SCOTT FAIIA '73
MEETING THE NEEDS OF THE WORLD'S NEEDIEST PEOPLE
IN THIS ISSUE

2
PRESIDENT'S VIEW
Congratulations to Rensselaer's newest alumni.

8
A PERSONAL QUEST FOR EXCELLENCE
Brian Hamilton '86 triumphs over tragedy and continues to beat the odds.

3
LETTERS

10
KALEIDOSCOPE

18
A COMMON-SENSE APPROACH TO MULTICULTURALISM
How Rensselaer is preparing for a global society.

4
THE SWINGING SCIENTIST
John White '62 puts a new twist on batting a baseball.

22
BALANCING LOGIC AND COMPASSION
Scott Faiia '73 is "responsible for saving many, many lives."

28
ALUMNI NEWS

44
CLUB CALENDAR

47
IN MEMORIAM

48
THE LAST WORD
Debra Hamilton, coordinator of disabled student services, is helping Rensselaer to be more accessible—to everyone.
Congratulations to Rensselaer's Newest Alumni

There's an old Chinese proverb that says, "One generation plants the tree, and another enjoys the shade." As I contemplate the commencement of yet another Rensselaer graduating class, I am reminded of the importance of continuity between the Institute and our generations of alumni. Today's graduates can thank their predecessors for contributing to the quality of education they have received.

Our alumni are Rensselaer's most precious resource. Many maintain their contact with the university beginning right after graduation, without missing a beat. Others rediscover their roots years later. However they choose to support the Institute, Rensselaer alumni continue to have a positive and indelible influence upon our physical campus, our curriculum, and our worldwide reputation. Now the Class of '92 will have its opportunity to do the same.

As always, opportunity also poses challenges. And this year's class faces some formidable ones. The obstacles between them and the kind of success enjoyed by previous classes seem considerably higher. Such obstacles as the shrinking of corporate America, global competition, market uncertainty, and the shifting of power bases worldwide all lead to daunting job prospects and are cause for high anxiety bordering on fear for the future.

But there is no reason to dread these obstacles. They are, in fact, opportunities ripe for the picking by Rensselaer graduates. They are just the kind of tasks our graduates have been trained to tackle. The world needs exactly what Rensselaer graduates have to offer: superior knowledge, technical skills, and hands-on experience. A Rensselaer education is still an essential tool for achieving personal and professional dreams.

So I say to the Class of '92, as you find your own way in a world of uncertainty, I hope you will create opportunities to shape the course of change rather than allowing it to shape you. While the path may not seem clear to you now, you can find inspiration for your quest for success in the lives of the alumni who came before you.

As you read this, your first issue of *Rensselaer*, The Alumni Magazine, you will find stories about some of those special alumni. Each story is unique.

Each alumnus faced different challenges and obstacles. What they have in common is that they achieved success in arenas that as students they never planned to enter. And they did so by taking advantage of unexpected opportunities to put to work—in very nontraditional ways—the traditional skills they acquired at Rensselaer.

Like so many of our alumni, they achieved profound success by striking out on unworn paths to seek their own individual fulfillment. They've come to learn that no one else's yardstick counts, that they have only one chance at a life and they must live it on their own terms. By setting such an example, they have each planted a tree for future generations.

I hope that having been educated and sheltered in the shade of that tree, you, through your individual success, will continue to treasure and bring honor to the name of Rensselaer.
On the Fast Track to an M.D.

I read with interest the article on the six-year Accelerated Biomedical Program [December 1991]. Your readers should also be aware of a parallel program in dentistry run in cooperation with the University of Pennsylvania’s School of Dental Medicine.

I was a member of the first class of four biodental students, who enrolled in the combined program in the fall of 1977. As “biodonts,” we shared all of our classes with the biomed students profiled in the article...

There were some sacrifices. The most memorable one was my shortened time at Rensselaer, where I made many lasting friends and really learned to be a critical thinker. However, guaranteed acceptance to one of the finest dental schools in the country made the six-year program worthwhile.

Beth Ageloff Posner
'82 Biology, D.M.D. '83
Fairfield, Conn.

I must tell you how impressed I am [with Kim Schenck’s article]. You have certainly explored all aspects of the program, covering historical and anecdotal perspectives as well as the positive and negative features. The result is an extremely interesting and balanced overview that is well researched and very well written.

Sara J. Kremer
Registrar and Director of Admissions, The Albany Medical College

50 Years (and more) of Women

You were evidently unaware that there were two women at RPI in 1927 or 1928. They were students at Russell Sage College.

The president of McKenzie College in Sao Paulo, Brazil, sent his daughter there...[to] receive training in biological studies for premedical examination. Sage could not fulfill the stipulation and so sent her and two other biology majors to take Comparative Anatomy with Dr. Archie Bray. The class was held in Proudfit.

I subsequently married one of the girls who constituted the group, Helen Edgley. Helen died Feb. 14, 1990.

I returned for my 60th reunion and met a number of young women who were acting as assistants. I left with the pleasant feeling that they were extremely sharp but had not lost any of their femininity.

Raynal W. Andrews Jr.
'29, M.E.
Pittsburgh, Pa.

The March 1992 alumni magazine was interesting because I was there when it [women's history at Rensselaer] started. The Curtiss-Wright Cadettes were housed in the dorm next to the fraternity on Congress Street. We could “communicate” by hanging out of the windows and over the roof parapet, when we weren’t studying, that is. In those olden days, it never occurred to us to be unhappy about girls going to RPI. All this discrimination business is an outgrowth of our modern litigious society.

Milton C. Beveridge '44
Victoria, Texas

Your thoughtful article caused me to reflect on my own graduating class of 1949. There were five women in the two 1949 classes (January and June) and one of these, Marj Cummings, was in my E.E. section. I don’t believe Marj Cummings received much extra attention from fellow students or faculty. I am sure the women were treated gently, but I recall no special concessions...

In 1986 I retired and returned to the university for graduate training in another field. These days the academic environment is different...50 percent of my classmates are women. I see absolutely no difference in the way the faculty or the male graduate students treat these women students. We are all abused equally and we are kindred souls.

Charles F. McMorrow '49
Bethesda, Md.

Another great issue. I also liked the December cover. In fact every issue is excellent. Especially this one, with my picture just to the left of Elizabeth English DeNike on page 26. With respect to the first article, I, too, thought Anita Hill was telling the truth. But the enclosed column [by syndicated columnist Walter Williams] raises some questions. I wonder if it will change John Carr’s opinion.

Herb Englehardt '46
Rochester, N.Y.

[At Mr. Englehardt's request, the editors forwarded the column to Mr. Carr.]

Halfway through my reading of Rensselaer, March 1992, I had to go back to the cover to see what magazine I was reading. You have articles about Rensselaer celebrating women’s 50th anniversary but include an article about a man suffering from AIDS.

Political correctness should not be part of Rensselaer. Would you please tell me what’s so special about suffering from AIDS?

It is obvious that the top four people responsible for the magazine are women. People at Rensselaer are supposed to know how to collect data, analyze the data and make logical choices and solutions: not political correctness.

Anthony Potts Jr. '51
Media, Pa.

Last Look at Cover Photo

I’ve never written a letter to the editor but now will break that silence...regarding Herman Koloseus’s letter saying that your December 1991 cover photo might be appropriate for Playboy, I’ll bet he never saw Playboy pictures. Fact is, Playboy magazine is doing very well here in Green Valley retirement community. Good mileage per issue—up and down the street and then it goes to the Veterens Hospital. Definitely a favorite and sought-after magazine. Leslie Butterfield’s photos wouldn’t have a chance or turn a head in 1992.

Jim Greenwood '31
Green Valley, Ariz.

To our readers: Rensselaer wants to hear from you. However, in order to provide space for as many letters as possible, we often must edit them for length.
THIRTY-TWO years ago, Ted Williams, at age 42, hit 29 home runs, averaged .316, and cemented his reputation as the sweetest swinger in baseball. Williams's 19th and last season ended with a home run in his last at bat, one of the most famous climaxes in baseball history.

That same year, John W. White '62 was winding down a distinctively undistinguished baseball career at Rensselaer. The highlight of White's hitting career, as White recalls it, was less dramatic than Williams's home run. During a game against Springfield College, the opposing catcher was taunting Rensselaer players mercilessly. White begged to pinch hit and, with one swing, launched the trash-talking catcher's mitt towards right field. White trotted to first base on catcher's interference. The catcher slunk back to his post, silenced by White's batsmanship and the pain in his own fingers.

Improbably, Williams and White crossed intellectual paths in an area of Williams's genius and White's persistent mediocrity: swinging a bat. White, a physicist at the Lawrence Livermore National Laboratory in California, has co-authored a book on the physics of swinging a bat. The book has raised eyebrows and batting averages from Little League to the major leagues.

The self-published book, Batting Basics: Science of the Perfect Swing, proposes a system of hitting based on Williams's approach. What makes it different is physics: White and co-author Charles T. Prevo explain and justify their system by citing basic principles of physics such as gyroscopic stability and conservation of angular momentum.

White's road to fame as a swinging theorist began typically enough: in Little League baseball. He started playing organized baseball relatively late, at age 12. In that year and in high school, college, and semi-professional ball, White was always the classic baseball specialist: the good-field, no-hit player.

White had athletic skills. Although slightly built—he was 5'10", 145 pounds in college—he was blessed with speed, agility, good eyesight, and a powerful lower body. With proper mechanics, he says, he should have been able to hit with at least modest success. "But I never found a way to get my body into the swing, which I needed to do, because my upper body is relatively light and my lower body is relatively strong," he says. "Without really good mechanics [hitting technique], I never solved the problem."

