the minority-student program at the College that Conrad participates in is a series of lectures by black professionals, given as part of the freshman "mini-course" program. Last year Conrad was a student adviser in the program and especially enjoyed serving as a host to the lecturers. Conrad feels that this series is

Far left: Conrad makes frequent use of the computer terminal in Upson Hall, home of the School of Industrial Engineering and Operations Research.

Left: Conrad has a part-time "work-study" job in the University's Learning Skills Center, which offers such special aids as language tapes and tutoring services. Conrad's special responsibility is to develop a library and information file for the use of minority-group students of engineering.

Right: A nearby record shop in Collegetown is patronized by Conrad and some friends. He prefers informal activities such as listening to jazz records to organized extracurricular activities.





extremely important to the minority-group students, for it provides them with insights into how they might forge a career in engineering or a related activity.

As for campus life, Conrad's experience is that "it is what one makes of it." In his case, he sticks pretty much to his studies (that's what I came to do') and his jobs. During his first two years at Cornell, Conrad

lived in the dormitories, but this year he lives in a black men's cooperative near the campus. For recreation he might attend a jazz concert on campus, listen to his own record collection, or attend an affair at the Africana Studies and Research Center.

He also tries to travel as much as possible, mostly to nearby cities where he can get together with others who share his

interest in the pioneer efforts to establish minority-owned enterprises, for his feeling is that students should try to correlate their college experience with the world outside. "I don't think any student should make a university his home and isolate himself from the concerns of the rest of society," he says.

Some students, including Conrad Kenley, enter the Engineering Cooperative Program as juniors, and obtain industrial work experience without delaying their graduation. Each Co-op student has a paid job with one of the approximately twenty participating companies during three different work periods that add up to almost a full year.

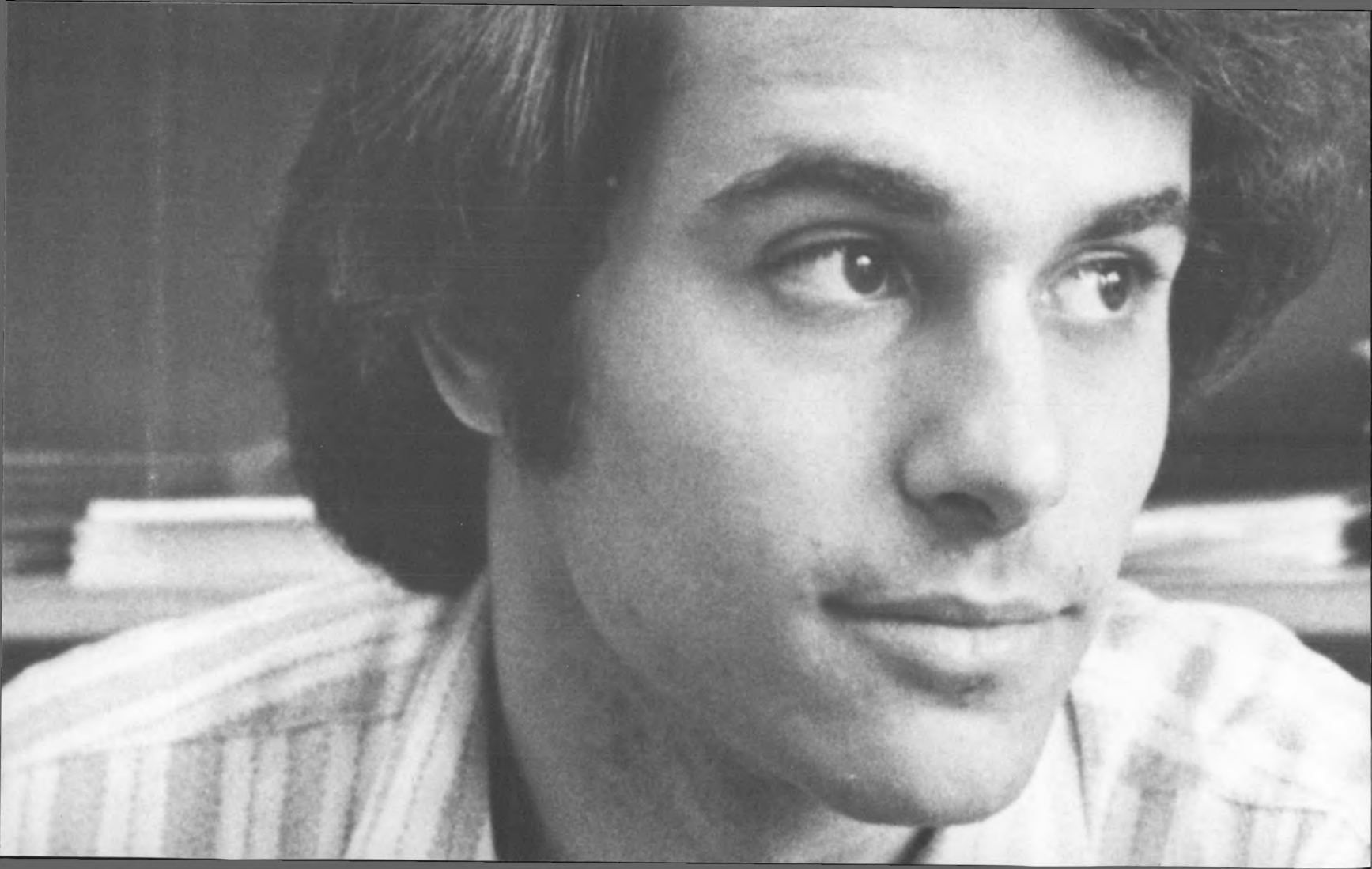
In this program the student usually begins his junior-year course work in special summer classes after the sophomore year. Then he spends the entire fall term on his off-campus, full-time job. Subsequent summer jobs with the same company complete the industrial experience.

Upperclass students in the fields of electrical engineering, engineering physics, industrial engineering and operations research, or mechanical engineering are eligible for this program.



Left: A class that Conrad especially enjoys is one in statistical decision theory taught by Professor Lionel I. Weiss. Conrad is planning a career in business management and feels that the study of operations research is good preparation.

Above: Conrad attends a lecture by a visiting engineering consultant, who participated in a special lecture series for minority students of engineering. The series is an optional part of the freshman mini-course program.





Until recently, Norman Marcus feels, engineers were thought of as men who carried around slide rules and stuck to their particular jobs without worrying about anything beyond the immediate technical problems. But this description is not valid in the contemporary world; engineers are developing more of a social consciousness, he says, and tend to view their work within a broad context.

Norm plans to apply his engineering education to work in the field of biomedical engineering. "The best use of engineering is to help people," he says. He plans to go on to medical school and perhaps, eventually, work on the design of electronically controlled devices for medical applications. He feels his Cornell program in electrical engineering is good preparation. His senior-year course Electronic Circuit Design with Professor Nelson Bryant, for example, is directly applicable to the kind of work he would like to do.

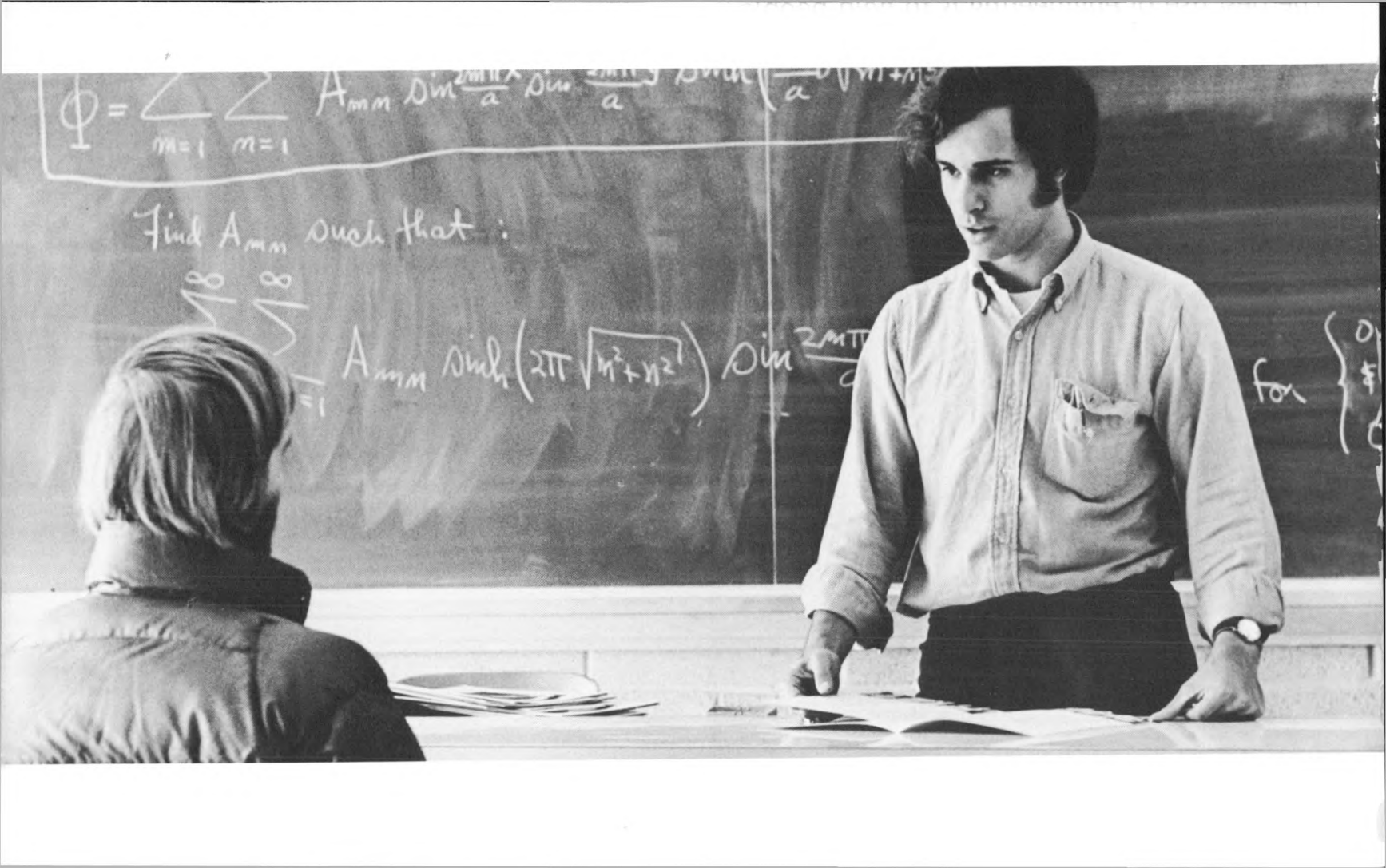
The idea of developing electronic med-

Left: Norman lives in an apartment near Sapsucker Woods, Cornell's bird sanctuary. Bridges over swampy areas help students and visitors observe water birds.

