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The magazine's objective is to inform alumni and friends about educational advances at Renselaer within a national and international context and to maintain a spirit of critical inquiry appropriate to the Institute's mission. Publication of material does not indicate endorsement by Renselaer nor reflect official policy. Letters are welcome.

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Renselaer Polytechnic Institute is an equal opportunity/affirmative action institution.
W2SZ CELEBRATES 80 YEARS OF SERVICE
AND ACHIEVEMENT
Rensselaer's amateur radio club serves the community that brought it to life.

CONFRONTING THE EMPTY CRADLE
Dealing with the emotions of a miscarriage.

REPOLISHING THE BIG APPLE
Rensselaer alumni and faculty renovate historic landmarks.

ALUMNI NEWS AND CLASS NOTES
The place to turn for the latest on your classmates and alumni events.

PHI SIGMA SIGMA TURNS FIFTEEN
The Institute's first sorority is still going strong.

ALUMNI NEWS
Homecoming '90 marks milestones

CLASS NOTES
Rensselaer student creates sculptures from old computer chips.

HOMECOMING '90
KALEIDOSCOPE
News and research on campus.

THE LAST WORD
Dave Hill '76 challenges fellow alumni to give of themselves for humanity.
This issue's lead story is about several Rensselaer alumni who are leaving their mark on the planet—specifically Manhattan—through restorations of important old landmarks. Of course, the same story could be written focusing on any number of cities. All over the world, Rensselaer people are building bridges and skyscrapers, restoring cathedrals and other old edifices, and developing life spaces. Yet, these physical examples are only one way that Rensselaer people improve the quality of life of people all over the world.

Rensselaer people are heading up major corporations and government agencies, doing research in lifesaving and life-changing arenas, and affecting social and economic policy.

Because of our long history of educating young people to make a difference in the world, we have a keen responsibility to assess regularly the entire process of higher education—and to make meaningful improvements in it. Today, as always, we can set an example for other colleges and universities about how best to reach students. And that's important because students' needs and desires change with each generation. Unfortunately, today's students are turning away from science and technology in droves. To keep America competitive, we must do everything in our power to get them back.

At Rensselaer, we are attacking the problem on a wide variety of fronts, beginning with grade-schoolers. We coordinate a leading-edge program with a local elementary school, where some of our brightest students participate in an innovative program designed to inspire youngsters to pursue science. (This program was recently featured on NBC News, by the way.) We also sponsor a physics magic show that demonstrates, in a very tangible yet entertaining way, the joys and wonders of physics. And we take a traveling Technology Awareness Module out to high schools to give young people first-hand opportunities to engineer and manufacture actual products. These are only a few examples of dozens of ways that Rensselaer is aggressively seeking to change a depressing national scenario.

We are also leading the way in developing new methods of teaching that will keep today's college students excited about technology. With guidance from our new Anderson Center for Innovation in Undergraduate Education, we are implementing myriad new programs that give our students hands-on experiences in creative projects with real-life meaning and opportunities for leadership.

Perhaps the most sweeping example is our new initiative integrating high-powered computers across our curricula. By next fall, our new calculus course will be available to all freshmen, and we'll be using similar state-of-the-art computer technology in many other fields like physics, chemistry, engineering, and architecture.

Through this initiative and its 520 individual computer workstations placed in classrooms, laboratories, and dormitories, students are learning on the kind of high-powered, state-of-the-art equipment they will encounter in real-world situations after graduation. We expect our program to serve as a model for universities across the nation throughout the next decade.

Finally, Rensselaer has one more opportunity—and responsibility—to change the face of American technological higher education. For too long, that face has been primarily male and primarily white. For both demographic and ethical reasons, we must find ways to make the fields we teach more palatable, exciting, and welcoming to women and minorities—even if that means redefining what a technological education is. It is time our definition included a more humanistic angle—closely relating the fields of engineering, the sciences, management, and architecture to the human condition. That's a tall order, but Rensselaer has the talent and the wherewithal to lead the way.

The next decade will mean more than a new century. It will be the dawning of a new age in which the stakes are higher and the work we do is even more urgent and important. I firmly believe that Rensselaer is now making the decisions and implementing the programs that will put us right at the focus of this important work and allow us to make an indelible mark on American higher education.
Faigenbaum Fans
I was delighted to read the article on Dr. Harold Faigenbaum (Rensselaer, September 1990), one of the most memorable and entertaining teachers I've ever encountered.

Dr. Faigenbaum was a formidable presence explaining chemistry in lively, well organized detail. Alas, the early hour and heat occasionally put someone to sleep. I will never forget Dr. Faigenbaum interrupting his lecture to awake the sleeper and ask: "Have you ever figured out how much it's costing you to sleep in my class?"

This question was followed by a careful accounting of the costs of an RPI education divided by the hours of classroom contact ending, of course, in the surprisingly high cost of classroom sleeping. It was a masterful performance, as were all his lectures.

It was a pleasure to learn of the RAA award to this distinguished educator.

Abraham J. Rothenberg '52
Westport, Connecticut
The article on Professor Faigenbaum renewed memories which are still vivid after nearly fifty years. He is unquestionably the best of many teachers I have experienced over the years.

How nice to learn of his being given the RAA Distinguished Service Award and of his carrying on as Professor Emeritus at the age of eighty-eight.

Alan R. Pels '48
Stamford, Connecticut
With an Eye to the Law
Engineering is an excellent background for the study and the practice of law [re “Discovering Engineering’s Greatest Advantages,” Dec. 1990 issue].

Having spent the 1970s in the study, practice, and teaching of law, part time, I returned to full-time engineering in the 1980s. Doing both at the same time was an interesting experience and exemplifies the similarities between the two. I have known many colleagues who made this transition.

Norman S. Cohen ’60
Redlands, California

About Those Undated Photos
Editor’s Note: The photographs on pages eighteen and nineteen of the December 1990 issue brought many responses via letter and telephone. Below are several samples.

I particularly enjoyed the article “One Hundred Years of Staying Power.”

Your caption on the picture on page eighteen asked for information about "a post -World War II Grand Marshal Week Celebration." The event was associated with the election campaign in the spring of 1952.

The candidates were Bill Moller, Jim Markin, and Jim Malakoff (for head cheerleader) versus Gerry Penna, Rick Schoenhardt, and Ken Horton. Gerry Penna and Rick Schoenhardt were elected Grand Marshal and President of the Union, respectively. They served those offices in an outstanding way.

The faces in the picture are quite familiar, but I can only attach Frank Fojo’s name to the face on the right.

Frank McNeil and Mrs. Walter Phelps Warren were two of the greatest people in the world: wise in their counsel and wonderful in their understanding of technically oriented (and hard working) students.

I salute the Union on its centennial and extend my best wishes to all.

William G. Moller, Jr. ’53
Ann Arbor, Michigan

In response to your call for information on the picture on page eighteen of the December issue, I’m hardly visible, but I remember the event well. I’m standing to the right of Al Glass and directly behind the young lady in the top hat.

Standing in the middle of the picture is Al Glass, trombone in hand. Little did Al know that in a year he’d be the candidate for Grand Marshal! The chap in the fedora hat, knapsack, and short pants is particularly humorous. Pray tell, what is he about to do to the young lady leading the parade?

The woman in the picture was not a student. I believe the Grand Marshal campaign organizers hired the young lady in the top hat from somewhere.

Robert Jennings Heinsohn ’54
Pennsylvania Furnace, Pennsylvania

Sorry, guys, but you’re off by about a decade on the photo of the unsupported circle on page nineteen.

I was one of the lucky participants and may even be in the photo you used (it’s hard to tell after all these years). I was on campus from Sept. ’73 until Dec. ’76. If memory serves, this piece of campus craziness took place about October of ’75, in an attempt to become part of the Guinness Book of World Records.

The photo brought back some great memories. Thanks.

Nancy Kippenhan ’76
Easton, Pennsylvania

Major League Standing
As a footnote to the article “Troy, NY; A major league city” in the December, 1990 Rensselaer. Troy is still in the National League (see attached).

David G. Matthes ’62
Houston, Texas

Matthes appended an excerpt from Baseball Anecdotes by Daniel Okrent /Steve Wulf, which noted that when they withdrew from the league, Troy and Worcester were granted honorary National League membership and promised four exhibition games a year if they could field representative teams. This status has never been rescinded, so both teams are still technically National League members.
THANKS TO

LOYAL ALUMNI

W2SZ HAM RADIO

CELEBRATES 80 YEARS

OF SERVICE AND

ACHIEVEMENT

BY KATHY WESTBROOK
It's 7 p.m. (EDT) October 3, 1990. Several time zones and an ocean away, East and West Germans celebrate the hours-old reunification of their two countries. On such a night, "working DX" is the only way to go.