In his junior year, White struggled on the field and in class until a broken finger ended his collegiate baseball career. "The injury was one of the best things that ever happened to me," he says. "I loved the game but I wasn't that good. It was clear that I had no career as a ballplayer. The injury focussed me on my studies."

White went on to earn a bachelor's degree in physics at Rensselaer, a master's degree in engineering physics at North Carolina State, and a doctorate in applied sciences at the University of California at Davis.

As he pursued his studies, White thought little about hitting or baseball—until he came across a now-famous 1968 Sports Illustrated story by Ted Williams. The topic was how to hit.

"I thought, 'Gee, I wish I'd read this as a high school player,' and set it aside, thinking that someday I'd have a son and I'd use this to teach him," White says.

White found himself dusting off that article 15 years later in 1983. When his son began Little League baseball, White volunteered to serve as hitting coach. While teaching Williams's method, White recalls, "It suddenly hit me: If the batter stays vertical, the principle of gyroscopic stability will help him keep his balance."

White then took a second look, from a physicist's perspective, at other parts of Williams's approach, and realized that "there was lots of..."
With Prevo, also a physicist at Livermore and a coach for the same Little League team, White spent a year analyzing Williams's hitting. The result was a systematic approach to hitting based heavily on Williams's, but improved and refined in a few ways.

Regardless of what system they use, White says, hitters must honor six "fundamental principles of batting mechanics": body balance; flexibility; use of the large muscles in the legs and torso to generate power; bat control; a steady view of the ball; and a smooth, fluid swing throughout.

Once they recognized these principles, White says he and Prevo quickly developed their theory of hitting. "It was almost like a derivation in the classic sense: you look for the rules of physics that let you generate those [principles]."

And this is why White and Prevo cite physics for support.

For example, the broad stance and deeply flexed knees lower the body's center of gravity, which improves the batter's balance. The rapid rotation of the hips also helps keep the batter balanced—because, by the principle of gyroscopic stability, "the faster you spin, the more stable you are," White explains.

A vertical spine means the body's axis of rotation will be perpendicular to the field of gravity. That's important because vertical is the most stable orientation for a spinning object—"a principle White demonstrates by spinning a top. As long as its axis of rotation is nearly vertical, it spins smoothly and in balance. As it slows and leaves its vertical orientation, it loses its balance, wobbles, and falls."

The vertical spine also helps keep the batter's head steady—and a still head is crucial to keeping one's eyes on the ball.

Holding the bat close to the body early in the swing reduces the batter's "moment of inertia"—the force an object must overcome before rotating. This enables the batter to attain a rapid rotation rate quickly. Then, when the arms and bat extend to hit the ball, the conservation of angular momentum ensures an increase in kinetic energy in the bat. "Twirling figure skaters use the same principle to accelerate or slow their rotations as their hands and feet move toward or away from their axis of rotation."

White and Prevo came up with a style marked by these characteristics:
- A broad stance in the batter's box;
- Weight evenly distributed on both legs;
- A vertical spine;
- Deeply flexed knees;
- Bat held close to the body early in the swing;
- Hips turned away from the pitcher, "cocked" for a rapid turn into the pitch;
- A short, soft stride into the pitch;
- A fast rotation of the hips driven by the legs and torso—"turning into the pitch"; and
- A short, compact swing.

For each tenet, White and Prevo cite physics for support.

After White and Prevo developed the theory, White tested it as any scientist would—by experimenting. The first guinea pigs were the members of his son's Little League team. "We taught these kids the entire system," recalls White. "We didn't say, 'Do it this way because I say so.' We explained it in terms of table-top physics. We did a lot of simple demonstrations with props like a brick and a gyroscope.

The results were spectacular. Through the first six games of the 1984 season, his players stuck to his system but swung too mechanically. They averaged only one hit every four times at bat. But after players began swinging fluidly, "it was as if someone had thrown a switch," White says. "For the last ten games of the season, they hit .500. We averaged 20 runs a game for the last 10 games. A team that was struggling in last place at the end of the first six games won the league title going away!"

What makes their approach work, White argues, is that it's a system, an integrated approach in which the bits of advice are interrelated and, as White puts it, "self-consistent."

Few approaches to hitting are systematic, White says, and that's why many hitters—White included—fail. "I didn't know what I was doing," he says. "Nobody ever could explain batting mechanics to me in a way that was self-consistent. One coach would tell you one thing, one would tell you something totally different.

"That would just drive me crazy. Some coaches say long stride, some short. Some say keep your back elbow far from your body, some say bring it in close. Batting mechanics instruction for years has been nothing more than a collection of tips, and those tips don't fit together in a consistent way."

After their success at the sandlot level, White and Prevo spent their Christmas holiday writing their book. They sent their manuscript to 12 professional batting coaches, six in the major leagues and six at the college level.

None of the coaches in professional baseball responded. "I think they all dumped it," White says. But Alan Regier, who coaches hitters at the University of California at Berkeley, liked it enough to accept White and Prevo's invitation to "peer-review it."

"We needed to see the pages bleed with red ink, and needed that from a baseball person," White says. Regier pointed out a few errors in mechanics in the first draft—and White and Prevo were able to verify Regier's observations with physics.

Regier says the system caught his eye because it was scientifically sound. "White broke hitting down scientifically, saying 'this is what you do in hitting and these are scientific reasons why,'" explains Regier. "No one has really approached hitting from that standpoint before."

Perhaps the most notable proponent of White's system is Kevin Maas of the New York Yankees, who
studied mechanical engineering at Berkeley. White says that he con-
verses occasionally with Maas, and that Maas is the major leaguer who
has made the most of his system.

Regier, who coached Maas before either of them knew of White's
approach, says Maas "was able to grasp the information not only physi-
cally but mentally. And that's probably a key component to their
system—understanding why and how."

White and Regier both think that
other major league hitters have taken
note of the system. White estimates
that more than 15 percent of the
players in the major leagues show
"the significant influence of our
work." He says his thinking is espe-
cially apparent among the Yankees
(through Maas's influence, White
suspects) and the Braves, last season's
surprise National League champions.

White attributes the Braves' use of
the system to two sales of his book
several years ago. The buyers were
baseball executives John Schuerholz
and Bobby Cox, then general man-
ger of the Braves. Cox is now the
Braves' field manager and Schuerholz
is the Braves' general manager.

"When I see so many Atlanta
players using our approach," White
says, "my conclusion is that it's not
just a little grass-roots movement, it's
something that's organizationally
approved."

Regier and White also think that
Cal Ripken Jr., shortstop for the
Baltimore Orioles, knows the system.
Ripken was a consistently good hitter
until 1991, when he became even
better. His home run totals increased
significantly, he was the surprise
winner of an all-star home run derby,
and he was elected the American
League's most valuable player—even
though he played for a sixth-place
team.

Despite this evidence of flattery
by imitation, White and his system
are unlikely to receive much public
credit from professional players, says
Regier, a former minor leaguer.
Baseball is an industry in which
players covet trade secrets and
unapologetically steal ideas from the
successful. "In your business, it
would be plagiarism," Regier laughs.
"In ours, it's just good coaching."

Even Regier is coy about his
secrets. Some opposing coaches
inquired about the improvement in
his teams' hitting after he adopted
the system. Regier says he did what
any coach would have done: He dis-
sembled. "You throw a little chum
into the water, but you don't really
reveal much," he said.

Major league coyness notwithstanding, the system has received
rave reviews at the college level, where coaches often must teach hit-
ting fundamentals.

The system is easy to teach,
"even to Little Leaguers," says Regier. The straight back and the deep knee flex
are uncomfortable at first, he
says. "But after the batter
works at it and practices it,
you see results. The ball jumps off
your bat and you get more power."

Ninety-five percent of Regier's
players now use White's systematic
approach to hitting, and Regier gives
it partial credit for a significant
improvement in team hitting. Last
year, the team set school records in
batting average, runs scored, hits,
and home runs.

Diane Ninemire, head coach of the
Berkley women's softball team aban-
doned the weight shift system in
the fall of 1990 and embraced White's
system. Again the results were
astounding. She credits White's
system for her team's fast start this
year: six wins and no losses. In the
first six games of 1992, her team
outscored all opponents by 22-1 and
was ranked sixth in the country in
Division I, the highest level of
college sports.

In Division I women's softball,
pitches are delivered from only 43
feet away (compared to 60.5 feet in
baseball), so the batter has even less
time to decide to swing at pitches
that average around 60 miles per
hour. Pitchers also change the speeds
of their pitches more. For these
reasons, Ninemire says, the ability to
delay the decision to swing by a split
second—an advantage of the rotation
system over the weight shift system—is
crucial.

Another fan of White's system is Karl
Steffen, a former pitching prospect in the
Yankees' and Detroit Tigers' organizations and now head baseball
coach at Rensselaer.

"There are a few minor things we
do differ on, but it [White's system] defi-
nitely helped me figure some things out and was especially useful as a
teaching tool," Steffen says. Steffen
agrees with White's criticisms of the
weight shift system: It's harder to
teach; players can't "pull" the ball as
well because they don't turn their
hips; timing of swings is harder; and
hitters are more vulnerable to slower
"off-speed" pitches.

Steffen now teaches his student-
athletes a modified version of White's
rotation system. "I think that's the
best chance they have of getting the
low outside pitch, 'turning' on the
inside pitch, and waiting on the ball
to hit it to the opposite field," Steffen
says.