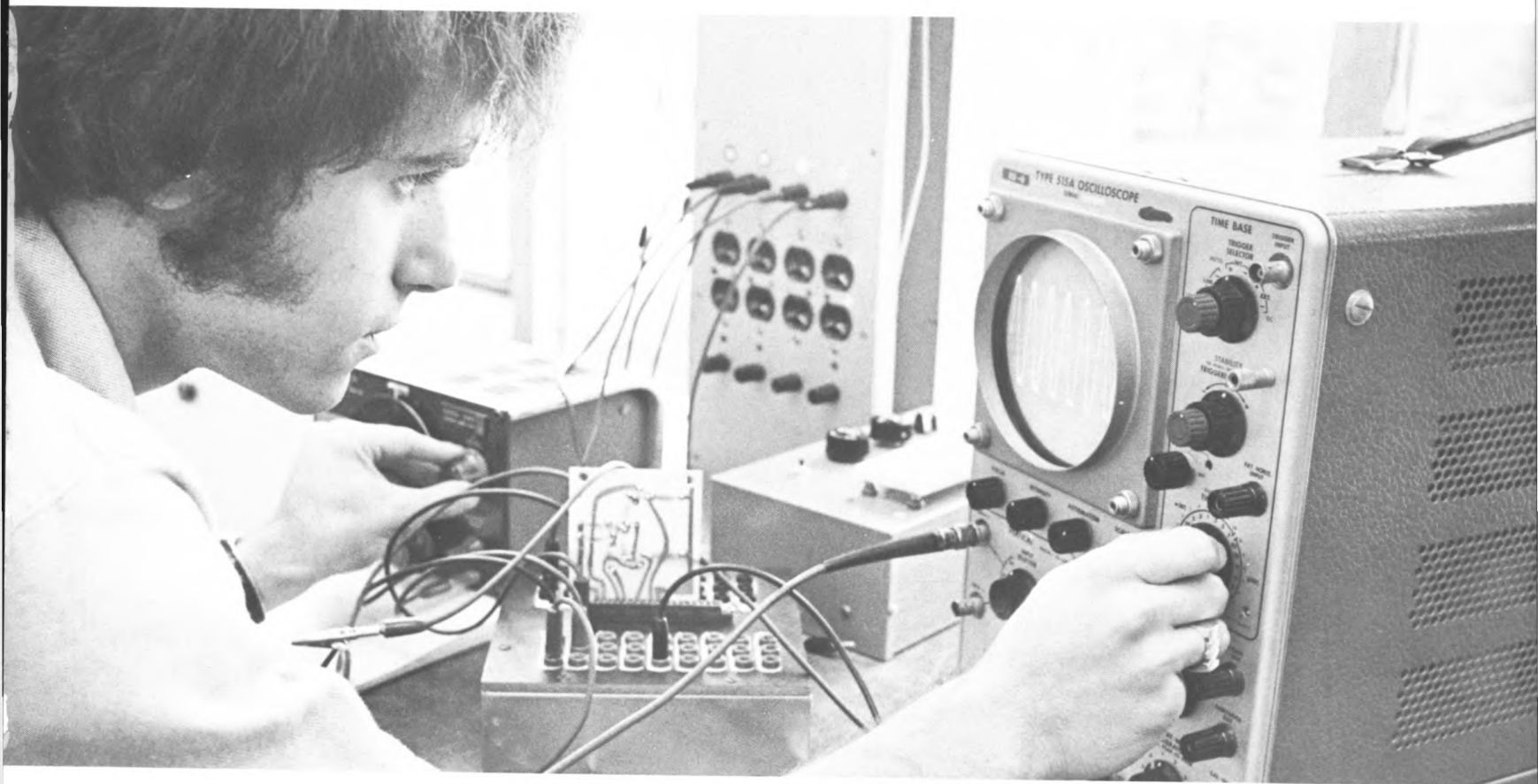
ical devices has interested Norm ever since the time his father, a mechanical engineer in Westchester, New York, participated in the design of a pacemaker for cardiac patients. His father's company manufactures automatic testing equipment of all kinds, including, for instance, a machine for blood analysis.

Norm decided to apply for admission to the College of Engineering after attending Cornell Day, an annual program for prospective students, held at the Medical College in Manhattan. He was undecided about what to specialize in, but found he didn't have a great many curricular choices to make until his upperclass years. Now, in his senior year, Norm is president of the electrical engineering honorary society, Eta Kappa Nu. Last year he was elected to a student-faculty committee, which developed ideas for curricular changes in the School of Electrical Engineering and presented recommendations to the faculty.

During his four years at Cornell, Norm has experienced a variety of living styles. He started out in a dormitory, joined a fraternity in his sophomore year, and then "deactivated" and lived in an apartment his junior year. This year he and five other stu-



The best use of engineering is to help people.





dents are sharing a rented house in a rural setting near Sapsucker Woods, Cornell's bird sanctuary. One of the men, a natural resources major in the College of Agriculture and Life Sciences, is currently taking a course in ornithology, and Norm sometimes accompanies him on field expeditions near their house. Each of the men has a special shopping or cleaning job, and they take turns cooking, each being responsible for the dinner one evening a week. On the weekend they usually have a cooperative meal — perhaps an outdoor barbecue in good weather — and sometimes invite guests. Among them, the residents have four cars, and simple scheduling solves the transportation problem.

As for his academic schedule, Norm says he puts in "a fair amount of work" — about four hours of study each night — though he also has time for leisure activities such as intramural sports with a team composed of his house-mates. He especially enjoys his electrical engineering subjects, of course, but is interested also in the behavioral sciences and has taken sociology and psychology because he wanted to and not necessarily because he thinks they would be helpful in his career.

The variety of courses available and the many different kinds of people around the University appeal to Norm. He finds that the bigness of the University makes it not impersonal, as some people might expect, but interesting.

A student — such as Norman Marcus — who hopes to develop electronic devices as part of his professional work very likely may enter the Field Program in Electrical Engineering.

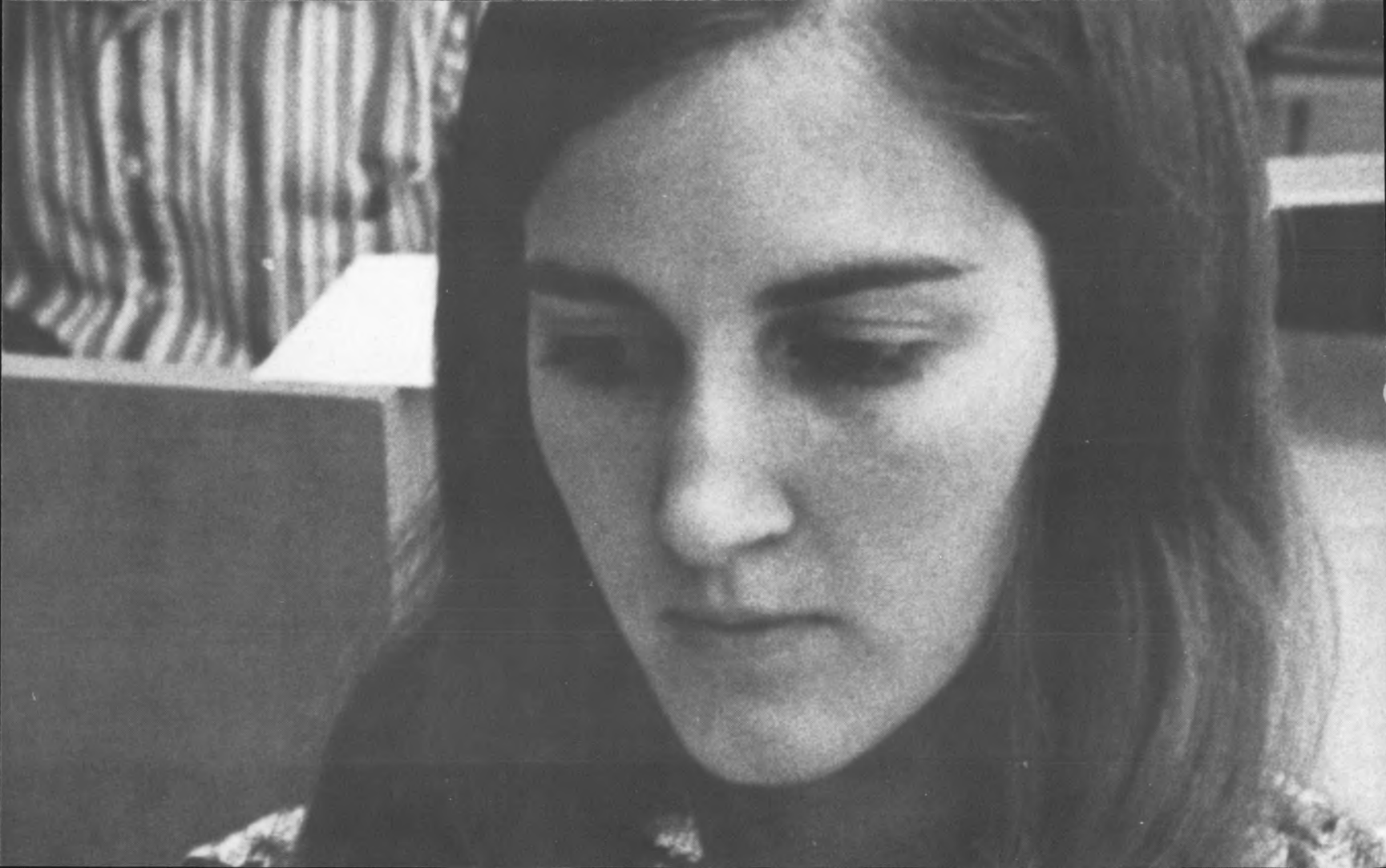
Because the scope of electrical engineering is so broad, most students in this field take certain basic courses and then, mostly in the senior year, electives chosen from some fifty or sixty offerings in many aspects of electrical engineering. These include electronics, power systems, computer methods and hardware, and radio and plasma physics. Of course, the students also have ample opportunity to take courses in nonengineering subjects.