"CQ CQ CQ from W2SZ, W2SZ, W2SZ... CQ CQ CQ 20 meters, CQ CQ CQ 20 meters from W2SZ, W2SZ, W2SZ."

Moments later comes the hoped-for response, "W2SZ this is DL2ADS, DL2ADS, DL2ADS."

Right now, you are probably patiently awaiting the translation of this alphabet soup. Yet, believe it or not, a large segment of your fellow alumni already know that some lucky Rensselaer student is experiencing the excitement of this historic night through the eyes of a German ham radio operator (DL2 stands for a German station).

Many alumni members of Rensselaer's Amateur Radio Club probably could have shared this student's experience. Still, the oldest among them may marvel at the achievement. For they can well remember when working DX, attempting a long distance or foreign contact, required days, weeks, or even months of persistence.

Predictably, Rensselaer students' involvement with amateur radio practically coincided with the technology's birth. Numerous students were among the first members of the Troy Wireless Club, initiated in 1911 by Wendell W. King, who at the age of twelve was credited with operating Troy's first wireless station.

For more than a decade, excepting a brief hiatus in operations during a World War I government suspension of amateur radio privileges, the club prospered, meeting regularly at the Troy YMCA. Yet with RPI students comprising almost 75 percent of the club's membership, its conversion to a Rensselaer-sponsored organization seemed inevitable. But, as the students who had joined the club following World War I began graduating in 1922-23, it appeared that the club might dissolve.

However, Leonard S. Inskip '22, one of these former student members, had become an instructor at the Institute upon graduation. Working with Harry R. Mimno, a senior member of the electrical engineering faculty, Inskip re-established the club on campus. Maintaining the call sign 2SZ (the W prefix was later added in accordance with a 1928 change in federal regulations) as well as much of the YMCA equipment, the club moved into a corner of the Sage Laboratory offices of WHAZ, Rensselaer's already existing broadcast station, in December of 1924.

Since then, Rensselaer's Amateur Radio Club has been drawing both student and alumni interest for more than sixty-five years. Granted, the club has experienced peaks and valleys in interest and participation levels. Yet, perhaps because club activities have continually evolved as the technology matured and have offered opportunities to educate as well as excite and entertain, it has endured long after many other organizations have been dissolved.

During the club's earliest years on campus, a desire to test the limits of the still new technology influenced most activities. One of the greatest challenges during the mid-1920s was to establish "DX" or long-distance contacts.

"Back then, it was unusual to make a contact more than 100 miles away," says James Youngberg '68, who while a student member of W2SZ wrote a historical account of Rensselaer's Amateur Radio Club. "But," he adds, "occasionally you could get farther away and maybe even reach overseas."

Rensselaer's ham radio operators were especially determined to establish two-way contact with one particular British station. The reason? In addition to becoming the world's DX record-holder with a contact between London and New Zealand, the London station shared the call sign 2SZ in common with the RPI club.

It took nearly a year from the first time the club heard g2SZ on the air on January 30, 1925, but at 4:40 a.m. on Dec. 6, 1925, it finally obtained a response.

"Have wanted to QSO you for years!" came the reply from g2SZ. "Heard you many times on 90 meters last year, called many times. Very pleased to get QSO [establish contact]. How is Rens. Poly?"

By the 1930s, according to Hiram D. Harris '23, another former member of the Troy YMCA Radio Club, who replaced Inskip and eventually became W2SZ's senior adviser until 1943, "the amount of air time for the students..."
began increasing so that they were really able to make a good many contacts. I remember one wall being simply plastered with confirmations from stations they had made contact with," he says.

This period, Harris adds, also brought about great improvements in equipment. "Once the facilities were moved up on the campus," he says, "I think the technical atmosphere at RPI really helped in equipment improvement, particularly transmitters and receivers."

"Back then," concurs Frederick J. Norvik '40, professor emeritus of electrical, computer, and systems engineering who served as W2SZ adviser from 1945-82, "transmitters, for the most part, were built by students." The hands-on nature of amateur radio at that time, he maintains, provided a ready-made educational opportunity for students to experiment with and apply technology they were studying to club equipment.

Interest in the club remained high throughout the 1930s. But with World War II came an instant halt to almost all amateur radio activities, and unlike the immediate resumption of activity following the First World War, post-World War II interest in the club regenerated slowly.

Wayne Green '44, who served as president of the club upon returning to Rensselaer to continue his education after war service, launched WRPI in hopes of regenerating interest in radio. Although this new broadcasting station proved immensely popular, the hoped-for extension of interest to W2SZ was less impressive.

Still Green recalls participating in a few activities with the club's handful of members. Particularly memorable, says Green, were occasional postmeeting trips to Mount Greylock in Massachusetts. "We would sit in my car and attempt to make contacts from there," he says. "We would turn the antenna with strings and use an old war surplus transceiver that I brought along."

In the early 1960s, the club moved to its current location, a tin "shack" on Sunset Terrace. To Youngberg, this move was greatly responsible for strengthening the club and generating new interest. "It gave us a place to go where we could get away from the pressures of school for awhile, a place where you could be yourself," says Youngberg. "In some ways, it was almost like a fraternity or at least a rallying point for people who felt a kinship because of their strong interest in ham radio."

Yet it was the club's venture into amateur radio contests that caused the most sustaining boost in its popularity. "Around 1967 or so," Youngberg recalls, "some of the guys got into hilltopping," or broadcasting with portable equipment from a higher altitude. Interest in the larger contests, mostly sponsored by the American Radio Relay League (ARRL), evolved from these excursions.

The club first entered such a competition in 1969, broadcasting from Slide Mountain, the highest peak in New York's Catskill Mountains. The station soon was competing in ARRL contests on a regular basis, but moved to Mount Greylock in Massachusetts, where it had access to a permanent antenna erected for the Northern Berkshire Amateur Radio Club. From 1971 through 1975, says Richard Frey '68, a regular participant in the contests from the beginning, the club consistently won first place.

During these competitions, club members commence rapid transmissions attempting to make as many contacts in as many areas of the country as possible. The contest divides the nation into rectangular grids, and points are awarded for each grid in which contacts are made as well as for the number of contacts made within each grid. Stations nationwide participate, using a universal time system that guarantees that all participants receive the same amount of day and night transmission time.

In addition to broadcasting skills, the contests also involve certain physical and technical demands. Despite access to one permanent antenna, several more of the towering structures must be assembled before the contest begins. Club members must also prepare...
several vans full of equipment for transmitting over very-high frequency, ultra-high frequency, and microwave bands.

Though interest waned briefly in the mid-1970s, Frey determinedly took over the management of the competitions and within about five years had rebuilt a strong group of competitors. W2SZ has been consistently winning these contests for several years, and last summer, the station even shattered its own record and became the first station in the country to break 1 million points.

Although much activity revolves around the ARRL contests, the club offers a range of activities, including preparatory classes for licensing examinations. In recent years, W2SZ has also been authorized to administer the examinations.

Every year, the station participates in a nationwide Field Day that tests its emergency preparedness. The effort has paid off in numerous instances, such as the 1989 San Francisco earthquake, during which W2SZ passed about 250 messages between local residents and family and friends in the Bay Area.

Club members also worked with local grade school children in a December 1990 attempt to communicate with astronauts in flight on the space shuttle Columbia as part of NASA’s Space Amateur Radio Experiment (SAREX). Although the position of Columbia’s antennas prevented successful communication, the opportunity to work with and learn from the W2SZ members helped mitigate the school children’s disappointment. “When we were waiting to talk to the astronauts,” says sixth grader Sarah Matteo, “they really encouraged me and helped keep me from getting nervous.”

Such programs have generated additional local interest in amateur radio which, as Norvick notes, brings the club “full circle. The club originated with the people of Troy, and in the last few years, it has been allowing Trojans to become associate members, which is good,” he says. “It keeps the activity up.”

Further advancing community interest in ham radio has been the club’s recent efforts to monitor military action in the Persian Gulf.

Through its new “Operation Desert Letters” program, the club is transmitting messages from local residents to relatives and friends serving in the Middle East. Although the club is capable of sending messages to Kuwait, members are heeding a Radio Society of Great Britain request to refrain from such activity. Kuwaitis caught by the Iraqis in radio contact with citizens of an allied country could be in grave danger.