White still devotes most of his
professional life to research on verifi-
cation technology for nuclear
weapons treaties. However, he is
spending more and more of his spare
time promoting his approach to hit-
ting through his book, a videotape,
and clinics. His main goal, he says, is
to teach the system so that young
players don't have to endure the same
frustrations he did. He hopes to find
a professional baseball player willing
to collaborate on a professionally
produced video aimed at teaching
this system at all levels.

"We want to see our stuff get wide
publication and be available for all
those 12-year-old kids who keep
wondering, 'How should I do this?'" White
said. "The other books and
videos that are out there now are full
of things that are just scientifically
wrong."
Last summer, an unusual story arrived for Rensselaer magazine. An accompanying note from the author, Richard Osborne, said, "This is the first time Brian has shared his story publicly. He is doing so in the hope that it will help others who are facing trials from whatever the source. Of all the possible places...Brian chose your magazine as the one he most hopes will publish his story."

Although we rarely publish unsolicited manuscripts, we are always interested in Rensselaer alumni whose accomplishments—personal or professional—are exceptional. The story of Brian Hamilton's struggle back to a full and productive life is an example of both personal and professional triumph. The editors are pleased to share it with you.

It was dusk on September 28, 1988. Brian Hamilton '86 was headed home after a long day, driving through the picture-postcard English countryside.

Suddenly, dusk became Brian's longest night. The blinking headlights of the oncoming Audi were Brian's last memory before he entered the black chasm of a coma that lasted a month.

No more picture-postcard life for Brian. His brain was severely injured in a head-on collision that fateful evening. Everyone thought Brian would die—or worse.

Brian's life had been a series of picture postcards: private prep school; B.S. in electrical engineering from Rensselaer; first job out of school with Procter & Gamble, one of America's most prestigious companies. A 99-percentile score on the Graduate Management Admission Test virtually assured he'd get an M.B.A. as planned.

Like everything else Brian had sought in his 24 years, only the best would do—Harvard or Stanford business school. To prepare, he had landed a job as International Projects Manager with the Birmingham, England, subsidiary of APSCO, an electronics firm based outside Cleveland, Ohio.

Brian was a planner. He had carefully charted each step in his young life. Brian was also a dreamer. Like his father, he wanted to start his own company.

Then, just six weeks after arriving in England, Brian's plans and dreams were shredded by the twisted steel of his demolished Nissan.

But in spite of all he'd
accomplished and all he’d lost, that is where Brian’s story actually begins. He set out on a long journey that started with his broken body—ribs, collarbone, pelvis, knee, and closed-head injury that shut down speech, right-side motor skills, and, most devastat­ingly, the emotional capacity to align his feelings with what was happening around him.

Brian wasn’t dead. He wasn’t a vegetable. But for months he was robbed of the central facility that makes us human—his feelings. Brian doesn’t remember much about those first sever­al months. He knows that the medical staff of George Eliot Hospital in Nuneaton, England, saved his life. That British Airways was the only commercial airline willing to fly him back to the United States in a stretcher. That his mother and father gave his. Indeed, that his father nearly lost his company to Brian’s rehabilitation.

He’s grateful to them, all of them—family, physicians, hundreds of supportive friends. But Brian’s journey, step by step, thought by thought, had to be travelled alone—alone in the deep reservoir of his will to get better.

He spent months in two of the best brain-injury hos­pitals in America. At Craig Hospital in Denver, a facility specializing in brain and spinal cord injuries, he began his recovery. Then in the community re-entry program of the Center for Neuro Skills in Bakersfield, Calif., he worked to regain his independence.

He talks about the mile­stones, ironic measure­ments of progress for a man whose energy and drive had earned him the name “Speedy” in college and whose life had been a land­scape of effortless achieve­ment in the classroom, the job, and the ski slopes. Brian, always the quick study, now took weeks to learn how to shave himself, to go to the grocery store alone, to drive a car.

Hundreds of hours in rehabilitation—lifting weights, swimming, prac­ticing the way he walked or manipulated his fingers—gradually restored Brian’s body.

But the bigger challenge was making his brain work. Brian’s considerable intel­lectual power had not been diminished by the accident, but the speed with which he processed information was impaired. Damaged neuron pathways prevented the smooth transmission of stimuli, slowing his ability to understand and take action. It was as though Brian were learning in slow motion. He slugged it out, learning to write with his left hand, to button his shirt, and to deal with con­descending people. All the while he was haunted by the memory of how fast and easy everything used to be. He wondered how women would react to him. And he fought fear—the fear that he wouldn’t make it back, that his cherished indepen­dence was forever left in the broken glass and twisted steel on the road from Birmingham.

Brian considered suicide more than once. But his impulse to fight was always stronger.

And fight he did: 1,000 hours to learn to write; 2,000 hours to restore the muscles in his right leg; 500 hours to lose his limp.

Three-and-a-half years later, Brian Hamilton’s journey is still not over. He’s 95 percent of the-way back. He bikes, skis, and leads an active social life. He works at a job he loves and is talking again about getting his M.B.A.

Except when he’s tired, his speech is perfect. But that remaining 5 percent bothers Brian. He’s come too far to stop now.

Along the way, he’s learned some plain-wrapper, profound messages that he thinks he would have missed but for his injury.

He appreciates differences in people now, the little and big things about others that before had meant they didn’t quite measure up. He’s traded speed for grace in the way he relates to people and problems. He takes nothing for granted. He feels the small kindnesses and is quick to reciprocate. He can laugh at himself. He’s lost some pride and gained self-respect. And he never trifles about the future. He’s been too close to losing it.

Brian lives by a new ideal. He calls it “continuous per­sonal improvement.” With or without a savage brain injury, he believes that on most days most of us are operating at a fraction of our human potential. For Brian, that’s unacceptable.

He’s going flat out for 100 percent. He hopes others will join him in his journey, his quest for excellence in every dimension of life.

In August 1989, Brian Hamilton left the rehabilitation program in California and returned to Ohio and his job at APSCO. He also joined the board of directors of the Cleveland chapter of the National Head Injury Foundation. His growing desire to help people in his work led to a career change. Today, Hamilton is manager of the materials department of the National Head Injury Foundation in Wash­ington, D.C. He handles all requests for the foundation’s sizeable array of informational and promotional literature and tapes—most on the subject of prevention. And occasionally he accepts public speaking engagements.

In a recent interview, Hamilton revealed that every year two million people suffer head injuries in the United States alone. Three-quarters of those people’s injuries are consid­ered minor (they do not enter a coma), but almost all suffer some difficulty—such as cognitive changes, slurred speech, or emotion lability (diminished emotional control)—as a result of their injury.

"The thing about head injuries," he says, "is that there are no general rules for knowing how severely a person may be injured or how long recovery, if it happens, may take. With a broken bone you can predict how long healing will take. But the brain is so complex that every single injury is totally different from every other.

"What’s kept me going is realizing that I’m always getting a little bit better. With practice, things do get easier. Writing is still a bit tedious for me, but I’m beginning to get my guitar-playing back. I’m not good, but I’m getting better."

Richard L. Osborn is executive dean of the Weatherhead School of Man­agement at Case Western Reserve University. He is on the board of directors of APSCO, Hamilton’s one­time employer, and describes himself as "one of Brian’s many friends."
CLASS OF ’92 LOOKS BACK

RENSSELAER WELCOMES ITS NEWEST ALUMNI

Change and opportunity awaited the 1,207 Class of ’92 freshmen arriving at Rensselaer in September 1988.

Still the largest freshman class since 1985, they represented a blip in the annually declining college-age population. Rensselaer’s Class of ’92 had 50 percent more architecture acceptances and 10 percent more engineers than usual.

The Class of ’92 also has unique recollections, according to senior-class officers Bill Connors, president; Sheryl Terry, vice president; Sue James and Andrea Hugh, co-secretaries; and Tal Saraf, treasurer.

In September 1988, Rensselaer inaugurated its 16th president, Roland Schmitt. “We met the new president at the Texas barbecue party,” Saraf says. “And in September 1991 we had RensselaerFEST. We’re the only class I know that’s had two big Rensselaer community celebrations.” Terry feels RensselaerFEST “really worked,” and Connors thinks such “friendly settings, and talking to faculty in T-shirts, helped to dispel ‘us-and-them’ attitudes.”

In fall 1988, a new awareness of the problems with alcohol was growing. The Polytechnic of Sept. 21 found the Hockey Line’s “party atmosphere” somewhat reduced due to the increased drinking age. And 1988-89 saw Rensselaer’s first dry rush. The Class of ’92 has had a chance to cast a new mold. “In four years,” Connors says, “we’ve gone from night to day socially. We’re finding more creative social outlets than dozens of fraternity parties every week offering unlimited public admission for a dollar.”

In 1989, the class dues were increased from $1 to $3 per semester, tripling senior-week and class-gift funding. Terry says work on the gift “taught us a lot about logistics, negotiation...” and, Hugh interjects, “how to write memos!”

The class’s overarching concern quickly emerged: a tough job market. This year’s seniors are making bold decisions. James mentions student interest in the Cooperative Education Program; one in six Rensselaer graduates now have co-op backgrounds.

Record 1990-91 co-op assignments confirm that students see the market value of co-op experience—even if it means deferring graduation, as Connors and James have done.

Already tradition-minded, the Class of ’92 incorporated the seal of its sister Class of 1892 in design elements of the class ring and pennant. The theme, “the essence of time,” inspired the class gift: a clock tower located on the Hassan Quad, between the Lally and Sage buildings.

The officers share some thinking on the value of the Rensselaer experience. Given tougher career prospects, the seniors have appreciated the arrival on campus, also in 1988-89, of the Center for Student Leadership Development. For all of them, development of interpersonal skills has been a highlight of their time here. Hugh is proud of her new-found confidence in self-expression, and for Saraf “active involvement has left me...
President and Mrs. Schmitt with members of the Class of '92 at their second campuswide party, RensselaerFEST. Seated, clockwise from left: sophomore John Diego; seniors Eric Rankin, Mike Lewantowicz, and Jason Young; and George Polchin '90 (back to camera).