Norm, who developed his program with the idea of concentrating on biomedical engineering, has taken elective courses in electronic circuit design, bioelectric systems, and neurobiology. Among other electives that he especially enjoyed are courses in psychology and population problems.



Above: Electrical engineering headquarters are in Phillips Hall, one of ten modern buildings on the engineering campus.

Left: Norman believes that a combination of engineering and medical skills is good preparation for a career in biomedical engineering. He plans to enter medical school next year. Here he works on the design of a circuit for an oscilloscope.



Sherri Koenig, SENIOR

Sherri Koenig, one of the approximately eighty undergraduate women enrolled in the College of Engineering, has the highest academic average in the senior class in industrial engineering and operations re-research, and possibly in the entire College. Her average is 4.15 (4.0 is equivalent to an A).

Sherri's experience is that young women who are good in science and math in high school are usually advised to go into teaching. She felt, however, that what she wanted from college was a technological background that would be applicable to the solution of problems in industrial and other organizations, and so she decided to enroll in an engineering school. She had some experience with engineering, for her father is a chemical engineer in Columbus, Ohio. She chose the Cornell College of Engineering, she says, because of its good reputation and nonrestrictive curriculum and general atmosphere.

She had never heard of operations research until she was a freshman, but, when she became familiar with the field, she decided that it was just what she had been wanting. "It is a relatively new field that appears to offer much opportunity for inno-



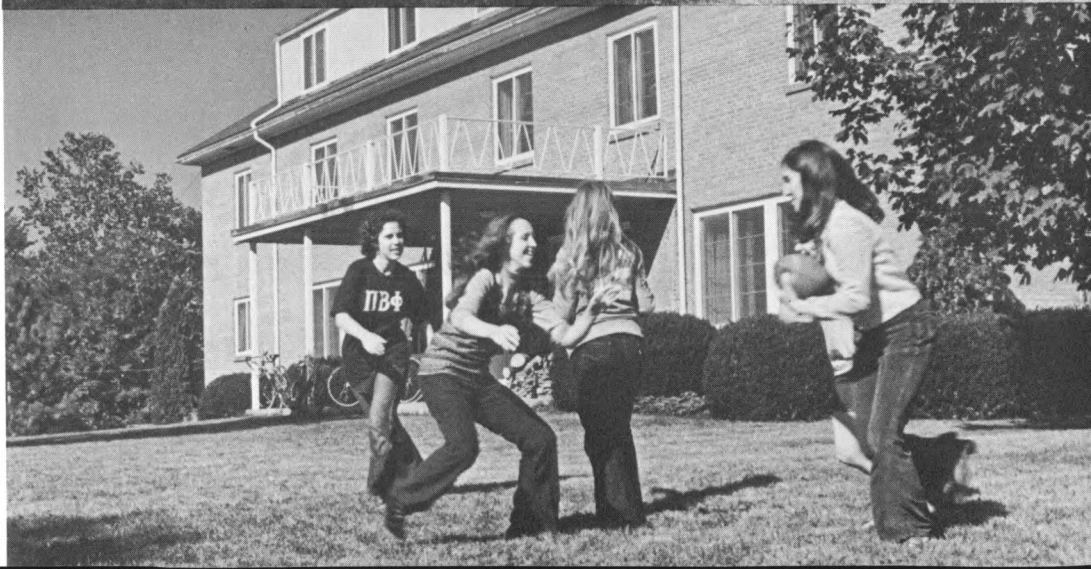
vative work," she said. Though the roots of the discipline are in military applications, she believes it has major humanistic trends now. This is important to her because she agrees with the opinion often expressed in recent times that scientists and technologists have a responsibility about the consequences of their work.

An important tool for operations research is the computer, and much of Sherri's course work involves computer programming. She had some experience in the subject before she started college, for, although her high school did not offer a

Above: *Sorority life is a part of Sherri's college experience. Here she helps plan a group project.*

course in programming at the time she was a student, it did have a time-sharing terminal available and Sherri learned the fundamentals on her own. Then the summer before her senior year she participated in a National Science Foundation program at Case Western Reserve University that included some programming instruction.

At Cornell Sherri has a part-time job in the Engineering Advising and Counseling Center, advising underclass students and



much opportunity for innovative work."

also tutoring. In her free time, she prefers informal activities to structured ones. She likes to read and sew, and occasionally go out for a few beers with friends. She is an enthusiastic sports fan and attends many Cornell athletic events, including football, hockey, gymnastics, and lacrosse.

She also has a strong interest in drama. In high school, she completed a year's apprenticeship in professional theater, work-

ing mostly on stage and properties crews and with costuming, and undertaking an occasional bit part. At Cornell, though she feels she cannot devote the intensive effort to drama that is required for active participation, she does enjoy attending the University plays.

Sherri lived in University housing at first and, although a quiet person, enjoyed the dormitory life. She appreciated the personal freedom that was possible. During her sophomore year she joined a sorority and moved into the sorority house, where she still lives. She has served as vice president in charge of pledges and she does some unofficial tutoring of younger students.

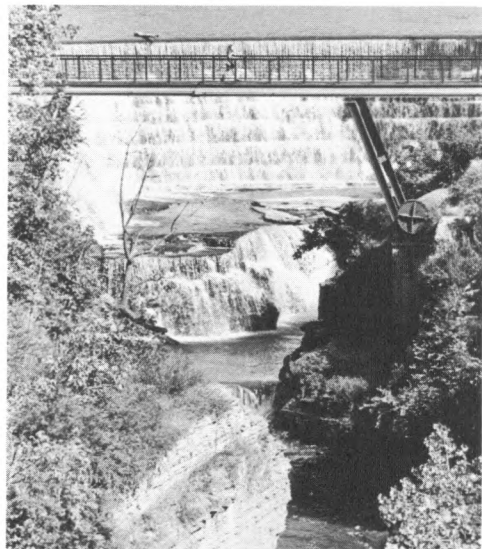
After she completes her work for the B.S. degree this spring, Sherri hopes to enter Cornell's Ph.D. program in operations research and eventually build a career in research and consulting.

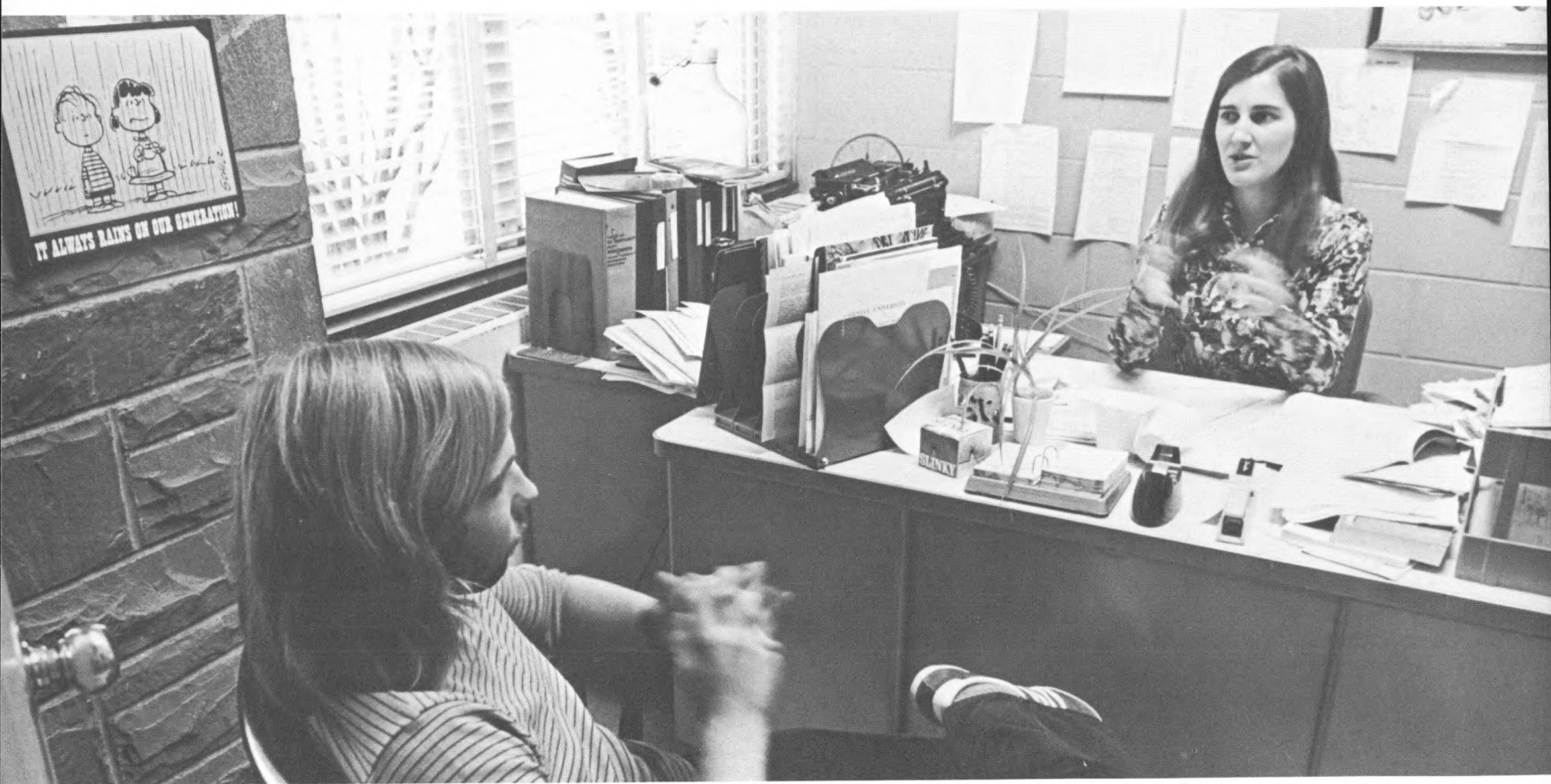
Far left: *Sherri's major in operations research requires a great deal of computer work.*

Far left, top and bottom: *A crisp fall day calls for scrimmage in the backyard.*

Left: *The tiny figure crossing the bridge on her way to classes is Sherri.*

Right: *The gorge near the sorority house is a pleasant place to talk.*







Industrial Engineering and Operations Research, the Field Program that Sherri Koenig chose for her upperclass specialization, provides a curriculum designed for just the kind of career she wants in organizational planning and management.