All of these services have contributed to the club’s longevity, but probably the greatest contribution to the club’s endurance, however, is the ongoing dedication of many of its alumni. From Inskip and Harris, who helped firmly establish W2SZ on campus, to Frey, whose leadership of ARRL contests keeps the station winning as generations of students come and go, W2SZ gains an element of continuity unattainable within many other campus organizations.
IT WAS SO UNEXPECTED. I WAS SO FAR ALONG CONFRONTING AND WE'D ANNOUNCED THE PREGNANCY EVEN BEFORE I GOT PREGNANT. "OK," WE TOLD OUR EMPTY FRIENDS, "WE'RE GOING TO START TRYING!" AND CRADLE I GOT PREGNANT EEE-MEDIATELY! AND IT SEEMED THE WHOLE WORLD KNEW. BY R. BRUCE ADAMS
And we got this pregnancy book and we’d tell people, “This week we’re working on the baby’s face,” because the book would tell us which of the body parts were being developed.

And my mother arranged for a party at Christmas time to make the official announcement to her friends. And she made these party favors with a message “From the Grandma and Grandpa to be.” When I lost the baby, it was devastating.

We don’t hear such stories often. Not because pregnancy loss is unusual. Twenty to 30 percent of all pregnancies end in miscarriage or stillbirth.

It’s just that most people don’t want to hear about or think about or talk about the fact that some parents-to-be don’t get to be parents.

Linda Layne wants to talk about it. The assistant professor of anthropology is trying to understand the cultural silence that shrouds pregnancy loss from open discussion in schools and churches and childbirth classes.

And the couples who have gone through this want to talk about it. “And when they share, there are real similarities in their stories,” Layne says. “That’s what first alerted me to the fact that it’s a cultural issue. As an interpretive anthropologist, whenever I see narrative patterns, I say, ‘Aha! It seems like culture is at work here.’”

But Layne’s investigation of how couples make sense of the painful experience and how their interpretations are culturally influenced is prompted by more than scholarly interest — the story above is Layne’s own story.

“I had three more miscarriages, and it never got easy; but the first was clearly the hardest for us. And each time it happens, we have to conclude that maybe we will never have a child of our own. Although most couples that go through this do have successful pregnancies.”

Layne’s personal experience gave birth to her professional interest. She is now engaged in research with pregnancy loss support groups to study the way participant couples define their experience.

Because personal meanings are not self-supporting, but depend upon cultural contributions, Layne is also examining how caretakers — doctors, nurses, clergy, and others — influence the way couples interpret what’s happened in their lives.

And because Layne teaches in Rensselaer’s department of science and technology studies, it’s natural that she is also trying to understand how developments in medical practice and technology have advanced and exacerbated the couple’s ability to make sense of their pregnancy loss.

Hundreds of hours of intensive research must be completed before Layne can gather and interpret the data. She must interview many participant couples and do follow-up inquiries at regular intervals to determine if the beliefs and experiences change over the course of a year.

She must also attend regular meetings of pregnancy loss support groups sponsored by organizations such as Unite and SHARE. She must read poems and stories contributed to newsletters around the country. She must interview clergy and doctors and nurses and support group leaders to determine what training, attitudes, and experiences they bring to the mix which produces cultural interpretations of pregnancy loss.

But Layne says that her research to date has already provided some valuable insights on the experience of miscarriage and stillbirth. One of the most powerful realities is what Layne and her colleagues call “the liminal experience” — the feeling of being trapped on the threshold between childlessness and parenthood. As in most cultures, pregnancy marks a couple’s transition from one status to another. When pregnancy ends in miscarriage or stillbirth, the husband and wife are not considered parents, and we have no status for would-have-been parents. They are caught in a cultural and emotional limbo. And, to date, our culture provides neither a rite of passage nor a rite of return.

“Another thing that’s sure,” says Layne, “the cultural silence is profoundly real. Very often the remains are disposed of and everyone acts as though nothing has happened. But the husband and wife believe that something terrible has happened, even though they may have other children or have good reason to hope for a successful pregnancy later. For them it’s a horribly painful experience, and no one will acknowledge it.”

Our technological advancements make pregnancy loss harder to accept, says Layne. “Couples believe that modern science and quality prenatal care just guarantee that things will be fine. But it isn’t so. And they feel deceived by their culture.”

On the other hand, technology seems to assist some couples who are surrounded by those who want to deny that a loss took place. The sonogram image or a printout of the fetal heartbeat serves, at times, as marvelous evidence for the man and woman who somehow need to cry out against the conspiring silence and say, “Look here! Look at this. Don’t tell us we didn’t lose a baby!”

In the midst of all this hurt and anger, the support groups validate the grief and acknowledge it as normal and appropriate. “Week after week, I
thought I was going crazy,” a husband exclaims. “I’d pass the toy counter at a store and break into tears. I couldn’t control myself. And people around me wondered why I wasn’t over it and why I couldn’t pull myself together.”

Layne has learned that “composing oneself” takes place literally and slowly as couples uncover and gradually share their stories of what it was like and what the experience means to them today. “Bereaved parents seem to build a sense of order from the fragmentation as they construct and reconstruct the narrative of their pregnancy loss and integrate it into their life story.”

Participants often report that the experience eventually produced something positive such as personal growth, the strengthening of marriage ties, or a new concern for others. And Layne says that the direction these stories take seems to depend on whether the couple defines miscarriage or stillbirth as an “accident” or an “illness,” as a “tragedy” or as a “problem to be solved,” and whether they attribute the loss to “chance,” “bad luck,” “God’s will,” or “nature’s course.” Layne’s research will examine the cultural factors which influence the choice of explanations and the repercussions of those choices.

But Layne wants to do more than observe culture, she wants to change it. “As an anthropologist, my primary responsibility is to document and interpret,” says Layne. “But I want to use what I learn to help develop ways of doing things that will help these couples, their parents, the children at home, their ministers, their doctors, their nurses, and the support group leaders.”

Layne acknowledges that more and more hospitals are developing caring protocols that are triggered whenever a pregnancy ends in stillbirth. “They move the woman off the maternity floor if she chooses. They put something on her door so that an uninformed nurse or chaplain doesn’t come in and ask, ‘What’d you have—a boy or a girl?’ They discuss options concerning burial. They provide an opportunity for the family to hold the child if that’s desired. They link the research if she’s not careful and falls into the trap of thinking that every experience of pregnancy loss is similar to hers. “But it helps more than it hinders,” she says. “The people know I’ve been there too, and I can understand. It opens doors. And most of all, I can ask others the painful questions because I’ve had to ask them of myself.”
Richard L. Fork, a principal in the creation of the ultrafast laser capability at Bell Laboratories, has joined the physics department at Rensselaer.

Fork's appointment and the planned construction of ultrafast laser facilities in the Science Center are major steps toward the department's goal of building strong programs in optical physics on both the undergraduate and graduate levels, according to Timothy M. Hayes, physics department chairman.

The department is also seeking a recognized leader in another area of optical physics for a second senior faculty position. Two junior faculty positions will also be added, Hayes said.

To support a new undergraduate optical physics concentration, the physics department is also adding four new courses, three of which include laboratories. Fork is co-teaching one of the new courses this fall, "Topics in Optics."

Hayes said that optical physics offers excellent employment opportunities for students with both undergraduate as well as graduate degrees and that there are new research and funding opportunities in the field.

Fork will have new laboratories in the Science Center, including laboratories for other Rensselaer researchers who wish to use ultrashort light pulse spectroscopy as well as laboratories for undergraduates. Hayes believes Rensselaer will be the only university nationwide to allow undergraduates to work with this state-of-the-art technology as part of the normal curriculum.

Fork uses techniques he developed to shorten pulses of laser light to durations of six femtoseconds, an interval so brief that light travels only about .0001 inch in that time. In comparison, light can travel from the earth to the moon in slightly more than one second.

These ultrashort pulses allow scientists to use strobe-like techniques to see into the world of time intervals 100,000 times shorter than was possible before discovery of the laser. This lets scientists "see" events such as chemical reactions and the motion of electrons in materials and devices. Ultrashort pulses also have potential applications in optical communications and optical computing.
The Chemistry of Cancer

Ivor L. Preiss ’55 brings the unusual perspective of a radiochemist to the study of cancer.

Working with graduate students and with Adrienne S. Frank of the Albany Veterans Administration Medical Center, Preiss, a chemistry professor at Rensselaer, uses radioisotopes to monitor levels of trace elements such as zinc, selenium, copper, bromine, and rubidium in the body.

His research shows that a tumor affects the chemistry not only of the area in which it is located, but also of the entire body. Furthermore, his work shows that the chemistry throughout the body begins to change from the earliest stages of disease, even before a palpable tumor is present.