Tom Clancy has been chosen as commencement speaker for the Class of '92. The author of such best sellers as The Hunt for Red October and Red Storm Rising and the forthcoming The Sum of All Fears, he is also to receive an honorary doctorate in humane letters. The Class of '92 was particularly thrilled to have its first choice for speaker respond almost immediately, and more than a year in advance, to their personalized letter asking him to accept the formal offer from Rensselaer President Roland Schmitt.

feeling I can go into any situation and manage it." Terry, Saraf, and Hugh participated in the CSLD's Lifeskills program, and Terry and Saraf used PLP, the School of Management's 18-month Professional Leadership Program, to interact informally with alumni and industry leaders and learn valuable lessons in human relations.

As for future study, all five plan to go on. But there's something else they'd all like to do first, as Terry suggests: "I'm definitely going back to school for a graduate degree in some area of construction management, or else an M.B.A. But I'll take a year off first to work." Connors agrees with a laugh: "I'm sick of being poor!"

The officers of the Class of '92 admit surprise at how quickly they've reached alumni status. "Many seniors haven't given much thought yet to staying connected," Connors feels, "but once the idea sinks in, I think they'll want to explore the opportunities. We've made friends we'll want to keep for the rest of our lives."

SMART-MATERIALS FUNDING

Rensselaer has won two Defense Department contracts for research on high-performance composite and "smart" materials and structures. Funded for five years, the projects total more than $7.5 million.

George Dvorak, chairman of civil and environmental engineering, is directing "Mechanism-Based Design of Composite Structures." For this interdisciplinary project, the Center for Composite Materials and Structures and the Scientific Computation Research Center (SCOREC) will receive $5.2 million from the Defense Advanced Research Projects Agency (DARPA).

Iraj Tadjbakhsh '59, professor of civil and environmental engineering, will direct "Interdisciplinary Basic Research in Smart Materials and Structures," a $2.3 million project for the U.S. Army Research Office. Both projects emphasize fundamental research and education. Graduate students involved in the DARPA work will obtain advanced training in processing, micromechanics, and computer-aided design (CAD) of high-performance composite materials and structures for use in high-temperature settings such as jet engines.

The DARPA-project goal is to create procedures for selecting and designing composite materials. The researchers will work closely with industry in developing CAD tools to help engineers evaluate manufacturing processes as well as materials.

The second grant focuses on the mechanics and control of two types of smart materials and structures. Smart materials are capable of suppressing vibrations, healing cracks, and detecting damage in the structures themselves. The Rensselaer researchers will investigate materials that perform uniquely when subjected to electric current.

Also in the second project, researchers will study shape-memory alloys, which tend to remember their shape at the time of annealing, the heating-and-cooling process that strengthens certain materials. Designers can even reshape alloy structures by changing temperature.

Possible applications for these smart materials are helicopter rotor blades, fuselages, gun barrels, and such civilian devices as medical probes. Shape-memory materials also are being studied for use in specialized fasteners, seals, connectors, and clamps.

Researchers in the two programs include faculty from materials engineering; civil and environmental engineering; mechanical engineering, aeronautical engineering, and mechanics; electrical, computer, and systems engineering; and computer science.
FOR A BEST SELLER, HIT F-1

An ambitious, 10-year Rensselaer program called "Autopoiesis" may create a creative-writing machine.

Philosophy Professor Selmer Bringsjord and David Porush of the language, literature, and communications department have received a $300,000 Henry Luce Foundation grant to fund the first three years of the project. The money helped bring computational linguist Marie Meteer to Rensselaer as a research professor, to join Porush and Bringsjord in developing a system that will generate engaging stories from a database of themes and other input on the creative process.

Although the press might trivialize the project by focusing on an interim goal of pulp-fiction generation, Autopoiesis (Greek for "self-making") is an absolutely worthy and daunting scientific task.

The plan is to create a simple story generator, then a workstation for writers comparable to CAD for designers, and finally a true artificial intelligence (AI) that will do most—maybe all—of what creative writers do.

The challenges are enormous. "To humans," Porush says, "the statement All the world's a stage is a metaphor. To the computer, it's a lie. Can a computer gain enough world knowledge to exploit metaphorical language? Autopoiesis may delineate exactly in what ways machines are impoverished." Meteer is not convinced you can decide if something is computable when you can't yet fully describe the something. Do we know enough about language itself, much less stories and creative thought? Today's linguists have better tools than ever, but how 'advanced' is our knowledge of what we're setting out to do? Could the Romans have debated rocket flight to the moon?"

As for Bringsjord, in writing his first technothriller, Soft Wars (whose plot presaged the Soviet coup of August 1991), he carefully observed himself writing fiction. "This is the prehistory of AI story generation," he says. "Whether a computer writes credible fiction someday may be secondary to what we'll learn about human thought."

MANAGEMENT AND TECHNOLOGY: THE NEW M.B.A.

Rensselaer set the stage for M.B.A. innovation at the 1990 management faculty retreat, when Dean Robert Hawkins asked: "If deregulation were to come to the M.B.A. world, could we respond quickly and become one of the top five small business schools?"

A few months later, national business-school accreditation guidelines were indeed revamped, and in September 1991 Rensselaer launched its unique Management and Technology M.B.A. program.

A pioneering approach to business education, "the M&T" responds to a decade of criticism that M.B.A. graduates are too narrowly focused; that managers of technology cannot communicate, much less collaborate, with general managers; and that all managers need a solid footing in technology.

"We're linking two broad but distinct perspectives," says Associate Dean Kenneth Bardach. "The key word is management and—not of—technology. Not only must we manage technical and functional disciplines such as manufacturing, but more importantly we must convert technological advantage into strategic business advantage."
The M&T stands alongside Rensselaer's traditional M.B.A. curriculum. Bardach worked closely with Joseph Morone, Andersen Consulting Assistant Professor of Management, to oversee the intense curriculum preparation. Courses are modular—as short as four weeks—with instructors "passing the baton" along four parallel tracks integrating traditional disciplines. Faculty give joint presentations and grade collaboratively. A skills course teaches writing, public speaking, and managing meetings.

The first-year curriculum has no options, electives, or waivers. Year two has a practicum, in which small teams of students complete projects with participating companies, guided by faculty mentors and corporate consultants. Every course examines the concrete effects of explosive technological change.

Student Jack Hemment offered his impressions of the M&T thus far: "It's relevant because today's managers in big companies must improve cross-communication, and many small companies are critically tied to developments in technology. The M&T faculty answer questions across disciplines. And they're well-rounded and enthusiastic, maybe because this kind of innovation attracts such people. Whatever the reason, the M&T program works.""}

Rensselaer researchers are building a detector that will observe astonishingly tiny amounts of light—as small as a single photon. The detector will be part of the $500 million Continuous Electron Beam Accelerator Facility (CEBAF) at Newport News, Va. Set for completion in 1995, the CEBAF will amount to a huge electron microscope, capable of astonishing clarity and detail. Scientists will observe atomic particles measuring 0.00000000000000001 (one-ten-millionth of one-billionth) meter in diameter.

Rensselaer was a leader in early efforts to persuade the international community to construct a facility for such research. In 1980, physics Professor Paul Stoler chaired a conference here of concerned scientists, whose conclusions largely convinced the U.S. Department of Energy to fund the CEBAF. Now a team of Rensselaer physicists, engineers, graduate students, and undergraduates, headed by physicists Stoler, Gary Adams, and Paul Yergin and by mechanical engineers Kevin Craig and Warren DeVries, is designing and building the subatomic detector.

"Never before has an instrument been able to secure the marvelous pictures and make the beautiful measurements that the CEBAF will," Stoler reports. Protons and neutrons are made up of even tinier entities called quarks, held together by gluons (pronounced "glue-ons"). To examine the makeup and behavior of these quarks and gluons, Stoler explains, scientists use microwaves to accelerate electrons to nearly the speed of light over a half-mile course of superchilled superconductors. As the electrons strike atomic particles, the Rensselaer detector will scrutinize a shockwave of light called Cerenkov radiation.

The light could amount to as few as 100 photons. But for this research, scientists must be able to detect even a single photon.

The venture demands great scientific and engineering expertise, confidence, faith, and a pragmatic perfectionism. "We know that our detector won't work as well as it will be designed to," Stoler says. "We must therefore design it to work far better than it will ever have to."
FIRST IN NEW HAMPSHIRE

While a pair of presidents, George Bush and Roland Schmitt, were in Manchester, N.H., on Feb. 12, they took a break from their primary concerns to watch a Rensselaer-sponsored robot vehicle churn its way through an a-maizing race.

FIRST is an acronym: For Inspiration and Recognition of Science and Technology. It’s the 1989 brainchild of New Hampshire inventor and entrepreneur Dean Kamen. He asked MIT’s celebrated professor of teaching innovation, Woodie Flowers, to help create FIRST Encounters, a national engineering design program of which “Maize Craze” was the prototype.

FIRST’s prestigious membership includes GE, Harvard University, Motorola, Xerox, and Rensselaer. Each organization sponsored a high school in designing and building a vehicle from a standard grab bag of electromechanical parts.

The Manchester-based nonprofit coalition of businesses and universities seeks to “showcase science as a sporting event” and excite a generation of young Americans about science and engineering.

Richard Blais, director of occupational education at Shenendehowa High, says the 19 students in the honors automation-and-robotics class were winners in a big way, having been involved in every aspect of the vehicle’s design, production, and testing.