Important areas of study for those in this Program are industrial systems analysis and design, computer science, optimization methods, and probability and statistics, and Sherri has had courses in all of these. In addition, she has included in her program liberal studies electives in "outside" subjects that interest her: economics, psychology, communication arts, history, and comparative literature.

Students in this field might choose elective courses to emphasize some special area of technology, such as manufacturing processes, environmental processes, urban and regional planning, or transportation systems.

Far left: Sherri has a part-time job in the Engineering Advising and Counseling Center, which provides tutoring and other special help as well as curricular and career guidance.

Left: Sherri passes Cornell's chemistry building on her way to engineering classes.



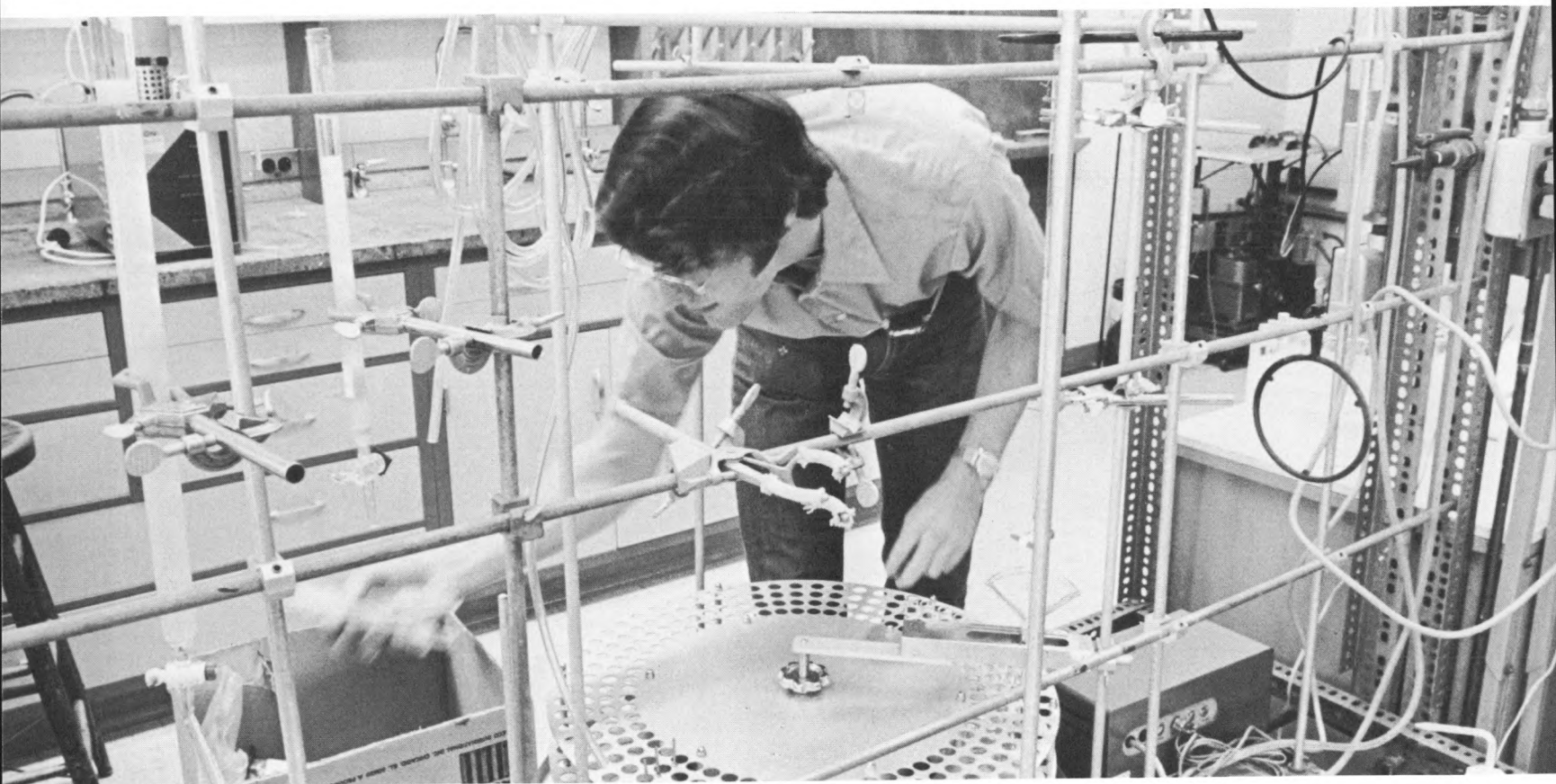
Jerry Tobler, SENIOR

"Even in high school I knew I wanted to do research," says Jerry Tobler, and now as a senior engineering student he has already begun.

Jerry is following a College Program — an individually structured curriculum — that combines chemical engineering, chemistry, and biochemistry. His research project, which he is working on for academic credit, is concerned with the kinetics of protein unfolding and is under the direction of Cornell chemistry professor Elliot Elson. Jerry plans to study for a Ph.D. in biochemistry after he receives his B.S. degree from the College of Engineering, with a view to working on medically oriented problems.

When he was still in high school, Jerry says, he wasn't sure whether his interests were more in theoretical or applied science, and he wasn't sure whether he wanted a career oriented toward engineering or toward medicine. A high school counselor suggested that he go to an engineering school and Jerry feels that this has turned out to be a good choice, since an undergraduate engineering education, especially with an option like Cornell's College Program, can be used as preparation for a research career in many specialty areas. "Engi-





"Engineering is basically a way of looking at problems."

neering is basically a way of looking at problems," he says.

Jerry attended high school in his hometown of Elgin, Illinois, near Chicago, and says he was rather unusual in choosing an eastern college. He had gained some firsthand knowledge of Cornell as a result of visiting the campus on a trip arranged for high school juniors by the Cornell Club in Chicago. He feels that a person's physical environment has a lot to do with how well he performs, and that Cornell's campus and area environment are excellent for students. He also has come to believe that a university experience is more valuable than that of a technical school because a student gets exposed to so many kinds of people. Although the "engineering approach" is good for problem solving, engineers should be aware of other ways of thinking, he feels.

For somewhat the same reasons, Jerry prefers an independent living style to fraternity life. He lived in a fraternity house for two years as a nonmember but is now sharing an apartment with two other students. One of these fellow residents is studying entomology and the other ornithology. "I enjoy living with people whose interests are so different from mine," Jerry says. "I cer-

tainly have learned a lot about insects, and, while I don't yet know much about birds, I'm working on that."

When he first came to Cornell, Jerry decided to concentrate mostly on his academic work, at least until he discovered how much of his time it would require. He did join the marching band as a freshman, though, continuing his high school participation in musical activities, and he never misses the Big Red band concert held outdoors on Libe Slope each fall.

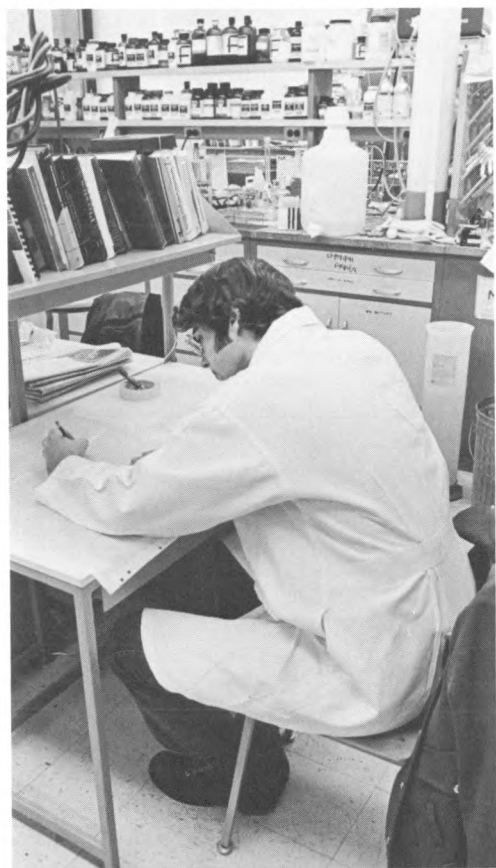
Jerry was elected as a junior to membership in Tau Beta Pi, the national honorary society in engineering, and he attends the group's monthly meetings. Each spring the Cornell chapter holds a spring banquet, at which time the Excellence in Teaching Award is presented to a professor the society members have selected. The Award is jointly sponsored by Tau Beta Pi and the Cornell Society of Engineers, an alumni organization.