In one study, Preiss monitored zinc levels in mice afflicted with human liver tumors. One reason zinc is needed by the body, he explained, is because it is bound to alpha-fetoprotein (AFP) which triggers growth. Without zinc, a fetus cannot develop and grow. Zinc also is present in high concentrations in certain tumors, as is AFP.

By charting the changes in zinc concentrations from the earliest stages of tumor growth, Preiss found that the distribution and concentration of zinc deviated significantly during tumor growth. In some organs, the concentration increased, while in others, such as skin and muscle, zinc was depleted.

Earlier studies of zinc concentrations had been done at autopsy or in the final stages of tumor growth and had looked only at the disease-involved tissues.

The interrelationship of various trace elements is probably more important than the absolute level of any one, Preiss said.

In another study, he looked at the relationship between zinc and copper, which is used in protein metabolism.

As long as zinc and copper are in balance, there is no problem. But if the copper concentration in the blood increases, it displaces zinc. This is a serious problem if it happens to a pregnant woman because without the zinc-dependent AFP, the fetus ceases to grow and dies.

Further studies are needed to discover the implications of the chemical changes that are associated with tumor growth. It is not clear, for example, if the changes in levels of trace elements are causing the tumors, or if the changes are a reaction to the presence of tumors. But Preiss suspects that keeping levels more constant might inhibit tumor growth.

Preiss has not yet conducted studies to see whether changing the level of trace elements can retard tumor growth. Such tampering would have to be done carefully, because the changes may damage the host animal as well as the tumor. A high concentration of selenium inhibits tumor growth, but it has a toxic effect on the host animal, he said.

Ivor L. Preiss ’55 conducts research that may lead to new ways to detect tumors.

Megagifts of Megabytes

A $4.25 million gift from IBM to Rensselaer Polytechnic Institute “will help put Rensselaer at the forefront of the effort to revitalize U.S. technological education,” said Rensselaer president Roland Schmitt.

The gift, to be made over a three-year period, will provide IBM RS/6000 computer systems to be used in Rensselaer’s schools of engineering and architecture, the Center for Integrated Electronics, the Center for Manufacturing Productivity and Technology Transfer, and the Design Research Center.

The RS/6000 is IBM’s newest and most advanced system of computer workstations and servers with increased computing power for mechanical, electrical, and molecular modeling and for three dimensional architectural design and testing.

“Rensselaer and IBM have enjoyed a longstanding, mutually beneficial relationship,” said James J. Forese ’57, IBM vice president, finance, and a member of RPI’s board of trustees. “IBM views this contribution to RPI as a visible commitment of our shared goal: a world-class education for the technological innovators and leaders of the next century.”

The new equipment will move RPI ahead of most U.S. universities in student and faculty use of advanced workstations in engineering and architecture curricula, said Rensselaer provost James D. Meindl.

“The nation’s critical shortage of top-flight engineering faculty and the rising cost of technical education require us to look to technology for some answers,” Meindl said. “IBM’s gift will expand the teacher’s power to teach and the student’s ability to learn.”

Most of the new equipment will be used in engineering education for a major new project to integrate computing into the undergraduate curriculum. This project will be led by John Kolb, director of engineering computing services.

In addition, the IBM gift will also triple the number of computers available to students in Rensselaer’s School of Architecture.
Recovering Heavy Metals

A new Center for Manufacturing Productivity and Technology Transfer (CMPTT) project has focused the skills of Rensselaer researchers on an environmental issue: recovery of heavy metals now being landfilled as hazardous wastes.

Harrison Radiator, a division of General Motors Corp. located near Buffalo, manufactures heat exchangers such as those in radiators and air conditioning systems. Each day, the company produces 2.5 million gallons of waste water that contain organic oils and greases and heavy metals such as chromium, zinc, lead, and cadmium.

This waste stream is treated at an on-site facility that removes the organics and the heavy metals before discharging the treated water to a nearby stream in accordance with the company's permit.

General Motors is a partner in the CMPTT, so officials of Harrison Radiator came to the center to see if researchers could help develop a system for dealing with the heavy metals other than trucking them to a hazardous waste landfill.

A feasibility study completed in December recommended segregating the chrome-bearing portion of the waste stream from the portion containing zinc, according to Rene Cooper '81, project manager with the CMPTT. The zinc then could be recovered and sent to a smelter.

Plumbing lines already exist for segregating the waste streams, but modification to the present waste treatment facility would be required, Cooper said. Capturing the zinc for further use instead of land filling it would yield savings of about $400,000 a year, he said. If it is possible to recover the chromium as well, savings could be even greater.

After looking at the feasibility study, Harrison Radiator approved a 15-month Phase 1 project in which Rensselaer researchers will look at methods for treating the two waste streams.

Research is being done by Nicholas L. Clesceri, professor and co-director of the department of environmental engineering and environmental sciences, and doctoral student Dana Levy.

The researchers primarily will be looking at ways to separate the zinc from lead that also is in the waste stream, Clesceri said. They will consider chemical, mechanical, and electrochemical means, but the chemical probably will be the most effective, he said.

New Art from Old Chips

When are computer chips not computer chips? When they are a work of art.

A few years ago, when Paul Formisano '91 had a summer job moving a printer company to a new location, he accumulated a lot of "computer junk," such as PC boards from printers that had gone bad.

"One day," he said, "I started taking the stuff apart looking for reusable parts, and I started playing..."
around with the computer chips and some old vacuum tubes." Before he knew what he was doing, he had formed a sculpture of a robotic man.

After that he became fascinated with the shapes of the chips and created a giraffe, a dog, and "a strange kind of bug." Each creation took him roughly four hours to make.

Although these creations gained him some notice in his hometown of Swansea, Massachusetts, he considers them only a hobby. His real love is serious sculpture, and his current interest is casting in bronze.

Formisano sees a natural connection between art and his chosen profession, mechanical engineering. Design, according to Formisano, has to do with both function and aesthetics. "There's some kind of connection between something doing the job and looking good. Sometimes the best designs are the simplest and the most beautiful."

In his summer job at Texas Instruments, he designed duct work to carry air from place to place. His design was based on smooth curves that were pleasing to the eye that also happened, according to his supervisor, to be the most efficient system. "It was not only aesthetically right, but solved a mechanical problem." Formisano believes that there is a definite link between "something that is aesthetically pleasing and theoretically correct."
Improvements in packaging also helped. McDonald now plans to adapt a Rockwell Science Center fabrication process that uses gallium arsenide layered with aluminum gallium arsenide. This process is compatible with the FRISC design, he said. At the end of the three-year contract, he hopes to have a 1,000 MIPS prototype completed, with all chips mounted and ready to go.

John E. McDonald, right, with doctoral student Robert Philbauer working to break the computer speed barrier.

Even if development of the device is successful, practical problems remain. There will be a great deal of heat to take out, McDonald said. He believes this might be overcome by building the next generation device of a new material being tested by Rockwell, indium aluminum arsenide or indium phosphide layered with gallium indium arsenide.

In addition, there is the problem of software. To achieve the highest possible speed, the designers made changes in standard architecture. As a result, software compatible with the new device would have to be developed at a cost that could run into the millions of dollars, McDonald said.

But he believes that if his team proves that 1,000 MIPS is possible, the technology needed to exploit the speed will follow. Such speed could one day mean workstations with the power of supercomputers sitting routinely on the desks of engineers and scientists.

What's in a Knee?

A football player is brought down by a tackle. A skier slips on the ice. A tennis player lunges for a ball and falls. Or a late-night phone call awakens a sleeper who stumbles and trips on the hallway stairs.

In each case, the result is a knee injury. "Hips and knees are the most studied joints because they take a lot of abuse," said Mark H. Holmes, professor of mathematical sciences. "We expect knees to do so much, but they don't bend in every direction we would like."

Holmes and Robert L. Spilker, professor of mechanical engineering, are part of a group collaborating to develop mathematical understanding of the cartilage in the knee. Their work is yielding basic knowledge about how the cartilage does its job.

Holmes is a mathematician who seeks analytical understanding of the forces at work in soft tissue. Spilker, on the other hand, is an engineer who develops models for numerical simulations of large-scale problems.

"We complement each other," Holmes said.

They are concentrating on the soft tissue structures of the knee such as articular cartilage and the meniscus, two crescent-shaped pieces of soft hydrated tissue that cushion stresses between the femur and the tibia, the major bones in the leg. A common knee injury involves a tear in the meniscus.

Spilker looks at the meniscus as a

Robert L. Spilker and Mark H. Holmes work to solve the mysteries of the knee.