Deborah Kaminski ’73, associate professor of mechanical engineering, and Larry Ruff, project manager with the Center for Manufacturing Productivity, mentored the Shenendehowa students, while Rensselaer juniors Cem Telli and Mark Wiinikka helped them prepare their machine.

LINAC Turns 30, Still Accelerating

At its startup in December 1961, Rensselaer’s Gaertner Linear Accelerator (LINAC) made history as the most powerful machine of its type. The LINAC still packs a research punch, providing basic information on neutron cross sections for nuclear-reactor design, on how radiation affects spacecraft electronics, etc. Soon it may be doing CAT scans on space-shuttle rockets and “curing” new polymers. Thus far, the LINAC has propelled more than 50 Rensselaer students to their doctorates.

NEW PRESIDENTIAL PANEL TO TACKLE BUDGET CHALLENGE

In February, Rensselaer President Roland Schmitt established the President and Provost’s Budget and Program Panel, to address serious threats to Rensselaer’s budget-balancing through fiscal year 1997-98.

Schmitt explained the need for the panel in a campuswide letter:

It was only a few short months ago that Rensselaer unveiled an ambitious and visionary plan to guide the intellectual efforts of our university into the 21st century....

As I write this, Rensselaer is moving forward along this ambitious path. [But] external factors have produced serious challenges to our financial situation. The continuing erosion of state and federal support, the deepening recession, and the ever-growing need of our students for financial aid have seriously limited our ability to achieve the needed growth in revenues over the next several years. At the same time, we, like the rest of academe, face extreme increases in the cost of doing business, ranging from skyrocketing health-care costs to the long-deferred cost of maintaining our buildings and facilities....
Meindl, the 14-member initiatives of this great review of Rensselaer's utilities to university."

president asked the panel Nov. 1, "to constituencies." The president asked the panel "to be mindful of the mission, goals, and strategic initiatives of this great university."

Chaired by Provost James Meindl, the 14-member panel includes faculty, administration, and students. Its preliminary report is due this spring and will be followed by two or more periods of "vigorous substantive discussions with Rensselaer's various constituencies." The president will receive the panel's final recommendations by Nov. 1, 1992.

Nevertheless] I feel confident in our ability to use this period of challenge to our advantage. [I believe that] Rensselaer's prospects are bright and that our claims of excellence are... backed by solid accomplishment and momentum.

Schmitt charged the panel with recommending policies and actions that will maintain a balanced budget primarily by identifying "explicit opportunities for expenditure reductions." These could range from conserving utilities to "scaling down or abolishing nonacademic and academic programs and units." The panel will estimate resultant cost savings and then set priorities and timetables for implementation.

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Margaret Cheney, associate professor of mathematics, is among 100 women scientists and engineers honored for outstanding work by the National Science Foundation. The NSF Faculty Award for Women recognizes and helps retain in academic careers the nation's most outstanding and promising women scientists and engineers.

The award, $50,000 annually for five years, will help Cheney bring in three graduate students and new equipment for her research in inverse problems. The research and its applications in impedance imaging may improve the way hospitals monitor intensive-care patients.

Inverse problems involve obtaining inaccessible information through measurements in accessible regions. For example, scientists can "access" the earth's interior by passing sonic waves through an inaccessible region and measuring them at the earth's surface. Mathematics enables the researcher to convert measurements into visual images, for such diverse uses as ultrasound studies of a fetus and seismic prospecting for oil and minerals.

Cheney is part of an interdisciplinary project that uses mathematics to form pictures of the body's internal organs by measuring electrical impedance. This permits medical specialists to safely and continuously monitor the heart, lungs, and other organs, using only mild electric currents. The procedure will provide convenient, uninterrupted visual monitoring not possible with X-rays, CAT scans, or other techniques.

"I see math as a way of doing something to help the world," Cheney says. "What's more, most people can do it. Learning mathematics is like learning to play the violin. The key is practice, practice, practice. And it's fun!"

For the first time, say Rensselaer researchers, a scientific study shows that individual comfort control boosts job performance. Walter Kroner '67, director of Rensselaer's Center for Architectural Research, led a study conducted at West Bend Mutual Insurance Co. in West Bend, Wis., in which productivity rose 2 percent through use of individually controlled, environmentally responsive workstations (ERWs).

The number may seem small, but Thomas Willemain, a statistician with Rensselaer's Center for Services, Research, and Education, notes that "unpublished Department of Labor statistics show an average annual decline of 0.2 percent in service-sector productivity from 1979 to 1989. I'd say a 2 percent productivity increase is very good news."

Advocates have long argued that worker control over workplace environment would improve productivity. But could it be demonstrated quantifiably? The West Bend site was perfect for scientific research. "For the first time," Kroner declares, "we could conduct our productivity study in a real work setting using real employees and base it on a company's own productivity measures." The firm had been measuring productivi-
Antibodies in Abundance

Georges Belfort, chemical engineering professor, and doctoral student Katherine McKinney are using a new bioreactor design of great potential in mass-producing valuable pharmaceuticals. Initially successful with a specific hybridoma crossbred from spleen and cancer cells, the researchers "hope the device will prove widely useful in overproducing vital antibodies," Belfort says.

**HOCKEY**

The Rensselaer varsity hockey team's season came to an improbable end March 13 at the Boston Garden with a 6-5 loss in double overtime to St. Lawrence in the semifinals of the Eastern College Athletic Conference (ECAC) Division I tournament.

The Engineers were not expected to advance as far as they did in the ECAC tournament, after losing three of their last four games to finish the regular season with a 12-14-4 overall record. Rensselaer finished 10th in ECAC play with a 6-12-4 record and barely made it into the playoffs.

Sophomore Jeff Gabriel scored the game-winning goal against Harvard in the ECAC quarterfinals.

In season play, Craig Hamelin, a freshman forward from Blyson, Que., led Rensselaer in scoring with 21 goals, 19 assists, and 40 points (21-19-40). Sophomore Ron Pasco, a forward from Gloucester, Ont., was next in scoring (12-23-35) and led the team in assists.

Neil Little, a sophomore from Medicine Hat, Alta., is Rensselaer's top goaltender. He finished the season with a 3.75 goals-against average, an 87.4 save percentage, and an 11-11-4 overall record. In the playoffs, Little stopped 69 of 73 shots against Vermont and Harvard and then made 37 saves in the loss to St. Lawrence.

Little and 10 of the top 12 scorers will return next season. Coach Buddy Tom Ronan '92 record this season. Tom Ronan '92, a forward from New City, N.Y., rewrote the record book as he ended his college career with 20 personal records, seven all-tournament team honors, 1990 and 1991 team MVP, 1991 league Player of the Year, 1990 and 1992 league All-Star, ECAC Player of the Week, third-team All-America selection, and Rensselaer's Olympian 90-91 Athlete of the Year. Ronan broke career scoring and rebounding records with 3,373 points and 1,025 rebounds in 101 games.

Guard Patrick Doyle '92 (West Reading, Pa.) led this season with 150 assists, one shy of Rensselaer's record. Doyle holds records for career assists (419) and three-point field-goal percentage in a season (53.7 percent in 1988-89). Erik Whalen '93, a center from Longmont, N.H., made 29 consecutive free throws, setting a school record. He also set a season record for free-throw percentage (91.1). John Mone '92, from Dover, N.H., and Mike Comerford '93 (Truxton, N.Y.) set several three-point field-goal records. Mone attempted 11 three-pointers in one game, made six in a game, and had a career record 148 three-pointers in 368 attempts. Comerford also had six three-pointers in a game and set season records for three-point field goals made (53) and attempted (120).

Head coach Mike Griffin will lose four players as Ronan, Doyle, Mone, and Kurt D'Amico (Central Square, N.Y.) graduate in May. Griffin looks to Comerford, Whalen, George Foley '93 (Hillsdale, N.J.), and Mauro Oliva '94, from Como, Italy, to share their leadership and experience with an impressive group of underclassmen.

**WOMEN'S BASKETBALL**

The team struggled to a 10-13 overall record, 6-8 in the EAA. Julia Butterly '92, a native of Brookfield, Conn., led the Engineers with 384 points in 23 games (a 16.7-point average). She had a career record of 15 20-point games, tied the record for consecutive 20-point games with four, and set a record with a 31-point game. Butterly was named to the ECAC honor roll and was league Player of the Year twice.

Sue Bator (Cheshire, Mass.) and Nancy Kelly, of Delhi, N.Y., both members of the Class of '95, had impressive rookie seasons. Bator was second in scoring, averaging 9.2 points and 6.9 rebounds per game. Kelly scored 119 points (6.6-point game average), despite missing five games with an injury. Sue Hayes, from North Reading, Mass., led the team with 27 three-point field goals and 69 assists. Hayes averaged 6.9 points per game for Rensselaer.

Head coach Kathy Ryan will lose two players, Butterly and Mary Robbins (Victoria, Ill.), to graduation in May. Eight of this year's 11 members are underclassmen, including five freshmen.

**JUNEAU SHINES IN OLYMPICS, SIGNS WITH BRUINS**

Joe Juneau '91 of Team Canada scored six goals and nine assists (6-9-15) to finish as leading scorer in the 1992 Winter Olympics hockey competition and help Team Canada take home the silver medal. In March, Juneau signed a two-year contract with the Boston Bruins, where he joins Adam Oates, who left Rensselaer in 1985 but returned to receive his degree in 1991.
How Rensselaer Is Taking A Common-Sense Approach to Multiculturalism

Rensselaer's 1993 M.B.A. class includes students from Iran and Iceland. There are several students from Japan and Taiwan. Colombia, India, and Pakistan are also represented. In fact, almost half the class are foreign nationals. The 55 percent who are American citizens are of different racial and ethnic backgrounds, represent a variety of undergraduate institutions, and have a range of work experiences. Women make up 21 percent of the class.