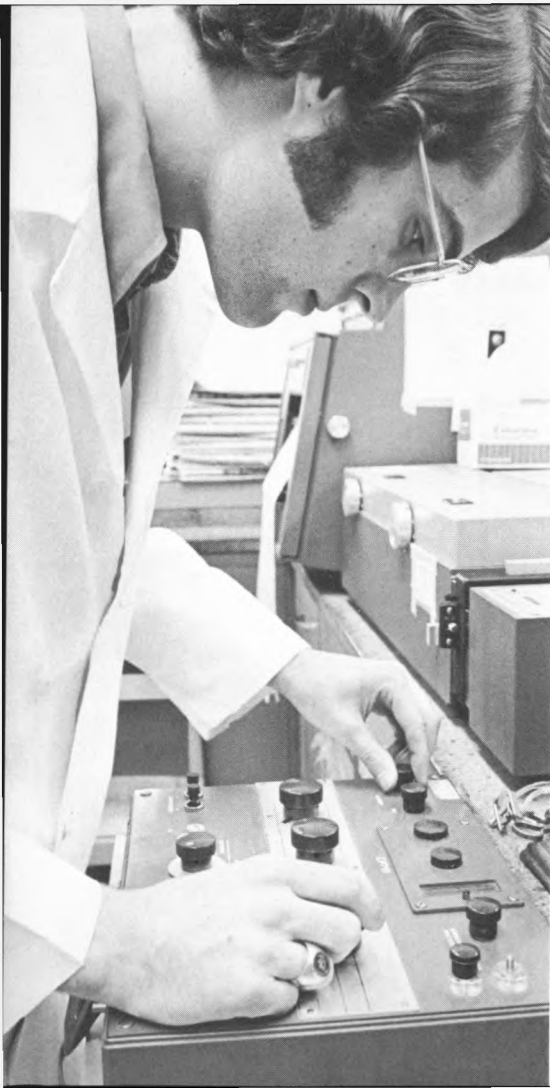
Jerry's main interest, though, is unquestionably his research. He has outlined a study that sounds perhaps more like a Ph.D. thesis problem than a senior laboratory project, but Professor Elson is encouraging him to accomplish all he can. In general, Jerry's



Above: A good place to study, Jerry finds, is at home in the apartment he shares with two other students.

Left: As part of his research in the kinetics of protein unfolding, Jerry collects sample fractions separated on a column. He is conducting this research as an independent project for academic credit. After graduation, Jerry plans to begin graduate study in biochemistry.





Far left: Jerry has a desk and laboratory space in the chemistry building, where he conducts experiments for his senior research project.

Center: One step in his experiment is to place fractionated samples in a centrifuge that is temperature-controlled at -20°C .

Left: Changes that occur as the protein molecule unfolds are detected as changes in the optical density.

aim is to find correspondences between the primary structure of protein molecules such as hemoglobin and the kinetics of thermal unfolding. Such studies could contribute to an understanding of diseases such as sickle-cell anemia, he believes.

"Finding out about something unknown, especially if it has the potential of being beneficial to man, is the most exciting thing I can imagine," Jerry says.

Jerry Tobler is among those Cornell engineering students whose objectives are not met by one of the established Field Programs and who therefore have arranged individually structured curricula through the College Program. Often these curricula are interdisciplinary, combining an engineering major with a minor offered by another unit of the University.

Jerry's College Program is adapted to his interest in biochemistry. In his junior year, many of Jerry's courses were in the areas of chemistry and chemical engineering (materials, rate processes, chemical engineering thermodynamics). In his senior year, he is concentrating on chemistry and biochemistry, and is especially interested in his senior research project on protein molecules. He has also worked into his schedule courses in computer programming, electrical systems, and engineering analysis of physical systems. He has used his liberal studies electives to take a series of courses in government: The American Congress, The American Presidency, and Urban Politics.

College Programs are the most flexible programs the College offers. Partially pre-structured College Programs are available in computer science, energy conversion, engineering science, and geological sciences. Others might combine, for example, airphoto interpretation and geology; computer science and electrical systems; environmental quality management and ecology; mechanical engineering and biological sciences or oceanography; or transportation and regional planning.



David and Sally Osborn, SENIORS

Studying engineering the Osborns' way is hardly commonplace, but they are proving that marriage and a family don't have to wait for graduation.

Their daughter Betsy, eight months old when school started last fall, may have to accompany a parent to classes once in a while, but she is thriving. Sally and Dave are finding their schedules quite manageable and plan to continue on in Cornell's Master of Engineering degree program after their graduation this year.

It does take a bit of doing, though, and it helps to have friends who will lend a hand. The Osborns share an apartment just off campus with an electrical engineering student, Jaclyn Spear, who helps look after Betsy. And one afternoon a week Betsy's godfather, Jim Scinta, who is a chemical engineering senior and a former roommate of Dave's, takes over the baby-sitting. A bulletin board in the kitchen displays a master schedule that accommodates all the various classes and laboratories and "covers" Betsy almost all the time.

Sally and Dave met as freshmen and were married during their sophomore year. Since Betsy's arrival, Sally has carried a somewhat lighter academic load, but she has

been able to keep up with her class by taking electrical engineering courses last summer. Betsy went along to classes then, since Dave had a job at a nearby Boy Scout camp.

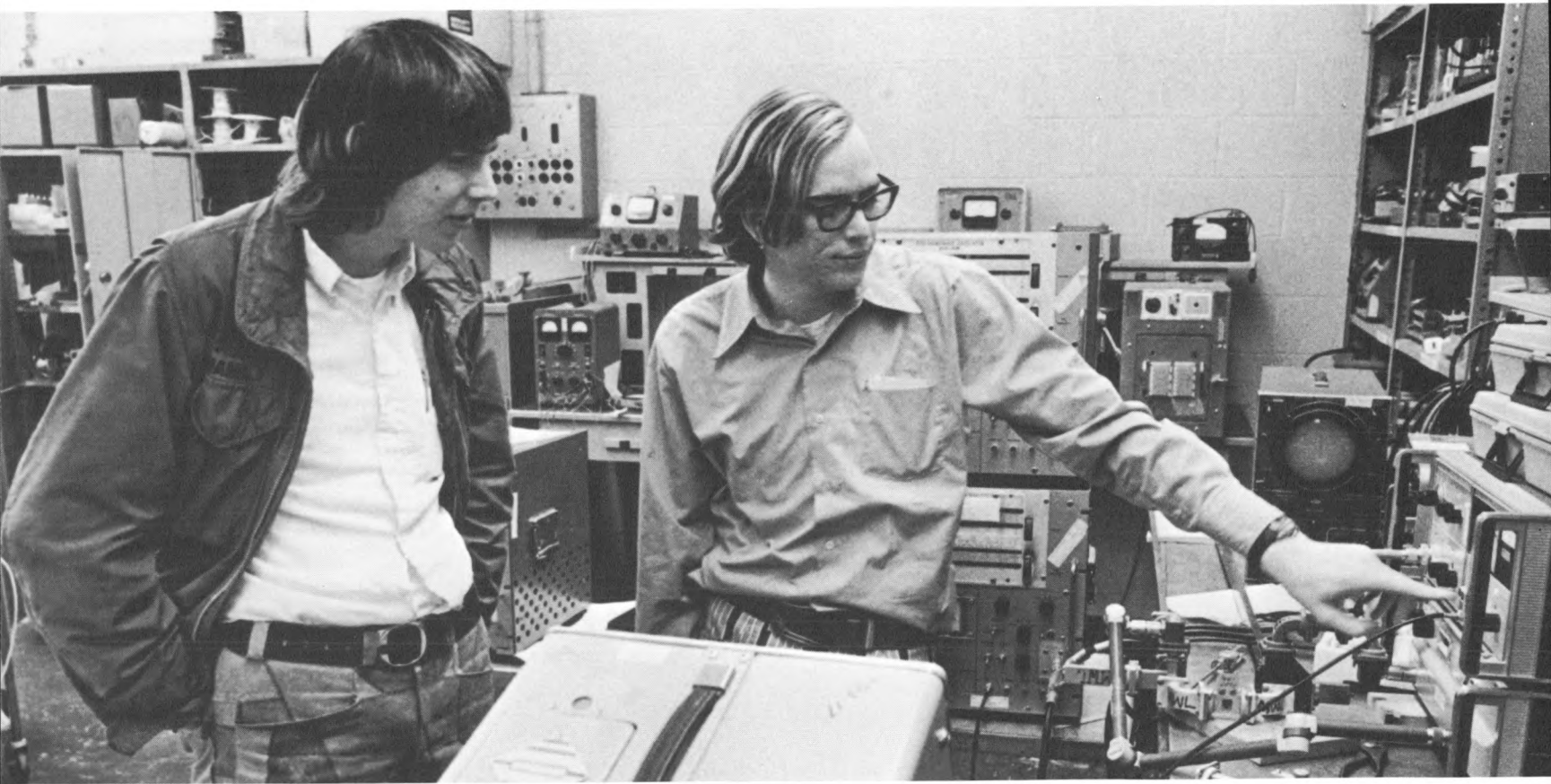
The Osborns are enrolled in different Field Programs — Dave in electrical engineering and Sally in mechanical. Sally's choice of specialty may have been influenced by the fact that both her parents hold Cornell degrees in mechanical engineering; her father is employed in Cleveland as an engineer with the telephone company. She has a competing interest in French and has taken a number of her liberal studies electives in French language and literature, but she finds engineering subjects easier for her. A favorite course was Systems Dynamics, which provided laboratory experience in mechanical engineering design and included work with computer hardware.

This year, in a biomechanics class project, Sally is helping to design mechanical aids for Ken Kunken, an engineering student who was paralyzed as a result of a football injury but is now continuing his studies in industrial engineering and operations research. One of the devices that Ken thought would be especially useful is an

improved page-turner, and Sally's team is working on that.

Dave has already had some experience in his specialty, for he has worked for several summers at a small electronics manufacturing plant near his parents' home in Sarasota, Florida. He thinks he may concentrate his studies on microwave electronics. He prefers practical to theoretical work ("I was always basically a tinkerer"). Although theoretical work is an important aspect of the research conducted at the electrical engineering school at Cornell, Dave says, there is also a great amount of applied research and development; and Dave was impressed by the access undergraduates have to sophisticated equipment. Dave is also interested in economics and has taken courses in this area as part of his liberal studies program. He found Industrial Organization and Public Control, a course dealing with the interrelationships of government and big business, especially valuable.