A

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mixture of solids and fluids strengthened with fiber bundles. Drawing on established theories of mixtures and composite materials, he has developed finite element methods of approaching the complex partial differential equations that describe displacement, fluid flow, and applied forces in the meniscus.

The finite element method is a technique for obtaining numerical solutions to complex systems of equations by breaking them down into parts. Spilker works with Mark S. Spilker, an expert in finite element modeling, has developed methods for automatically generating the mesh that breaks the problems into smaller parts.

These problems are well suited to massively parallel computer systems, and so Spilker also collaborates with Joseph E. Flaherty, chairman of the computer science department and an expert in using parallel computation to solve complex partial differential equations.

Spilker and Holmes obtain clinical information about the meniscus and cartilage in the knee from colleagues in the Orthopedic Research Laboratory at Columbia University. Using this data, they build models. The clinical researchers test the models, refinements are made, and more accurate models emerge.

Such work already has given insight into the importance of fluid flow and of the cartilage surface, Holmes said.

Spilker envisions a day when their models will lead to computer simulations that will aid in diagnosis and give guidance to surgical treatment of knee injuries. Such a system would require greatly improved CAT scans and massively parallel computers, he says. While the improved hardware is being developed, he and his collaborators continue to analyze the knee and to solve the highly nonlinear equations involved.

**FACETS**

Sidney Archer, research professor of chemistry, and Herbert M. Clark, professor emeritus of chemistry, have been honored as 50-year members of the American Chemical Society. Each 50-year member receives a certificate, a special pin, and a permanent badge good for free registration at all national and regional meetings.

Daniel Berg, Institute Professor of Decision Sciences and Engineering Systems, has been elected to the American Association for the Advancement of Science Council for a three-year term.

Robert G. Hawkins, dean of the School of Management, has been elected for a three-year term as dean (administrative officer) of the Academy of International Business, a worldwide professional organization that seeks to understand and advance the international dimension in business education and professional practice.

M. Harry Hesse, professor of electric power engineering, and J. Keith Nelson, chairman of the department of electric power engineering, have been elected fellows of the Institute of Electrical and Electronics Engineers (IEEE).

Charles W. Boylen, professor of biology and director of the Fresh Water Institute, has been selected to serve a three-year term on the National Science Foundation Advisory Review Panel for the Instrumentation and Development Program. Before his selection, Boylen and collaborators were awarded three major grants through this program for instrumentation for the School of Science.

Charles Malmborg, associate professor of decision sciences and engineering systems, has received the 1989-90 Region I Outstanding Chapter Award for the Rensselaer chapter of Alpha Pi Mu.

John A. Tichy, professor of mechanical engineering, received the ASME Board of Governors Award at the ASME/STLE Tribology Conference held in Toronto in October.

Patrick J. Quinn, Institute Professor of Architecture, has begun a year-long term as president of the Association of Collegiate Schools of Architecture, an organization to which all the schools of architecture in North America belong.

Harry Roy, professor of biology, has received a five-year appointment to the editorial board of The Journal of Biological Chemistry, the leading general-interest biochemistry journal.

Gerald Moss, research professor of biomedical engineering and a specialist in surgery, was one of 118 fellows inducted into the American College of Critical Care Medicine during recent ceremonies in San Francisco.

Norman S. Stoloff, professor of materials engineering, has been reappointed chairman of the U.S. Editorial Committee for International Materials Reviews, a journal published jointly by the American Society of Metalurgy International and The Institute of Metals of the United Kingdom. Stoloff has also been appointed to the editorial board of the journal, Materials Science and Engineering, for a three-year term.

William A. Pearlman, professor of electrical, computer, and systems engineering, has been named a fellow of the International Society for Optical Engineering. He was recognized for his pioneering work incorporating visual criteria into video coding design and his contributions in the areas of transform trellis coding and quantization.

James M. Tien '66, chairman of decision sciences and engineering systems, has been elected a fellow of the Institute of Electrical and Electronic Engineers. His election recognized his contributions to systems engineering as applied to public systems.

Albert S. Paulson, associate director of the Center for Science and Technology Policy, has been named the Frank and Lillian Gilbreth Professor of Technologies of Management.
Women's Forum
Focuses on Flexibility

A job lasts from 9 to 5, but a career is on your mind 24 hours a day. And a dual-career family needs to juggle what amounts to six careers, according to Kerry Malitoris '80 (B.S. Engineering), a panelist at the third annual Women's Forum which took place October 19. Each partner has three full-time commitments — marriage, parenthood, and work outside the home. Flexibility is the key to balancing these demands successfully, along with communication and constant re-evaluation of priorities.

Flexibility, goal setting, and the support of friends and mentors were all key elements stressed by the speakers at the day-long seminar entitled "The Formula for Meeting Challenges and Living our Lives." Goal-setting is needed for paving "the road to success," which panelist Susan Steindorf, financial planner, stressed "is always under construction."

Other panelists included Bonita Hagan, executive director of the Adirondack Education Consortium for Health Organizations, and Drema Lipscomb Burnett, teaching assistant and Ph.D. candidate at Rensselaer. Dr. Lorna McBarnette, morning keynote speaker and executive deputy commissioner of the New York State Department of Health, shared her dream of women holding positions of influence in state and federal government in which they can be instruments for change on social issues such as reproductive, civil, and human rights. Women must work alongside each other to achieve these goals. They must see other women "not as competitors, but as co-conspirators."

Afternoon keynote speaker, Dr. Adele Scheele, author of *Skills for Success*, explained that women who are successful are achievers as opposed to sustainers. Achievers look at life as an experiment, they are doers and risk takers, while sustainers are those people who do their work well and quietly hope that others will notice.

Women are trained by society to shy away from promoting themselves or going out on a limb. Only when they can break away from this mode can they achieve success, said Scheele. To help women break this pattern, Scheele added, they need mentors and support groups who can act as their cheering fans. "Most teams win," she maintained, "when they have cheering fans."

Shedding Light on Lighting

America's national program to test energy-efficient lighting products is underway at Rensselaer's Lighting Research Center (LRC), according to Russell Leslie '80, associate director of the LRC, who directs the project.

The multi-year project, budgeted at $450,000 annually, is funded by Rensselaer, the United States Environmental Protection Agency, the Lighting Research Institute, and electric utilities.

In the battle to reduce lighting costs, many war stories appear, said Leslie. "We've heard people say: 'We changed over to a lighting system that was supposed to save thousands of dollars, and we couldn't see our computers,' or 'Our company put energy-saving ballasts in the fluorescent lights, and people had to leave the room because they..."
couldn’t stand the buzz.”

User complaints, the absence of coordinated testing of new lighting technologies, and the lack of readily accessible information on product performance have frustrated architects, designers, utility companies, builders, government policy makers, consumers, and others concerned about energy, economy, and the environment.

More than 10 percent of the nation’s dwindling supply of energy is wasted on inefficient lighting, according to Kathryn M. Conway, technology transfer administrator at the LRC. Air pollution, global warming, dependence on fossil fuels, and the threat of energy brown-outs and black-outs have created tremendous interest in developing lighting products which are both energy-efficient and responsive to human needs, Conway said.

Government agencies, utility companies, and environmental advocates are working together to address these needs by reducing the demand for electricity rather than by focusing on building more power generators. These demand-side management programs have been thwarted, however, because industrial, commercial, and residential users balk at the high purchase cost of energy-efficient lighting technologies and believe that the products may not provide satisfactory illumination.

In announcing that his agency would sponsor the national product testing and information program, Robert Kwartin, director of the energy-efficient lighting program for the United States Environmental Protection Agency, said, “There is a great need for a third party to verify that any proposed system will produce the light, last as long, and save as much as the manufacturer says it will.”

As a first step, the LRC will assemble a panel of experts from national laboratories, the lighting industry, utility companies, the research community, government, and professional organizations for architects and lighting designers. With guidance from the panel, the LRC will formulate an immediate plan for gathering, evaluating, and reporting the information.

“The lack of an authoritative and accessible source of information on the performance of energy-efficient lighting products is a major barrier to success in the demand-side management of our nation’s energy resources,” said Leslie. “As our product testing and information program unfolds, those who manufacture products, design systems, test performance, recommend technologies, develop standards, and create regulations will have the data they need.”

Robert Davis, lighting applications specialist at the LRC, is the principal investigator for the project.
What would college be like if there were no varsity teams to play on, no social clubs, and no roommate to commiserate with over a dating disaster? If you were a woman student at RPI prior to the mid-1970s, chances are you know the answer.