Kenneth Bardach, associate dean of management and head of the M.B.A. program, thinks the diverse nationalities and backgrounds of the class make it much stronger. "In a global economy, future business leaders need a global outlook," he says. He also points out that people from different backgrounds have a lot they can learn from one another.

Bardach is quick to say, however, that this is not his ideal class. "We need to work harder to attract more American Blacks and Hispanics into the M.B.A. program." Moral imperatives aside, Bardach believes that American society stands to benefit tremendously, economically and socially, by making American minorities "stakeholders in the system."

President Roland Schmitt couldn't agree more. "Our students will be part of a diverse society, wherever they may live, in the U.S. or abroad. A key ingredient of their education here must be an appreciation and understanding of different cultures and races and how to bring them together to achieve common goals. There are important ethical and societal reasons for pursuing cultural understanding, but it's also a pragmatic necessity."

To help ensure that Rensselaer graduates are prepared to face the workplace of the future, Schmitt appointed Jacqueline Peterson director of multicultural affairs in November 1991, reporting directly to him. Peterson, formerly acting dean of students, is charged with establishing campuswide programs to promote positive relationships among different groups on campus. Peterson wants to go beyond merely increasing the numbers of minorities on campus. In fact, her program is being called "The Beyond Diversity Initiative."

"Our responsibility goes much further than generating a more diverse population," Peterson says. "Diversity, as we define it, is just statistics—the percentage of women, American Indians, people with disabilities, etc., that we have in the Rensselaer community. Our ultimate goal is 'pluralism.' This involves getting people from many different backgrounds talking together, working productively side by side, and appreciating both their differences and their commonalities," Peterson says. "At minimum, our aim is for every member of our community to feel comfortable being in the same room with every other member."

With Peterson's appointment came the creation of the Office of Multicultural Affairs. Under its auspices a broad-based steering committee works together to improve communication on issues relating to multiculturalism. The group, made up of students, faculty, administrators, and alumni, meets regularly to talk about problems and challenges, devise programs, and generally brainstorm ways to help make Rensselaer a more diverse, communicative place.

by Kim Schenck and Debra Townsend
Illustration by Mark Hempstead
The momentum for multiculturalism at Rensselaer has been building at least since 1981, when former Rensselaer President George Low brought together a group to examine the campus climate and make recommendations. Efforts to diversify Rensselaer’s student body and faculty have been ongoing. The recent focus and activity on the issue has come about partly as a result of these earlier efforts and the President and Provost’s Panel on Strategic Initiatives (PSI).

The PSI was convened in February 1990 and charged with plotting Rensselaer’s course for the future. The panel published its report in September 1991, stating that it is strategically necessary for the culture of the Institute to become more inclusive and open—to foster a diverse intellectual community that encourages the growth of its members.

Why is a pluralistic community at Rensselaer “strategically” necessary? Partly because of the demographic changes taking place in American society.

“America’s population is changing dramatically,” says Peterson. “In the next century, Asians, African-Americans, and Hispanics will outnumber the current Caucasian majority in the United States.” According to U.S. Department of Labor statistics, 80 percent of those entering the work force at the turn of the century will be women, minorities, and immigrants. Only 15 percent will be native-born white males. The increase in minority populations coincides with a decrease in the number of high school students interested in pursuing careers in science and technology. For Rensselaer to be able to recruit and retain students in the future, it will need to provide a supportive, attractive environment for members of minority groups. Corporations are facing the same situation.

“To attract good people, employers will have to make some changes in the definition of the traditional mainstream,” Peterson says. “Organizations can either try to compete using less than a third of the available human resources or prepare for the inevitable cultural changes in the work force.”

It’s not hard to guess which route American business is choosing. “Industry is way ahead of us when it comes to multiculturalism,” says Melanie McCulley, associate dean of students and director of women student services. The corporate world knows that the strength of the bottom line depends largely on how well people work together, she says.

“There is an old idea at Rensselaer that as long as you know your discipline, you will be successful,” McCulley says. “But that’s not enough now, and really, it never has been. In the workplace, you have to manage people and be supervised. You have to communicate with people, be in meetings with people who are different from yourself.”

At Rensselaer’s Center for Student Leadership Development, students participating in leadership training learn that an appreciation and understanding of people with diverse backgrounds is essential for success. “People in industry work in teams,” says Linda Teitelman McCloskey, director of the center, “and these teams aren’t just racially, religiously, and ethnically diverse. Their members come from diverse disciplines—biologists working with engineers, and so on. Rensselaer’s students need to be prepared to work that way, too.”

Schmitt concurs. “The bottom line for Rensselaer is that we must give our students the skills and knowledge to succeed in the world of tomorrow—a world of drastically different composition than the world of yesterday—a world that will require more interpersonal understanding and teamwork among more diverse co-workers than ever before.”

Schmitt believes that America’s ability to compete with Japan depends on our ability to turn our multicultural makeup into our strength rather than let it drift into a debilitating divisiveness. “That is the pre-eminent challenge of education today,” he says.

Peterson’s appointment and the creation of Rensselaer’s Office of Multicultural Affairs were deemed necessary because, in spite of our aim to go beyond diversity, many would say that Rensselaer has not yet achieved diversity. The undergraduate population is still 80 percent white. In the fall of 1991, of 4,430 undergraduates 184 were Black, 194 Hispanic, and only 10 were American Indians. Women make up 53 percent of undergraduate students nationally, yet only 20 percent of Rensselaer’s undergraduate population is female. There were 42 women among the 395 members of the tenured and tenure-track faculty.

As the M.B.A. program illustrates, the graduate population at Rensselaer is highly international. But while 35.7 percent of Rensselaer’s graduate students are foreign nationals, only 2.4 percent are American Hispanics and only 1.4 percent are Black. Among 1,766 full-time graduate students in the fall of 1991, there were three American Indians.

Schmitt says he regrets all the baggage and “political correctness” issues that have been associated with the term multiculturalism. “If I could create a new term, I would,” he says. “To me, multiculturalism goes far beyond race relations or gender issues or any of the other topics that can become polarized. What it really means is the ability and desire to create, be productive, and communicate in a society made up of people of all different types and backgrounds.”

With all these lofty goals for the future, what’s the current climate on campus like? Not surprisingly, the answer to that question depends on whom you ask. “If you ask African-American students, they will say racism is prevalent on campus,” says Pat Tirino ’94. “If you ask the white population, they’ll say there isn’t a problem at all.”

Tirino, a candidate for president of the Union at the time of this inter-
Jewish students to protest what they see as insensitivity in its handling of an alleged rape. “I think a lot of the resistance, rather than being overt, will take the form of a lack of understanding of the need for change,” Robinson says. “Why do we need to do this? Things are fine,’ people will say. Things aren’t fine. There are fronts where the Institute needs to make changes,” he says.

Rensselaer has not experienced major bias-related crises, there have been some incidents on campus springing from tension between different groups.

At an international festival, for instance, Turkish and Greek students argued about who had the right to display the flag of Cyprus. On another occasion the Black Students Association invited Kwame Ture (formerly Stokely Carmichael) to campus, prompting a group of Jewish students to protest what they believe to be his anti-Semitic stance. In a third instance, some women protesters charged the university with insensitivity in its handling of an alleged rape.

The Office of Multicultural Affairs, in conjunction with many other groups on campus, aims to make such conflicts springboards for discussion rather than triggers for further polarization. Peterson’s office, for instance, held a forum on race relations shortly after the Ture talk. A panel of faculty, staff, and students offered their perspectives on the issues, and a microphone was open for attendees to offer their views. Some curricular innovations are also accompanying Rensselaer’s efforts to build pluralism. Under the leadership of philosophy Professor John Koller, for instance, professors at the School of Humanities and Social Sciences (H&SS) are working to broaden students’ opportunities to learn about cultural differences. Last year, H&SS was awarded a three-year, $264,000 grant by the Department of Education to develop cross-cultural curricula with a specific focus on science and technology. “It’s an unusual program that could help make Rensselaer a national leader in this area,” says David Hess, assistant professor of science and technology studies. Hess is one of the members of the interdisciplinary group of scholars that is developing the curriculum and a member of the Multicultural Affairs Steering Committee.

“Science and technology vary considerably across cultures and time periods,” he explains. “To help students understand the complexities of that variation, members of our group are developing courses on science and technology in India, Japan, China, the Arab world, and Latin America.”

Rensselaer students, who are required to take a three-course concentration in an area of the humanities and social sciences, now have the option of concentrating on cross-cultural studies. Hess says plans are being made to offer a minor in the subject. It is also now possible for students to take their humanities concentration in gender studies.

The Office of Multicultural Affairs and H&SS also teamed up last semester to offer a one-credit course, “World Cultures Through Film.” The films focused on different cultures throughout the world and were shown free of charge to members of the Rensselaer community who wished to attend.

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Less formal kinds of education are increasingly taking place on campus. Student groups sponsor discussions, videos, festivals, and other events associated with Martin Luther King Day and Black History Month. Similar activities are in place to commemorate Women’s History Month.

Peterson and her colleagues see all this activity as a good beginning but stress that reaching Rensselaer’s long-term goal of pluralism will be a gradual process. “We’re on a journey toward something,” says Robinson. “I think we need to see that each step along the path is as important as the ultimate goal.”