In addition to their academic work, the Osborns find time for special interests and recreation. Dave is active in his fraternity and they frequently spend time at the fraternity house. Betsy is no problem there.



"And besides, Betsy is such fun!"

Recently, for example, they attended a party and when Betsy got sleepy, they just "put her under the TV where nobody would step on her." Both the Osborns are bridge "fiends" and try to play one or two nights a week. Sally reads at least one paperback book a day — usually mysteries or books about baby care — and sews all her own clothes. Dave spends some of his spare time in Boy Scout work; he has volunteered to help with an Ithaca troop.

Financially, the Osborns are managing with the help of scholarship aid, part-time jobs, and summer jobs. Sally, for instance, has a job helping with housework and



child care one afternoon a week; she can take Betsy along. She also helps grade papers for an engineering professor.

After they finish their five-year programs, both Dave and Sally want to work as professional engineers. Of course, they will have to find jobs in the same geographical area. Both would prefer to work with medium-sized or small firms "where the people all know each other." They plan to continue their family-and-work style of life, probably having one more child of their own and then adopting several. Many of their contemporaries, they say, plan to defer marriage and certainly children until they are through school and have paid off their student loans, bought a house, and so forth, but that is not for the Osborns. They feel that theirs is a full and interesting life. "And besides," as Sally says, "Betsy is such fun!"

Sally Osborn's upperclass schedule is a little different from that of most students in the Field Program in Mechanical Engineering because she took some summer work and then a lighter-than-normal load in the regular fall and spring terms.

Usually, mechanical engineering students begin their field programs with cour-

ses in dynamics, thermodynamics, mathematics, and materials and manufacturing processing. The next term they would likely take mechanical design and analysis, fluid mechanics, and electrical engineering. In the senior year they would probably take courses in systems analysis, heat transfer and transport properties, and experimental mechanical engineering. Also, the great number of elective courses available during these years enable students to specialize in some area of mechanical systems and design — perhaps vehicle engineering or new production techniques — or in thermal engineering — energy conversion problems, for example, or pollution control.

Sally's electives have been directed mainly to the study of thermal engineering. But she has found a place in her schedule for courses in French language and literature, artistic design, and silk-screen printing.

Far left: "Basically a tinkerer" is the way Dave describes himself. In his major field of electrical engineering, he finds he most enjoys the practical work.

Left: Sally has a domestic side as well as a scientific one. She made the draperies for the apartment and sews all her own clothes.





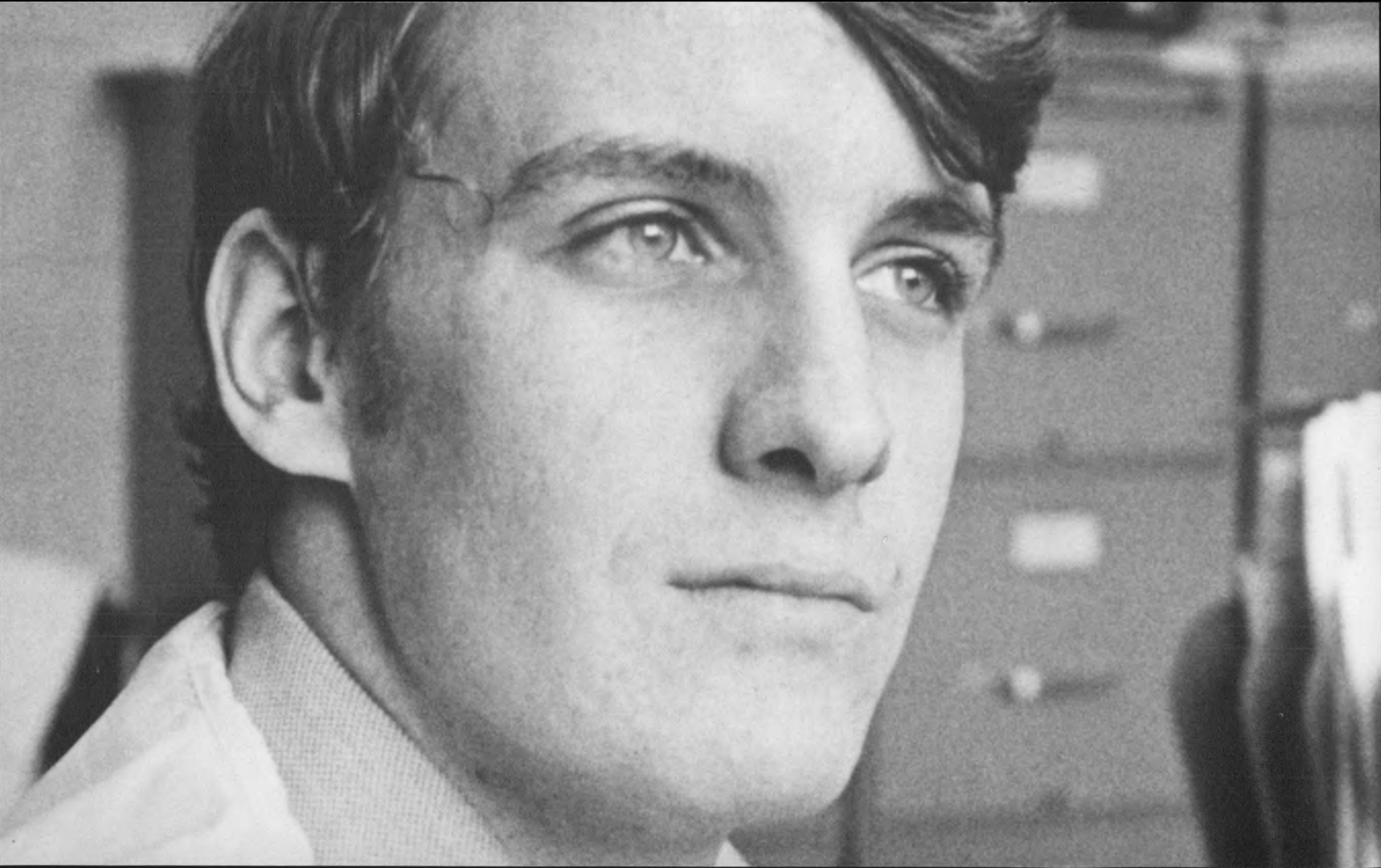
Far left: Family life fits in with busy academic schedules for the Osborns. Base of operations is the kitchen in their Collegetown apartment on the edge of campus. Out of sight is the bulletin board with the "master schedule" of classes and baby-sitting assignments. Other engineering students, friends of the Osborns, help care for Betsy on a regular basis.

Left: Betsy accompanied her mother to electrical engineering laboratory last summer. A special place in the lab was "Reserved for Betsy."

Above: Betsy in the backpack is a familiar sight on campus. "Toting the backpack is about the only exercise I get except for running after the little one," Sally says.

Right: Sally's mechanical engineering laboratory work this year includes computer simulation and involves hardware as well as software. After she and Dave complete their undergraduate work, they plan to study for professional master's degrees at Cornell, he in electrical engineering and she in mechanical.





Charlie Brown, MASTER OF ENGINEERING CANDIDATE

The manufacture of consumer products is the area that Charlie Brown, a fifth-year student in chemical engineering, plans to enter after he receives his Master of Engineering degree this spring.

He thinks this is a practical choice, since consumer goods are less apt to decline under changing economic conditions than many other products. In addition, he believes that it is an important field for technologists with a sense of social conscience. While he supports consumer activism, Charlie believes that the primary responsibility for quality production lies with those working in manufacture.

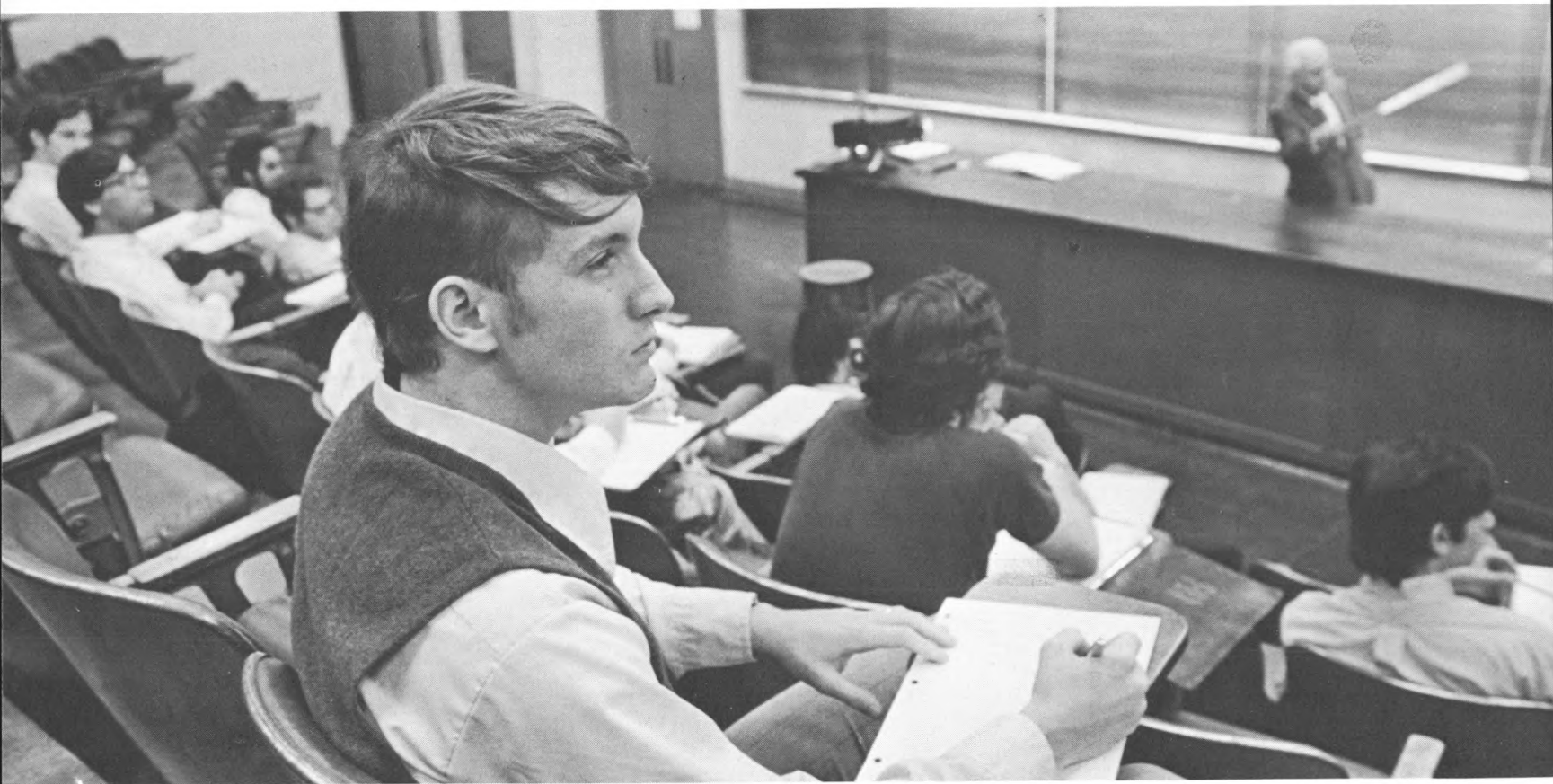
Charlie suggests that his outlook on engineering reflects changing national attitudes about technology and society. Certainly changes have become apparent at Cornell over the five years he has been a student. "The traditional concept of engineering as a means of producing the best product for the least money is now being balanced by a greater concern for the humanistic aspects of life," he says.