Life for women on campus in those days could be isolating. Other than professional organizations such as the Society for Women Engineers, there were few opportunities for women to meet and enjoy each other’s company. In the fall of 1975, however, a handful of junior women decided to change all that. And next month, the celebration of the fifteenth anniversary of the Gamma Theta Chapter of Phi Sigma Sigma, Rensselaer’s first sorority, pays tribute to their success.

Leading this group of women was Rebecca Kolb Segal ’77. When she arrived at Rensselaer, Segal recalls, even classrooms and dormitories provided little female companionship. After freshman year, the hundred or so women in her class of about 1,000 often found themselves the only woman in class. “That,” says Segal, “was a mixed blessing. You didn’t have to worry about being lost in the crowd, but if you missed a class, everyone knew it.”

“When Segal and several friends decided it was time to change this climate for women at Rensselaer, their thoughts turned to the idea of a sorority.”

“We had already seen the benefits of the Greek system. The women on campus were often invited to fraternity parties,” says Segal. “We soon saw how important the fraternities were to the men. We wanted a similar organization where women could meet and enjoy each other socially. In 1975 there were twenty-six fraternities on campus, but no sororities.”

Taking a typical Rensselaer problem-solving approach to the situation, the women began gathering and analyzing information. To determine the amount of interest in establishing a
women's group, they posted flyers all over campus, which brought twenty women to the first meeting of what would for a semester be called simply "The Sorority."

"That first meeting brought a good mix of women who were looking for the kind of group we wanted," Segal recalls. They began to meet in each other's apartments while exploring the possibility of joining a national sorority.

During the fall of 1975, Segal and her sisters researched sororities in the library, listened to the advice of fraternity friends and Rensselaer administrators, and wrote to several national organizations. From the information they gathered and the three nationals that made formal presentations, they made their selection.

Just a little over a semester after the first exploratory meeting, the sisters of The Sorority pledged with Phi Sigma Sigma. On April 10, 1976,

fourteen young women were initiated, and the Gamma Theta Chapter of Phi Sigma Sigma was chartered. Segal became its first president.

"One of the main reasons we chose to go with Phi Sigma Sigma was the national's willingness to recognize the very particular needs and interests of women at Rensselaer," says Segal. "The name of our chapter is an example of this attitude." Under ordinary circumstances, chapters are designated in order by the Greek alphabet. Gamma Eta was the next opening, but since the symbol "theta" is so important in engineering formulas, the national agreed to skip ahead to the next letter.

Today Gamma Theta Chapter has forty-eight members. And life for Rensselaer women is dramatically different than it was in the '70s.

Anabelle Velez '91, president of Phi Sigma Sigma this year, considers all women at Rensselaer beneficiaries of the consciousness-raising efforts of those first Greek sisters. "There are all sorts of athletic and social opportunities now," she says. "There are women's retreats and the Women's Forum. And there are three national and two local sororities to choose from."

"We're hoping many Phi Sig alums will come back to campus during April 5–7, 1991," adds Sheryl Terry '92, chair of the fifteenth anniversary celebration. The annual Sapphire Ball on April 6 will highlight a whole weekend of special events. Terry's greatest hope is to reunite the branch­es of Gamma Theta's family tree.

"Every member," she explains, "gets a big sister when she joins Phi Sigma Sigma. That's fifteen years—201 people, many of whom have never met but share a common bond."

Velez and Terry are enthusiastic supporters of sororities. "Because women are still a minority at Rensselaer," Velez says, "going Greek is still one of the best ways to get support—academic, personal, and social. The establishment of sororities has been a stepping stone for all women at RPI," she stresses. "It's especially good to know that, whether or not they're in a sorority, most of the women on campus today are organized in supportive women's groups."

ANNIVERSARY CELEBRATION
APRIL 5-7, 1991

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Repolishing the Big Apple

BY MEG GALLIEN AND KIM SCHENCK

Whether you love it or despise it, there’s no denying that New York City is like no other place on earth. To much of the world, it is the United States—more so than the Great Plains or the Rocky Mountains, or even the nation’s capital. It is a place where cultures
Michael Adlerstein ’67 is the project director on the restoration of Ellis Island.
meet, merge, and sometimes clash, where Old World values confront the avant-garde. The atmosphere is charged with the constant challenge of maintaining harmony between these elements without relegating any one to the other.

Recently several members of the Rensselaer community, all using twentieth century technology to maintain rather than tip the balance, have helped the city meet this challenge. Even more importantly, however, each has brought Rensselaer's world-renowned technological expertise to bear in working to restore to grandeur some of the nation's most treasured historic landmarks.

Restoring the Gateway to America

As the National Park Service's project director for the restoration of Ellis Island, Michael Adlerstein '67, a graduate of the School of Architecture, oversaw the return to glory of a place that recharted the destinies of millions of immigrants.

The island's main building, first constructed in 1900 for $1.5 million and restored for $156 million with private donations, reopened Labor Day weekend. The building houses the new Ellis Island Immigration Museum.

The building's most heavily used spaces—the main registry room, the baggage room, and the balcony rooms—have been restored to appear as they did in the era of heaviest migration, from 1911 to 1918.

The main registry room hosted more than 5,000 people on many days during those years, and for most immigrants, it epitomized Ellis Island. There they faced the bureau­cracy of immigration laws that would within a couple of hours allow or deny them entrance to America.

Today more than 100 million Americans, almost 40 percent of the population, are descended from immigrants who crossed Ellis Island. There they faced the bureaucracy of immigration laws that would within a couple of hours allow or deny them entrance to America.

Drastic immigration restrictions imposed in 1924 slowed the flow to a trickle. Subsequently the island served as a wartime hospital, a troop barracks compound, even a detention center for illegal aliens. From 1954 to the early 1980s, however, the island's buildings suffered abandonment.

From the rubble that remained, Adlerstein and architects Beyer Blinder Belle/Notter Finegold + Alexander were charged by then Secretary of the Interior James Watt and the Statue of Liberty-Ellis Island Foundation, chaired by Lee Iacocca, with turning Ellis Island's main building into a world-class museum.

Before restoration work could even begin, however, Adlerstein's team had to snake huge hot-air furnaces throughout the building to dry it out—an 18-month process.

Also in preparation for the restoration, Adlerstein pushed for the construction of a portable bridge to the island, which would enable his team to avoid the inflated costs of transporting heavy materials on barges. This lesson he had learned while directing the planning for the related Statue of Liberty restoration project. He had turned the management of the statue restoration project over to another when Ellis Island started demanding his full attention.

Once restoration began, Adlerstein's team confronted additional hurdles. A world-class museum, says Adlerstein, carries with it tight restrictions on humidity variance and temperature range. "So trying to shoehorn an extremely complex HVAC system into the building was one of a wide variety of interesting and challenging technical issues we faced," he says.

Perhaps the most unexpected of Adlerstein's duties was his supervision of the excavation of an early Native American's remains found at the footings of one of the building's columns. These remains, he says, are being retained with tribal elders and will be reinterred at Ellis Island when the restoration project is complete.

An unusual aspect of the restoration itself, says Adlerstein, was the recreation through new construction of the entranceway canopy and the staircase from the baggage room to the registry room. They could not be restored because both had been removed in the 1930s. It was determined, however, that their significance to the immigrants' experience of the building—in particular the staircase on which doctors evaluated the immigrants' health—demanded their inclusion in the project.

"The canopy and the staircase going up to the second floor were done in exactly the footprint of what used to be there, but in a modern vernacular," says Adlerstein, honoring a National Park Service policy that any new construction be obviously new.
Lee Harris Pomeroy ’54 served as the architect for the interior restoration of New York City’s Plaza Hotel.
Surprisingly, one element that required little restoration was the ceiling of the main registry room. Of 28,800 ceiling tiles, only two dozen needed replacement. These tiles had been laid by the Guastavino family after the explosion of a passing munitions ship caused extensive damage to the registry room in 1916.

"It was the only significant surface left in the entire building that did not have major structural or cosmetic problems," says Adlerstein.

Today this beautifully vaulted ceiling of cream-colored tiles frames the expansive room of immigrants' dreams, left empty but for some benches, for those who journey to the museum to relive the experiences of their ancestors.

Museum exhibits, including photographs, artifacts, and oral histories, as well as two movie theaters, are installed discreetly in the building's wings to enhance the visit without detracting from the rest of the building.

Visitors may search for family information in an electronic archive or look for family names on the Immigrant Wall of Honor built along the island's sea wall.

Adlerstein, now chief of urban projects for the National Park Service, continues working to find a viable reuse for the thirty-four other buildings on Ellis Island.