The next step on the path of the Multicultural Affairs Steering Committee is to establish a pluralism benchmark—to see where Rensselaer is now and determine what the Institute should do to get where it wants to be.

The steering committee is examining areas critical to the achievement of a pluralistic community at Rensselaer. One subgroup is re-examining Rensselaer’s efforts to recruit and retain a diverse student body. Another group is charged with finding the most effective approaches to establishing a climate at Rensselaer that supports and encourages the development of a diverse community. A third group is developing policies and practices needed to maintain a pluralistic environment.

The ultimate goal of the Office of Multicultural Affairs is to create a Center for the Advancement of Pluralism on campus. “The areas now under study will be established as the focal point for coordination of Rensselaer’s efforts toward pluralism,” Peterson says. “It will promote cultural activities, research, education, and training related to multiculturalism.”

The success of Peterson and her colleagues will require the cooperation of the entire community. “The Office of Multicultural Affairs and its steering committee are not going to be able to change Rensselaer’s culture on their own,” McCloskey observes. “We all have to be part of the change. It needs to be incorporated into a campus philosophy that says all of us are here together so that we can be the best we can be.”
The Hartishek refugee camp (pop. over 200,000) on the Ethiopian-Somali border, May 1991. Photo by Scott Faiia.
Living and working in America, most of us can gauge our success by the size of our paychecks or by the bottom line on a computer spreadsheet. Scott Faiia ’73 measures success in numbers of human lives saved.

For fifteen years, Faiia (pronounced Fah-ee-ah) has worked for CARE, the international relief and development organization that has operated emergency aid and long-term development programs throughout the developing world since 1946.
Refugee children displaced by war and famine make it through one more day with food and water provided by CARE.

Following a two-year stint in the Peace Corps, Faia joined CARE as a field representative starting out in Bangladesh. He went on to serve as assistant country director in Indonesia, and then in Haiti. He was promoted to country director while in Ethiopia and is now serving as country director in Nepal.

The role of CARE country director requires technical and management skills enhanced by creativity and compassion. Faia's responsibilities include planning, implementing, and managing CARE activities that range from agriculture, forestation, and hydrology projects to nutrition, health, and education programs. “Fundamentally,” he says, “it comes down to community development. We foster people's ability to manage and support sound and sustainable policies of resource and economic development.”

In virtually every country where Faia has worked, the demand to meet the most basic human needs has been immediate if not critical. The problems he has faced are fundamental: ignorance, disease, starvation. In many cases there's been no time to test alternative solutions. There's barely been time to set priorities, gather available resources, and act. “Usually, our major accomplishment is preventing a worse disaster,” says Faia softly in deliberately chosen words. His speech is clear, specific, nonidiomatic—characteristic of one more accustomed to communicating with nonnative English speakers.

Having spent his entire career abroad in third-world countries, Faia admits he “feels like a foreigner” when he visits the United States. Straight out of Rensselaer, he first
went overseas in 1973 on assignment with the Peace Corps in Malaysia. He explains, "Maybe it was '60s idealism that led me to join the Peace Corps. I just know I wasn't comfortable with the idea of conventional options centering on personal needs."

Faiia’s Peace Corps experience was a natural prelude to a career with CARE, and he has always been happy with his choice. "It is unquestionably concrete and meaningful work," he says, "with no possibility of being bored and wonderful opportunities for creativity. The stimulation and challenge are tremendous."

Faiia met what was perhaps his biggest challenge in Ethiopia following the overthrow of the government in 1991. After 17 years of Mengistu’s oppressive Marxist-Leninist regime, 30 years of civil war, and 10 years of drought, Ethiopia’s fragile agricultural system was ruined and 24 million people were in danger of starvation. To make matters worse, tens of thousands of refugees were streaming into eastern Ethiopia to escape the drought, famine, and war in Somalia.

"Conditions were very tough... appalling," says Faiia, who was country director for CARE in Ethiopia from 1986 to 1991. In the eastern province of Hararge, the refugees’ situation became even more desperate during the last days of Ethiopia’s civil war. As government troops abandoned the capital and the three main rebel groups scrambled to claim larger pieces of territory, shipments of over one million tons of supplies from the United States, Europe, and Australia were blocked. Despite the crisis, Faiia was able to mobilize resources and, with 800 CARE workers, keep the relief programs functioning. They missed only three days of refugee water deliveries and 10 days of food deliveries.

Faiia’s friend Jack Laurence, an ABC News correspondent who covered the crisis, describes Faiia as “having the demeanor of an engineer, with the calm, reflective attitude of one who speaks precisely—especially on technical matters.” Laurence understands engineers. He spent a semester at Rensselaer but had to drop out when he became ill during the flu epidemic of 1957-58. He met Faiia for the first time in May 1991 while preparing an ABC Nightline report on the plight of Ethiopian and Somali refugees.

Faiia escorted the ABC News team to one of the most desolate and remote places in the world, the Ethiopian-Somali border. They traveled by plane, jeep, and on foot. Along the way Faiia talked to Laurence about the environment, pointing out details of the landscape and soil systems—or what was left of them after 10 years of drought and erosion. Finally they reached Hararge’s dry, miserable plateau. Even the hardened reporter was stunned by what Faiia and the CARE staff had accomplished.

Describing the situation, Laurence says: "Imagine the difficulties of organizing a water-supply system, bringing thousands of gallons a week, by truck, to thirsty refugees on the edge of nowhere. Drivers were getting ambushed and terrorized, land mines were blowing up their trucks, and government agencies were interfering at every stage. Scott made it happen. He has been responsible for saving many, many lives."

Faiia says modestly that his success in emergency logistics is rooted in the logical thought patterns ingrained in him at Rensselaer. Here he learned that being able to think rationally and logically is the only way to accomplish a task. From experience he learned that accomplishment bolsters the spirit. Now he lives by the simple rule, "If your spirit is gone, you’re not going to be useful."

That perhaps explains how he managed, under crushing conditions, to mount and maintain the extraordinary effort to save the Ethiopian and Somali refugees—which, in fact, was only one of his many successful accomplishments during his five years in Ethiopia.

During that time CARE spent $45 million in that country. Over 200,000 people were fed each month. For over three years, more than a quarter of a million refugees received water that was trucked long distances over rugged roads. Millions of trees were planted. Countless villagers live better lives today thanks to the construction of wells and stock ponds and vast terracing and soil improvement projects.

None of this was done with ease. "For every improvement," Faiia explains, "funds had to be raised, proposals developed, staff recruited and trained, agreements negotiated with the local government, and effective administration established... change never comes quickly."

"It is unquestionably concrete and meaningful work," he says, "with no possibility of being bored and wonderful opportunities for creativity."

Having watched Faiia in action, Laurence says he is “a real problem-solver. The man has a zest for life, even in the harsh and often frustrating circumstances of his job. It’s refreshing to witness.”

Despite having suffered a serious case of cerebral malaria and having had the windows of his home in Addis Ababa blown out by explosions during the civil war, Faiia says that he and his family enjoy their life abroad. His wife, Santha, a Malaysian citizen whom he married in 1977 during his Peace Corps service, is an accomplished photographer. Her work has been exhibited at the Royal Geographical Society in London, and one of her photographs appears on this issue’s cover. The couple has two children, a son, Ravi, 11, and a daughter, Shanti, 12.

An important diversion for Faiia is his love of classical music. He has a large tape collection and plays the piano, too. According to his mother, Rose Faiia, “He plays beautifully,” adding, “but of course I’m his mother. I would think so anyway.”
In Nepal, CARE is concentrating on reforestation programs to protect the watershed.

She recalls that he took piano lessons throughout grammar school but stopped when he went to high school at Fairfield Prep in his hometown of Fairfield, Conn. Then, surprisingly, a music appreciation course at Rensselaer rekindled his interest. Recently returned from a visit to the family in Kathmandu, Mrs. Faiia says that he now plays a small electronic piano he bought in Hong Kong.

Certainly life in Nepal, where the Faiias have been since July 1991, is a good deal safer than it was in Ethiopia. And the Nepalese government is more supportive of CARE’s programs, two priorities of which are water sanitation and environmental protection.

As an environmental engineer with a background in hydrology (at Rensselaer he did an analysis of Saratoga Lake and spent three months one summer studying the Housatonic River), Faiia is using his expertise to improve Nepal’s watershed. He is devising projects to combat soil erosion and silting of two major lakes.

He believes it is possible to provide an economically healthy environment for people without sacrificing the beauty of the natural environment. Economic growth and environmental protection are not mutually exclusive. “But,” he says, “there are definitely limits to growth and we cannot conserve everything. We must change our attitudes and practices.”

And yet, as he says, “change does not come quickly”—not even in the United States. Whenever Faiia returns, he hears Americans longing for the “good old days,” perhaps referring to the time when we didn’t worry about contaminated air, water, or soil.

He warns, “Our economic and environmental policies are probably not sustainable.” And he worries that the status quo does not satisfy the needs of most of the world’s people. “The inequity is disturbing,” he feels.

Admitting there isn’t one grand solution to humanity’s problems, he believes the key is to continue to solve small problems incrementally. “In the meantime,” he says, “we must

Above: Ethiopian women at work in a CARE supported village.

Left: Food distribution in Hararge province, Ethiopia.
A Malaysian boy and his goat.

A deep well under construction in Ethiopia. CARE worked with the Borana people to construct over 100 such wells in southern Ethiopia.

ABC Correspondent John Laurence and Scott Faiia at the Harlishek refugee camp, where Faiia was responsible for supplying water to more than 200,000 people.

assure that we don’t pass the point of no return in damaging the ecosystem that sustains us all.