Charlie recalls that when he first tentatively decided to pursue an engineering career, he visited a number of schools around the country with his parents. He

was interested in attending college in a geographical area other than the Midwest, where he grew up, so that he could broaden his experience. Cornell appealed to him partly because it is a university offering opportunities to explore subject areas outside of engineering, it attracts people from all over the world, it has an attractive geographical setting and a well-defined campus (important especially for undergraduates, he believes), and it is coeducational.

As an undergraduate, Charlie served as president of the student chapter of the American Institute of Chemical Engineers. In extracurricular activities, his major interest was in sports. For two years he served as sports director for the Cornell student radio station, WVBR; in this capacity he conducted interviews with coaches in a weekly program called "Charlie and the Coach," and he did some traveling to cover games. In fact, Charlie almost decided to become a professional sports announcer. He participated in intramural soccer as a member of his fraternity's team, and, as a sophomore member of the fraternity swim team, he entered the annual swim meet and won the championship in breaststroke. Now, as a graduate student, he plays intra-





the traditional concept of engineering as a means of producing the best possible product for the least money is now being balanced by a greater concern for the humanistic aspects of life."



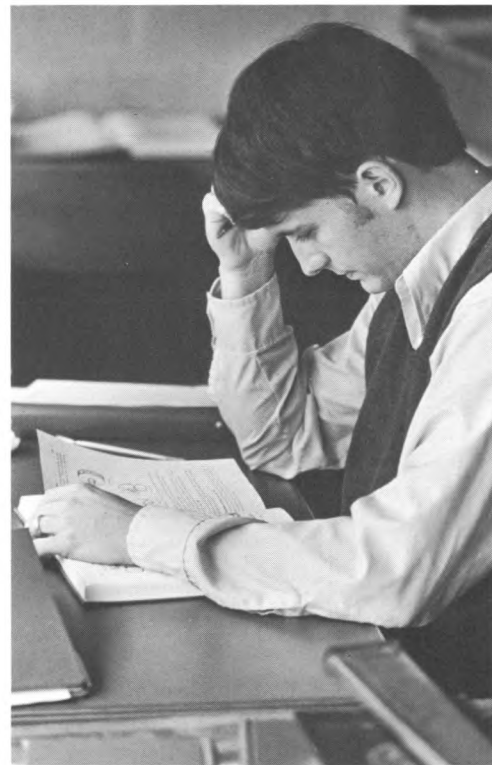
mural football with the chemical engineering graduate team.

After he completed his undergraduate education, Charlie married a girl from his hometown, Waukegan, Illinois, and returned with her to Ithaca for his year's study in the Master of Engineering degree program. His wife, Renee, a medical technologist, is working this year as a senior laboratory technician in the Cornell Department of Chemistry.

Looking back on his Cornell experience, Charlie reflects that his undergraduate engineering education was "invaluable." "It teaches a person to analyze problems systematically and evaluate possible solutions," he says. He also values highly the liberal-arts component of his educational program, but is inclined to agree with his father, also a chemical engineer,

Far left: A required course for the Master of Engineering degree in chemical engineering is *Process Design and Economics*, taught by Professor Robert York. About fifteen graduate students are enrolled in Charlie's class.

Left: Woodworking is a handy hobby for a student apartment dweller, according to Charlie. The Browns' living room doubles as workshop.



Above: Charlie's office in Olin Hall is his headquarters on campus. In addition to taking classes himself, Charlie serves as a graduate teaching assistant.





Left: Charlie is a teaching assistant in Professor George Cocks's course in materials. The laboratory work involves chemical microscopy, crystallography, and the microscopic characterization of materials.

Above: Skiing is among the sports Charlie enjoys with his wife, Renee, a laboratory technician in the chemistry department. Skis are stored and cared for in their apartment in downtown Ithaca.

that an education culminating in professional training best prepares a young person to do significant work.

Charlie Brown began his specialized study when he entered the Field Program in Chemical Engineering as a junior, and he is now completing it in the Master of Engineering (Chemical) degree program.

Undergraduates who plan to enter this field normally take extra chemistry courses and introductory chemical engineering during the sophomore year. Then as upper-classmen they study more chemistry and chemical engineering, and generally take courses in thermodynamics, equilibria, materials, rate processes, separation processes, and chemical process evaluation and synthesis, in addition to electives in other subjects, including liberal studies.

Among the engineering electives that Charlie took and now considers especially valuable to him are courses in fermentation, industrial waste, polymeric materials, and consumer products engineering. He rounded out his undergraduate program with elective courses in computer science, industrial microorganisms, surface chemistry, the chemistry of water and wastewater, and cost accounting.



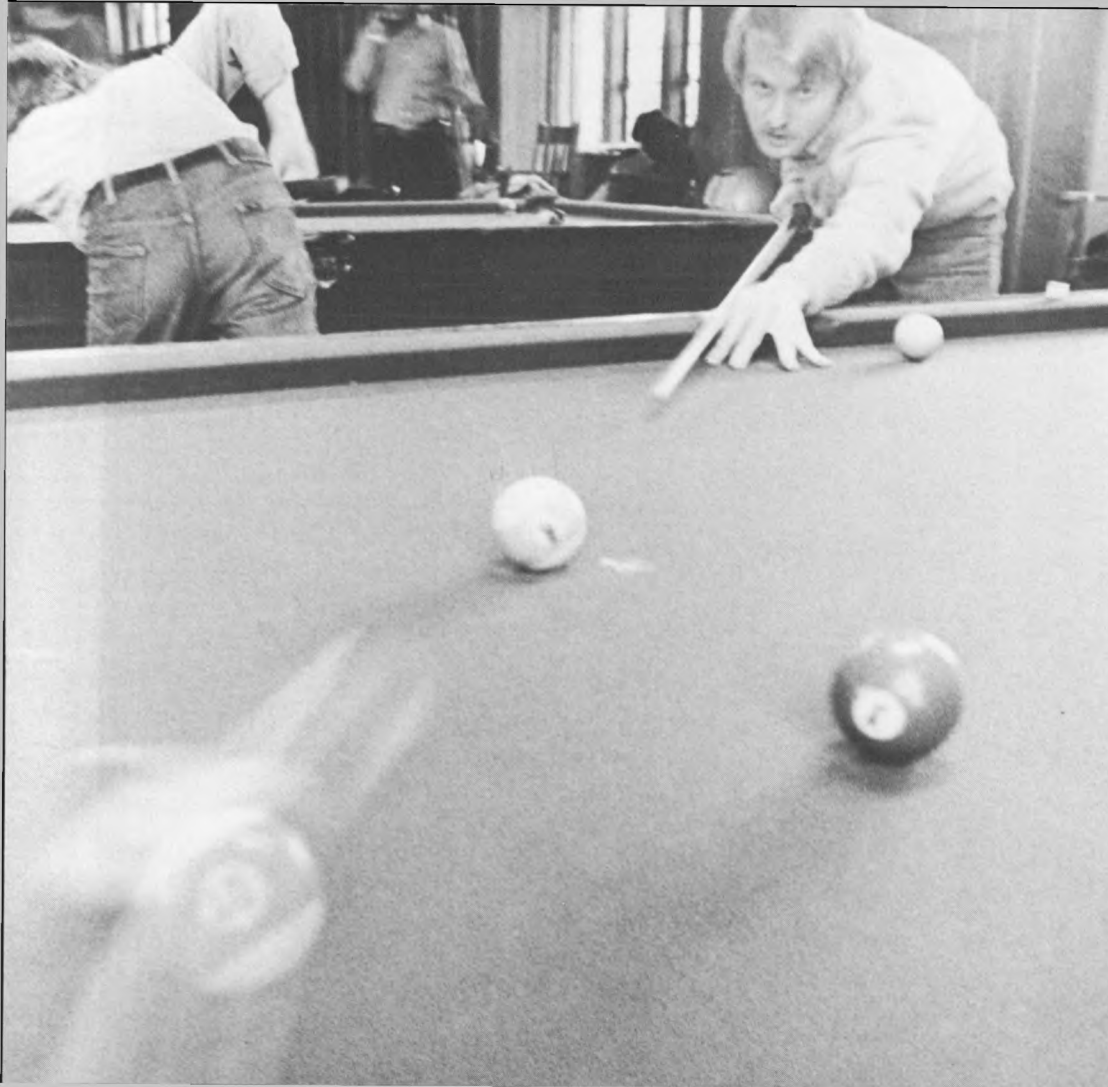
Joseph Krieger, MASTER OF ENGINEERING CANDIDATE



Joseph Krieger entered Cornell as a junior, one of the first of a growing number of students who transfer from two-year colleges to complete their education at the College of Engineering. He received his Bachelor of Science degree last spring, and this year he is finishing up his professional training in the fifth-year Master of Engineering degree program.