Reconstructing the Plaza's Past

When they decided to restore New York's Plaza Hotel to its turn-of-the-century grandeur, it was natural for the hotel's new owners, Donald and Ivana Trump, to call on architect Lee Harris Pomeroy '54 to handle the interior renovations. Natural, not only because of Pomeroy's reputation as a preservationist, but also because he and his firm had occupied the seventeenth floor of the Plaza for eighteen years.

In 1988 Pomeroy, head of Lee Harris Pomeroy Associates, was given the task of restoring what had once been some of the Plaza's richest spaces according to the original vision of Plaza architect Henry Janeway Hardenbergh. Pomeroy was also charged with bringing the 1907 structure up to current standards for a state-of-the-art hotel.

"In a way, this project involved moving both forward and backward in time," says Pomeroy. "We returned to the past for inspiration in restoring the hotel to its Edwardian splendor. At the same time, we modernized the mechanical systems and back-of-the-house service facilities to make the Plaza a modern hotel."

Some of the most spectacular renovations are taking place in what had once been the Rose Room and the Fifth Avenue Restaurant. These rooms had been designed by Hardenbergh as showcases of high culture, but in the eighty-two years between the Plaza's opening and its renovation, these rooms had undergone many transformations. At the time Pomeroy started his work, the spaces were occupied by a dress shop and the Fifth Avenue lobby. "Restoring these two rooms will recreate a significant piece of New York's history and the Plaza's golden age," says Pomeroy.

The renovation involved a great deal of architectural detective work. Pomeroy's firm opened existing ceilings and walls to reveal the original decorative features. Pomeroy says this was particularly rewarding in the Fifth Avenue lobby, where a dropped ceiling was added shortly after Conrad Hilton purchased the hotel in 1943. "Wherever possible, these spaces are being restored to reflect the original design," says Pomeroy.

Discoveries like these made the work "a treasure hunt," Pomeroy says. His firm found original Henry Hardenbergh and Warren & Wetmore drawings, as well as photographs from the many films that have been shot in the Plaza over the years. One photograph shows Cary Grant in the 59th Street lobby in Hitchcock's film North by Northwest. There is also a collection of photographs featuring prominent people who have visited the Plaza, such as President and Mrs. Kennedy and the Duke and Duchess of Windsor.

In addition to his restoration work on the lower floors, Pomeroy was called upon to design fourteen luxury suites, including eight duplex penthouses on the seventeenth, eighteenth, and nineteenth floors. In doing so, Pomeroy's firm has designed itself out of its seventeenth-floor offices and has already relocated to another landmark building on Broadway. Though he greatly enjoyed his Plaza offices over the years, he notes that, "helping to restore this special place was a major consolation."

To bring the Plaza up to today's standards, the architects have made a variety of mechanical improvements and innovations, including new elevators, automated baggage handling, an employee training facility, more efficient laundry rooms, and a new advanced phone and computer system. The administrative and service areas were reorganized to improve the efficiency of operations.

The Plaza is just one of Pomeroy's many restoration projects. Whether the task has been adding a 36-story tower to Saks Fifth Avenue department store, rejuvenating the copper roof atop Grand Central Station, or adding a bridge to connect Wall Street's historic Trinity Church to its parish house, Pomeroy is well known for his sensitivity to the historic fabric of Manhattan. He and his firm have won more than thirty awards for their projects, many of them preservation-oriented.

Relighting Lady Liberty

You wouldn't be able to see the Statue of Liberty if it weren't for Howard Brandston—at least not at night.

Brandston, a world-renowned lighting designer and an adjunct professor at Rensselaer's Lighting Research Center, has designed the illumination for more than 1,500 projects—none of them, however, is more special to him than the Statue of Liberty, which he relit when the statue was renovated in 1986.
"It wasn't the biggest job that my company [New York's H.M. Brandston & Partners Inc.] had ever done or even the most difficult project," says Brandston. "But it would certainly be one that had the greatest symbolic meaning to more people than any other previous project or perhaps any project we ever will do."

Brandston's work began with some historical research on the statue, a gift to the U.S. from France in 1886, to learn about what earlier lighting designers had tried. Brandston says that their ideas were "clear and accurate" but also that "earlier equipment could not match the mind's imagination."

Brandston also visited Liberty Island and carefully surveyed what lighting angles would most flatter the statue. "It became clear that we had to do something to increase the presence of the statue in the harbor," Brandston says.

Rather than having the statue "loom out of the darkness of the harbor with just her pedestal and herself lighted," Brandston thought people should see the island, the fort, the pedestal, the statue, the crown, and the torch clearly.

A soft light on the fort gradually brightens until it reaches the tip of the structure. Brandston used a similar strategy to light the statue's pedestal. Another soft light falls on the hem of Liberty's skirt, getting brighter toward the top, "until we reached a crescendo of light at the crown and the torch," says Brandston.

After an early morning visit to the harbor, Brandston got a flash of insight as to how the statue's face should appear. "We decided that the impression should be that the sunlight is on her face, and that there is always a beginning and hope in America. So that's what we worked for," he says, "the impression of the sun in her face with the clear cool light of the sky surrounding her."

Renovating the statue, a tour-de-force of nineteenth century technology, required the best in twentieth century technology. Several new lighting developments were necessary, says Brandston, noting that "they don't make lights to light green ladies." In response, General Electric developed and donated two new lamps.

The torch presented another problem. "The design team thought that perhaps the torch should be restored to its original shape and that we should replace the existing one that had cut-out parts and yellow cathedral glass," says Brandston. "I at once leaped at this because if we had a solid torch and it were gold leafed, it could be brilliant. It could fulfill the dream of sculptor Frederic-Auguste Bartholdi of a symbol of liberty welcoming and enlightening the world." The new torch, covered in gold leaf, now burns brightly every night.

In the statue's interior, Brandston wanted to be sure that visitors would be able to appreciate the astounding technical achievements of designer Alexandre Gustave Eiffel—of Eiffel Tower fame. "When you enter the statue and look around, it's apparent that some genius in the art of structure had a hand in creating something that could stand forever," says Brandston. He showed off Eiffel's genius by keeping the lights low so that as visitors ascend the statue, "the only parts they see are the structural elements that Eiffel put there," says Brandston.

Happily for Rensselaer, Brandston is now sharing the lessons he learned in his work on the statue—and his hundreds of other projects—with the students in his advanced studio course on lighting at the School of Architecture.
The more than 1,000 alumni and friends who returned to campus for Homecoming '90 October 19-21 celebrated student and alumni sports, clubs, and a couple of birthdays.

The Rensselaer Union, observing its 100th anniversary, and the School of Humanities and Social Sciences, celebrating its 30th anniversary of granting degrees, joined together for an anniversary cake-cutting ceremony at the Union.

The School of H&SS also held a symposium to discuss the unique values of liberal arts at a technological university. The symposium panel included Rev. Patricia Henking '76, priest at St. Thomas Episcopal Church in Hanover,
N.H., and William Blanchfield '60, professor of economics at Utica College.

The weekend's activities centered around Saturday's football game against Marist College. The Engineers didn't disappoint their fans, playing a high-action game which ended in a 28-28 tie.

Other student athletic matches which took place during the weekend were rugby, field hockey, junior varsity football, and women's soccer.

In addition to student athletics, alumni sports reunions continue to grow, this year attracting stalwarts of lacrosse, football, baseball, and rugby teams past.

Alumni who had not been on campus for a few years visited the new Heffner Alumni House. Many enjoyed a "picnic in the pub" downstairs in the house's rathskeller and listened to a quartet from Rensselaer's Glee Club, recently turned coed. Following the football game, fans passed through the student-sponsored Fall Festival in the Quad en route to the chowderfest in the Rensse-
laer Union’s McNeil Room. There they saw the Union’s new display of international flags, which represent Rensselaer’s culturally diverse student body. The 22-flag display rotates monthly to accommodate the 66 countries from which Rensselaer students hail.

Model railroad buffs were able to attend the Model Railroad Club’s Trainfest 1990, a train show and railroad memorabilia sale, as well as visit the club’s acclaimed layout based on actual 1950 scenes of Troy and other northeast locales.

Also, the Rensselaer Society of Black Engineers and the Society of Hispanic Professional Engineers co-sponsored the 12th annual career fair, at which representatives from more than 100 companies were on hand to discuss employment opportunities with students and alumni.

Don’t you hate it when you go to pull your trash bag out of the can and the bag sticks?

Don’t you wish someone would invent something to handle this hassle?