This macro view is not something Faiia remembers learning at Rensselaer. Looking back from his present perspective, he says, “The [educational] environment was narrowly focused and connections to the outside world were neglected.” He would like to share with alumni the message that it’s “a big world out there,” and Rensselaer graduates, with their knowledge, skills, and physical and financial resources, are especially well-equipped to help solve world problems.

Despite what he’s seen and experienced, he admits that optimism still comes naturally to him. Faiia believes, “We human beings have wonderful opportunities before us. We can ensure that everyone has enough to eat and no one suffers unnecessarily. We can go beyond ideology and narrow self-interest. It just remains for us to do it.”

Scott Faiia would never suggest that the path he took is right for everyone. But his example proves to us all that there needn’t be any contradiction between logic and compassion.

Special thanks to Marianne Birrwell, assistant director of development and alumni editor, Fairfield Prep Magazine for her help in preparing this article.
New RAA President Thrives on Change

John Malitoris '78, the Rensselaer Alumni Association's new president, has a penchant for planning and a thirst for change. For even as he assumes the RAA's highest office, he is leaving a successful career in management consulting to go into business for himself.

At The MAC Group, where Malitoris worked for the last seven years, he helped other businesses plan for change. His specialty was operational consulting, and in his last project for the company he orchestrated a major business transformation, leading 26 consulting teams whose work delivered $270 million in savings to the client.

Upon completion of the project, The MAC Group promoted Malitoris to vice president; a month later, he left the company to create Grand M Enterprises.

"Some people would say I was crazy," says Malitoris. "But those people wouldn't include Mark Feinstein '77, who, with Malitoris and a third partner in Grand M, is buying rights to a franchise called Discovery Zone, which operates play environments designed to improve children's fitness. The Discovery Zone Corp., formed two years ago in the Midwest, has developed equipment that exercises kids while they play. Discovery Zone "stores" are operated in retail areas and encourage parents to play with their kids. Malitoris and his partners plan to open a number of stores over the next few years in eastern Massachusetts and southern New Hampshire.

"It's a little different from management consulting, but it's a real exciting concept," says Malitoris, who is president of Grand M.

As Malitoris begins his one-year term as RAA president, he anticipates changes in that organization as well. And he has played a key role in designing those changes. He chaired the RAA's long-range planning committee, which over the past year developed a revised plan for the association.

At the base of that plan is
a renewed sense of direction, says Malitoris. "We want to position the organization as being much more involved in the institution." That involvement includes areas the RAA has traditionally supported, such as alumni admissions, as well as such new efforts as Spectrum, the minority organization, and an active role in the development of the Institute's strategic initiatives, says Malitoris.

The RAA also is planning new programs in placement and career assistance.

The RAA structure itself will undergo change, says Malitoris, "to build a stronger base of leadership and have more focus in what we do." Each of five vice presidents will now oversee a specific function: volunteer management; outreach programs, such as admissions; alumni programs, including classes and clubs; finance and marketing; and fund-raising activities.

Malitoris comes to the RAA presidency well prepared. An active student—he was Grand Marshal and president of Phalanx, among many other activities—Malitoris has never stopped being involved with Rensselaer. He has been a member of the Rensselaer Council since 1980. He chaired the RAA Admissions Committee for two years and has been an RAA trustee for many years. He has been a fund-raiser, a director of Friends of the Folsom Library, and a trustee of the Newman Foundation. And he is serving his second five-year term as alumni president of the Class of '78.

Malitoris has continued to serve Rensselaer while aggressively pursuing his career—even during an overseas assignment in London. "It's one of the things that keep me from going out of my mind," he says, "There's only so much time you can put into work; at a certain point you need to feel that you're doing something good for somebody." And, reflecting on his many years of service to Rensselaer, he says, "I've been able to see quite a few things accomplished over the course of that time."

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Hartford Relives RAA Club of Year Honors

The Rensselaer Club of Greater Hartford was honored as the 1990-91 Craig W. Angell '35 Club of the Year during a black-tie ceremony at the Simsbury Inn in Simsbury, Conn., Jan. 18.

It was the second time the club had earned the honor in the six-year history of the award. The Hartford club also was named Club of the Year in 1986-87.

Rensselaer President Roland Schmitt presented the award to club President Angela Campisi '83, Hartford club president; and Bruce Masland '56, RAA president.

Club of the Year in 1986-87, Rensselaer President Roland Schmitt presented the award to club President Angela Campisi '83.

"The Rensselaer Club of Greater Hartford has now twice distinguished itself as an award-winning club through its diligent work to support the goals and objectives of the Rensselaer Alumni Association," said Schmitt.

Among the activities through which the club has distinguished itself, said Schmitt, are receptions for Rensselaer Medalists, which the club inaugurated in 1986, and raising more in phonathon pledges—over $60,000 in 1990—than any other club for three years in a row.

In addition to Campisi, 1990-91 officers of the club were James Peta Jr. '64, vice president; Allan Walch '50, secretary; Donald Miner '75, treasurer; Robert Storelli '87, alumni admissions chair; and Dieter Groll '89, alumni admissions co-chair.

Alumni, guests, and staff from both the main campus and the Hartford Graduate Center attended the cere-
Technology Fair Excites Children

The 50 Year Club joined with the Rensselaer Club of Hudson-Mohawk to sponsor the first-ever Rensselaer Technology Fair, a morning of demonstrations designed to give alumni and their children a hands-on look at cutting-edge technologies. The RAA Student Chapter hosted the fair, which was held on campus March 28.

Due to the success of the program—325 people were able to participate in the demonstrations, while an additional 800 were put on a waiting list—and the enthusiastic response of those who attended, plans are under way to repeat the fair next year.

Some 100 alumni brought their children, grandchildren, nieces, nephews, and friends, ranging in age from 2 to teen, to participate in demonstrations of such technologies as virtual reality, plastics recycling, hypermedia, electronic arts, and robotics.

Following the individual demonstrations, for which the participants were divided into small groups, nearly 400 people attended Rensselaer's popular Physics Magic Show, given by lecture demonstrator Annette Orfitelli. After an informal pizza lunch, the children received diplomas certifying that they'd attended the Rensselaer Technology Fair.

Sherwood Davies '40, a member of the 50 Year Club, brought his granddaughters, Jessica and Carolyn Gordon. "It was awesome!" said Jessica, age 10. "I loved the virtual reality—it's like you're in a different building. And the magic show was cool. I liked how she did all those colors."

"I liked the technology awareness module, and I loved the magic show!" said Carolyn, 7. "I hope I go here for college."

Davies said the 50 Year Club was enthused about sponsoring the fair for several reasons: to get alumni acquainted with the school, to provide a service to the community, and to develop an interest in science and math in younger minds. "If you could spark the minds of even five or six kids who would not otherwise have gone into math or science, it would be well worthwhile," he said.
Class Notes

Class Notes Deleted for Privacy Concerns
W hen I was hired six years ago to be Rensselaer’s third coordinator of disabled student services—and the first person in that role with a disability—the most frequent comment I heard from friends was, “It must be hard to get around that campus in a wheelchair.” My first glimpse of the hill did give me pause! But I soon found out that a quick look around didn’t tell the whole story.

In 1978, federal regulations mandated that any institution receiving federal funds be accessible to people with disabilities. More recently, the Americans with Disabilities Act of 1990 reinforces that mandate and extends it to the private sector as well.

Unlike many colleges, Rensselaer responded assertively to the 1978 regulations, hiring the first coordinator (then called the Specialist for the Handicapped) and creating an annual budget of $10,000 to remove architectural barriers.

The results of that commitment were already evident when I arrived in 1985. Common sense solutions were in place for many situations, such as moving classes when necessary from older buildings to the newer, accessible complex around the Jonsson Engineering Center. Ramps were installed in several other buildings. A quick drive-by of the campus might miss the progress we’ve made in improving basic access to our physical plant.

It’s important to emphasize, however, that access goes beyond bricks and mortar. We have nearly 30 students with learning disabilities such as dyslexia, who are covered under federal regulations, as well as six students with low vision. For these students, access means such things as extended test time, large-print exams, or taped recorded textbooks. One of our biggest challenges right now is finding ways to make the new RISC-based computer workstations accessible to visually impaired students, since commercially available products for print enlargement and voice output are designed for DOS-based platforms.

We’ve also undertaken a special effort to review our services for learning disabled students, including an effort to raise more awareness about “L.D.” These students have difficulty, believed to be neurologically based, in areas such as reading, written expression, and concentration for extended periods of time. With minor learning modifications, provided mostly by understanding faculty, these bright young people go on to successful careers.

I’m often asked by my counterparts at other universities what it’s like to work at Rensselaer. The most pleasant surprise has been the positive, can-do attitude applied to access issues.

On a campus full of engineers and scientists, many of whose research will directly or indirectly benefit people with disabilities, perhaps I shouldn’t be surprised. But the straightforward, problem-solving approach seems to carry over to nonacademic areas, too. From Admissions to Residence Life, from Facilities to the Registrar’s Office to Human Resources, staff recognize their role in providing access, whether to students or employees.

Our efforts today to improve access are part of a wider social movement to bring people with disabilities into the mainstream. Advances in technology and the new information age have allowed more disabled individuals to demonstrate their abilities. I can name a long list of recent graduates, some who would be considered severely disabled, who have gone on to good jobs with companies such as Microsoft, DEC, Texas Instruments, and IBM. They are capable, tax-paying employees, and we’re all better off for utilizing their talents.

We haven’t solved every access problem at Rensselaer, and only in my dreams have we flattened the infamous hill. But we’ve summoned impressive energy and inventiveness to tackle what remains. On a campus like ours, should we expect to apply anything less?
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