Joe studied for two years at Farmingdale, a two-year college of the State University of New York system. Since it was near his home in Huntington, Long Island, he could save expenses by living at home as well as by taking advantage of the relatively low tuition costs. His original idea was to prepare for a career in aerospace engineering, but because of instability in the aerospace industry at that time he decided to switch to civil engineering. After completing Farmingdale's Engineering Science Program — similar to Cornell's underclass Basic Studies Program — he came to the

Left: As a graduate student in the Master of Engineering degree program, Joe is continuing to work in his undergraduate specialty field of aerial photographic interpretation. The M.Eng. degree is offered in eleven fields of study.



Above: Joe rehearses with the Sage Chapel Choir. Other music groups open to all students include the orchestra, band, chorus, chamber music ensembles, an opera workshop, and a glee club that makes international tours.

Left: Joe sometimes stops in at the game room in Willard Straight Hall, one of three student unions at Cornell.

Cornell College of Engineering with the help of scholarship aid especially designated for transfer students.

At Cornell he developed an interest in aerial photographic interpretation, a field with "possibilities limited only by the imagination," and he has continued this specialization in his graduate program. Under the supervision of Professor Ta Liang, a specialist in aerial photography and physical environment, he is now working on his required master's project, which is concerned with the location of preglacial buried channels by remote sensing techniques. A potential use of such information, Joe says, would be the location of sand and gravel deposits and ground-water supplies.

Joe's academic program has been augmented by two short-term jobs at the University that have given him the opportunity to participate in specific projects related to his field of interest. These projects, sponsored by various governmental agencies and carried out at Cornell, include the setting up of a computerized information service that can provide detailed data on land use and natural resources in New York State. The information for this inventory was assembled and interpreted by staff members

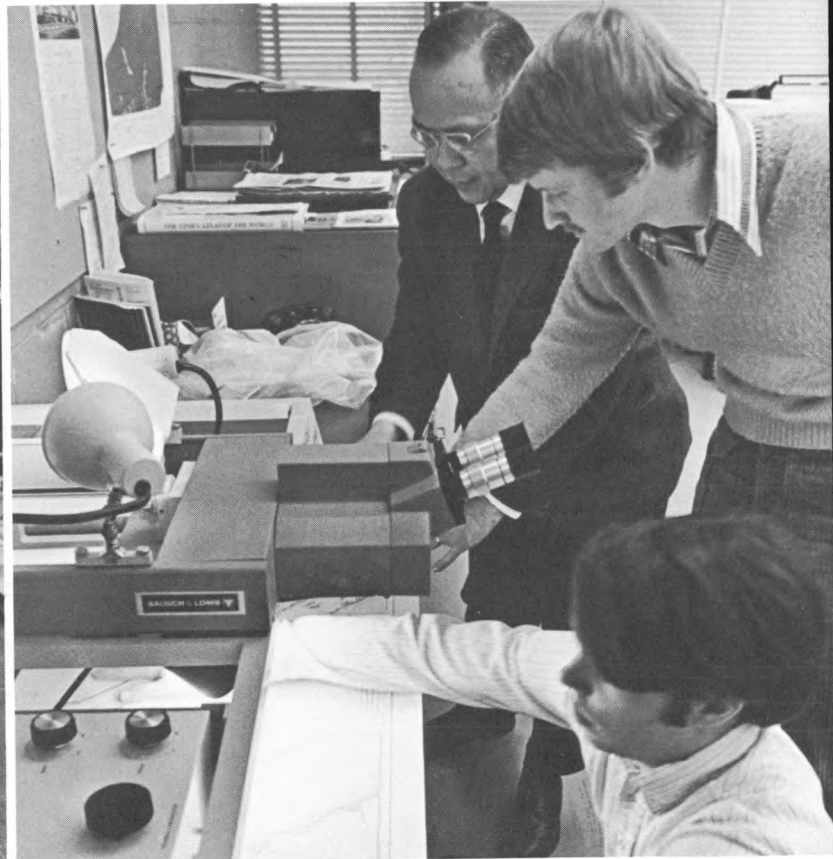
of the Cornell Aerial Photographic Center.

While the main thing Joe appreciates about Cornell is its academic excellence and vitality, he also enjoys the campus atmosphere and the geographic beauty of the area. He joined the Outing Club, which sponsors such activities as hiking, canoeing, and cave exploration trips. He also participates in the Campus Crusade for Christ activities at Cornell, and he is a member of the Sage Chapel Choir. During his undergraduate years he lived in campus dormitories; this year he shares an apartment near the campus with three other students.

The transition from a small two-year college (his graduating class at Farmingdale numbered about twenty) to a large university was not particularly difficult for Joe. Academically, he found the work at Cornell not more difficult, but, rather, more demanding in terms of time and effort. He found that in a university setting a little more initiative is required on the part of the student

Right: *The cafeteria at the Straight is the customary dining place for Joe when he doesn't eat at home. Although Cornell has no formal dining requirements for students, a variety of eating places is available on campus.*





... college is what you make it.



Above: On days when he plans to cook dinner, Joe finds the shop at the North Campus Union a convenient place to pick up groceries. Other patrons include student residents of new North Campus halls that are arranged in suites with kitchenettes.

Far left: For his Master of Engineering degree project, Joe is investigating the use of remote sensing techniques, including aerial photography, in locating buried sand and gravel deposits dating from pre-glacial periods.

Left: He is working under the supervision of Ta Liang, professor of environmental engineering, who is an expert in remote sensing techniques. Joe has augmented his studies and research with part-time jobs on sponsored projects related to his specialty.

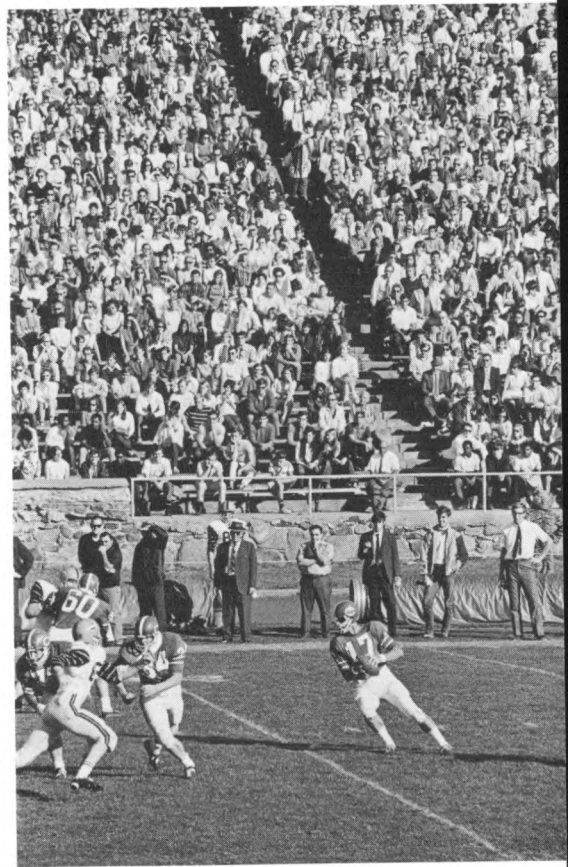
to establish acquaintanceships with the faculty, but that professors are basically friendly, helpful, and interested. "I believe that college is what you make it," Joe comments.

After he graduates, Joe may join a company or engineering consulting firm whose operations make use of remote sensing techniques. Work with a governmental agency, such as the Soil Conservation Service, that is concerned with the use of land or natural resources, or even setting up his own consulting service, are other possibilities.

Whatever specific job he undertakes, Joe feels that he will be well prepared for effective professional activity. "I will always remember my three years at Cornell," he says, "as a time in which I obtained much knowledge, not only academic, but in other areas of life vital for coping successfully with the world today."

Many Cornell baccalaureate graduates in engineering — the largest single group — continue on for an integrated fifth year of study in their upperclass fields and earn the professional degree of Master of Engineering. This is what Joe Krieger decided to do; he is a candidate for the degree of Master of Engineering (Civil). Altogether, there are eleven areas in which the M.Eng. degree may be taken. They are:

- Aerospace Engineering
- Agricultural Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Engineering Mechanics
- Engineering Physics
- Industrial Engineering
- Materials Engineering
- Mechanical Engineering
- Nuclear Engineering





Far left: A popular winter sport for Cornell students is skiing, available at several nearby areas.

Left: Cornell, a member of the Ivy League, supports an extensive intercollegiate athletic program. A comprehensive and popular intramural program is also offered.

Above: Buildings of the College of Arts and Sciences line the Arts Quad, the oldest part of the Cornell campus.

Right: The buildings of the College of Engineering are clustered around a quadrangle at the south side of the Cornell campus. Engineering students quickly become familiar with the entire campus, for they share residence halls with students in other Cornell colleges and take a number of classes offered by other colleges. Twelve of the University's fourteen colleges are located on the Ithaca campus.



Further Information

The *Announcement of the College of Engineering* contains information about such things as admissions requirements, financial aid, and details of curricula and courses. An overall picture of Cornell programs, facilities, services, living arrangements, and academic and extracurricular activities is given in the University's *Announcement of General Information*. Both of these publications may be obtained by writing to Cornell University Announcements, Day Hall, Ithaca, New York 14850.

The admissions staff of the College of Engineering is helpful in answering questions about special areas of interest and can provide reading material about engineering fields in general and Cornell programs in particular. Staff members are also available to discuss individual problems in such matters as entrance qualifications and finances. The address is Engineering Admissions Office, College of Engineering, Carpenter Hall, Cornell University, Ithaca, New York 14850.

It is the policy of Cornell University actively to support equality of educational opportunity. No student shall be denied admission to the University or be discriminated against otherwise because of race, color, creed, religion, national origin, or sex.

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