Well, someone has. And not only does it eliminate a perennial pet peeve, it’s also good for the environment and your pocketbook, says Bob Bard ’64, inventor of the Freedbag.

Bard was inspired to invent Freedbag one day in 1979 as he struggled to remove a trash bag filled with sawdust from a garbage can. Finally after several tugs, with a whoosh the bag popped out.

Bard realized that it was a vacuum-type suction created by filling the trash bag that made it difficult to remove the bag. And he decided that a tube mounted vertically inside the trash can would provide a path for air molecules to get below the bag and help push it out.

With the help of friend and patent attorney Tom Farino ’67, Bard obtained a patent for his invention in October 1981. It took him considerably longer to perfect the design, find the right materials, and find a manufacturer who would agree to his “high tech” design.

The Freedbag includes an unusual truss in the center of a flattened tube that allows the tube to flex, but keeps it from being crushed, says Bard.

Bard began by calling his invention the D-tube, but a friend who worked in advertising helped him
develop the name Freedbag.

"It says what the product does—free de bag," says Bard.

With an initial run of 10,000, Bard has distributed his invention, which sells for $2.99, to pharmacies, lumber yards, and hardware stores in central New Jersey. He is also approaching major retailers with his idea.

For now he is counting on word-of-mouth to sell the product. "I haven't had one negative comment about it," says Bard. "People come up to me and say, 'This is great. It really works.'"

Bard is also convinced that Freedbag is "environmentally very friendly."

Now that people are recycling bulkier items, the trash that's left in bags is smaller, creating a tighter seal, says Bard. Also, people are moving to biodegradable bags, which are weaker and tear faster, he adds. And people are packing their trash bags tighter to reduce the volume of trash going into landfills. In all these cases, says Bard, Freedbag helps.

"I'm delighted that it helps people immediately, and it helps the environment," he says.

For Bard, who is an aerospace engineer with the Naval Air Propulsion Center in Trenton, N.J., building things in his garage has been a life-long hobby. And it was that hobby that led him to Rensselaer.

"RPI was great," he says. "As a kid, I used to build things but didn't know why they worked. After going to RPI, I knew why they worked. The labs really tied the theoretical into the practical, so you understood the whole process better."

RAA Announces New Credit Card

The Rensselaer Alumni Association has entered into a contract with Marine Midland Bank N.A. to market a Rensselaer Mastercard.

The card was made available to all alumni, faculty, staff, and students of Rensselaer January 1, 1991. The alumni association benefits when alumni use the card, the Institute benefits when faculty and staff use the card, and the student body benefits from student use.

The RAA had a similar marketing program with a Visa Card; as of January 1, the Visa Card no longer benefits Rensselaer.

If you are currently a Rensselaer Visa Card holder and wish to continue to use a credit card to support Rensselaer, you must apply for the Rensselaer Mastercard. You can apply for a new card by calling 1-800-9MARINE.
Janet Rutledge '83 Opens Doors

Janet Rutledge '83 feels that alumni have a critical role to play in the lives of today’s students. One of the newest trustees of the Rensselaer Alumni Association, she serves on the RAA’s Campus Life Committee because “two of the committee’s special interests are women and minorities, and both of those are pet interests of mine.”

Although she’s only been active in alumni activities a short time, she’s gone full speed ahead to see that those special interests are being served.

Last spring she was asked to speak at the Office of Minority Student Affairs (OMSA) awards banquet. In October, she facilitated a workshop on transitions at the Women’s Forum held on campus. In the fall she became president of the Chicago Alumni Club.

And now she’s busy helping form an official RAA minority club that will have as its goals recruitment, scholarship support, and mentoring.

Rutledge feels that it is important to reach out to minority alumni, some of whom—particularly the older alumni—may have had difficulty adjusting to college life at a time when there was no such thing as the Office of Minority Student Affairs on campus.

These alumni, according to Rutledge, come back at reunion, but don’t attend on a formal basis. “They don’t register. They just appear.”

Rutledge, who was one of only 21 female electrical engineering graduates at Rensselaer in 1983, went on to earn a doctorate at Georgia Tech. She understands what it means to have few models to draw on. “It is very hard to do something if you can’t picture yourself doing it, if you can’t imagine what that life is like.” Students who have no idea what engineering or college are all about and who haven’t come from a background where they see their parents doing these things are not going to be prepared, says Rutledge. “They’re going to come in and not be successful.”

Female and minority alumni must make an organized effort to talk with students, visit high schools, sponsor local science fairs, and sponsor minority precollege programs working on a one-to-one basis so that students have real-life models to work with, she says.

Alumni can follow the lead that Rutledge, as assistant professor of electrical engineering at Northwestern University and a leader of Rensselaer’s alumni body, has set. She has opened doors to paths that today’s students can now visualize themselves following.

MINORITY ALUMNI CLUB FORMS

On April 5-7, 1991, minority alumni will take the first steps toward formation of an official minority alumni club, according to Scot Spencer '83, assistant director of alumni programs.

The weekend, called Rensselaer’s Reunification Reunion I, is a follow-up to the Minority Alumni Reunion held in October 1989. It coincides with the Minority Student Awards Banquet and Minority Student Seminar for prospective students, as well as meetings of the Society of Women Engineers, the Rensselaer Council, and the Alumni Leadership Conference. During the weekend, minority alumni will discuss the goals and procedures for the new club. They will also have a chance to talk to prospective and current students and minority faculty and staff about common issues and goals.

Spencer foresees annual club events to coincide with Fall Alumni Weekend and with the weekend of the Minority Student Awards Banquet in the spring.

Interested alumni should contact Scot Spencer at the Heffner Alumni House, 518/276-6205, for further information.
Class Notes Deleted for Privacy Concerns
Let's Build a Better World

Dave Hill ’76, President of D&B Electrical Design in Norwalk, Conn., is currently considering taking a hiatus from the business world to work full-time for Habitat International, perhaps on a project to organize a Habitat operation in London. He encourages fellow alumni interested in volunteering for Habitat for Humanity to call 1-800-HABITAT for additional information.

Mention Tijuana and many people envision poverty, squalor, dirty-faced little kids, rampant unemployment, thievery, and violence. But when I think of Tijuana, I think of hope, joy, happy little kids (OK, so they have dirty faces), zero unemployment, caring and sharing people, and at least 100 clean, new homes.

Last June I joined 1,200 other volunteers, including former president Jimmy Carter and his wife, Rosalyn, as Habitat for Humanity workers in Matamores, Mexico, about eight miles south of Tijuana. Habitat for Humanity was founded by former Georgia attorney, Millard Fuller, and his wife, Linda, who literally sold their worldly goods and set out to make a difference in the world. I got involved because I feel good when I can help someone, especially a person really, truly in need.

This event, called “The Miracle on the Border,” was the 1990 Jimmy Carter Work Project. For a week we lived two-to-a-tent with no electricity, no running water, and very basic sanitary facilities (does the term port-a-potty mean anything to you?). But in that single week, we built 100 simple homes in Tijuana and eight houses in San Diego, California.

As an engineer who has been involved in many construction projects, my skills were helpful during the electrical wiring of all 100 houses. This process involved mobilizing several teams of individuals (most with little if any understanding of electricity), training them to pull wire, and getting them started. Later, a group of us with some electrical experience inspected, corrected, and connected the wiring as necessary.

The rewards of volunteering are varied. In this case, one of the best was working alongside some very interesting people (how many people get to “sling mud” with a former head of state?). We also worked alongside some of the future homeowners. Families who purchase Habitat for Humanity homes must put in 500 hours of sweat-equity toward the completion of a home, not necessarily their own.

This mixture of people from so many different places made the joint effort especially challenging. I can’t even speak passable Spanish, but managed to communicate through hand signals, smiles, and lots of pointing. One of my favorite memories is of a Mexican woman, in whose home we were installing some wiring, bringing us ice cream. It was a small gesture, but her thoughtfulness and gratitude were obvious.

As engineers and architects, we are trained to find creative solutions to problems. Therefore, we are well-suited to programs like Habitat for Humanity. Yet I know few engineers who volunteer for such programs or for their community. Although many people are curious about the projects I have worked on, they just seem “too busy” to spend a few hours a week actually working for a project such as Habitat.

As a result, I would like to challenge my fellow Rensselaer engineers and architects: Let’s get involved, as a representative group, in programs like Habitat for Humanity. Ideally, I’d like to see RPI become well-known for the generosity of its alumni and alumnae in terms of the time and effort they expend on purely humanitarian pursuits. Plenty of us are unselfish with our money, but it’s time we invest some of our most precious commodity—ourselves.
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