JOHN RIGAS ’50
Delivering Entertainment for Over 40 Years

ALSO IN THIS ISSUE
Congressman John Olver ’55 (D-Mass.)
Virtual Reality, Architecture, and RPI
NHL great Adam Oates ’91
This year marks the 100th anniversary of the Ferris wheel. It was Rensselaer grad George Ferris (Class of 1881) who conceived and built this "mechanical wonder" for the World's Columbian Exposition in Chicago in 1893. To celebrate, Rensselaer will kick off Grand Marshal Week '93 with a spring carnival, featuring, of course, a modern version of Ferris' great wheel (see story, page 34).

FERRIS WHEEL FACTS:
At the time, it was the largest wheel ever built, at over 260 feet high and with a 790-foot circumference; the axle (45 feet long, 32 inches in diameter, and 70 tons) was the largest piece of steel ever forged; each of the 36 carriages was capable of holding up to 40 people, for a total of 1,440 riders!
It's happened again. In reading two of the feature stories in this issue of the magazine, I've gathered more evidence supporting a premise I espouse regularly: That a technological education is the foundation for just about anything one wishes to do. Neither of the two alumni featured on the forthcoming pages, John Rigas, Engineering Management '50, a cable TV mogul, nor John Olver, Chemistry '55, a Congressman, had an idea where his unusual career would take him when he first embarked on a Rensselaer education. But both remark that the analytical training they received at Rensselaer was indispensable in the advancement of those careers. The trademark of a Rensselaer alumnus—the ability to identify, partition, define, and solve a problem—is a trait of value to many important human endeavors.

The image of a technological education as less versatile than an education in the liberal arts is just no longer true, if it ever was. In my five years as president of Rensselaer I have met hundreds of alumni who prove just how wrong the prevailing wisdom can be. You've met many of them yourself, through the pages of this magazine. A few spring immediately to mind: the two Rensselaer graduates who reconstruct the facial anatomy of young patients with severe malformations; the alumnus who has devoted his life to helping underdeveloped and developing nations through CARE, or the top gun at TOPGUN, the Navy Flight Weapons School at Miramar Naval Air Station in San Diego.

One of my favorite stories is of an alumni dinner in Los Angeles several years ago. I sat next to a man who had graduated from Rensselaer in 1947 with a degree in mechanical engineering. He spent the dinner telling me how much he valued his education, how much it had helped him in his career and how much it had contributed to his obvious success. And he is a Catholic bishop!

Certainly, these unconventional careers are not the ones usually envisioned when we think of universities like Rensselaer. And most graduates do go into jobs that are “conventional” —if you consider designing space vehicles or developing advanced software or inventing new composite materials or solving environmental problems “conventional.”

But all careers, in today's complex times, are expanding in scope and dimensions. Technology is moving not only in the space of economics and markets but also in regulations, politics, social concerns, global trends and ethics. The pace of technical advances and their impact on society and business is being determined by much more than how fast scientists can discover and invent and how fast engineers can design and manufacture.

For every prominent industry today, the locus of the most important technological decisions is moving out of the laboratory, out of the design center, off the manufacturing floor and into the executive suite, into the executive agencies of government, and even into the legislative halls of Congress and state legislatures.

A technology-based education should be viewed as a “liberal education” for students of the next century. Scientific principles and modes of thought should be the centerpiece of what the liberally educated, future leaders of the world are expected to know. I believe that Rensselaer is leading the way.
Those Anonymous Engineers

When you [publish] an article about the Brooklyn Bridge [Dec. '92], reference should always include the best book ever written on the subject, David McCullough's *The Great Bridge*.

He did a major part of his research at RPI, discovering historical papers tied in shoelace and hardly ever looked at.

*The Great Bridge* could and should be required reading for all those attending Rensselaer. It enlivens the subject, covering history, heroes and heroines (Emily Roebling in particular), engineering, morals and ethics, and so many other disciplines under its wonderful title.

When you read it you will love and respect RPI and engineers in general that much more.

Arthur Goldstein '53
Larchmont, N.Y.

*[The bibliography with Professor Petroski's original article did indeed cite McCullough's work.]*

Henry Petroski's article brought back recollections your readers may find of interest.

As a senior editor of *Engineering News-Record* in the late 1950s, one of my responsibilities was covering the many doings of Robert Moses, which included construction of the Verrazano-Narrows Bridge. Mr. Moses took great care in choosing the engineers who designed his projects. I dare say he knew the top dozen or so on each project.

In the 1960s I remember putting together a program on design and construction of the Verrazano-Narrows Bridge featuring Herb Rothman '43, who was one of Milton Brumer's principal assistants on the project. I remember asking Herb what was the most notable aspect of Verrazano-Narrows. He replied, "...getting the $325 million." If memory serves, the $325 million price tag was the largest for a bridge up to that time.

Finally, there is the Holland Tunnel completed, if I recall correctly, in the late 1920s and named for the head engineer. I believe this was the first large engineering project in the New York metropolitan area named for its designer (as I remember the Goethals Bridge was named in honor of the Panama Canal builder).

Howard Jacoby '50, P.E.
East Norwich, N.Y.

If Gallup Had Asked Me

As a graduate of RPI, I have considered it my obligation to take part in the annual Rensselaer Fund phonathon. I have participated over the last several years.

The Gallup survey [Dec. '92] indicated that 45% felt that RPI's fund-raising efforts were only "somewhat effective." Telephone solicitation and the feeling of being pressured were cited as being particularly ineffective.

But when I recently approached the Rensselaer Alumni Association (RAA) with a painless way of making money for the school [a no-surcharge telephone calling card], I was rebuffed. I was told that they "only had so much energy to devote to fund-raising." Apparently, they were (are) working on travel promotions.

If the travel promotions are working, that's great. Perhaps our program is not for RPI; but, maybe the RAA needs to purchase a large supply of vitamins.

The poll tells the story better than I can. To reject a fund-raising idea that has been successfully used by others is disturbing. To reject it because of "lack of energy" is extremely disturbing.

My company does receive compensation from the long-distance carrier we utilize, so my motivation is not entirely altruistic. But, I would personally feel better about contributing to RPI if I felt that the RAA at least puts forth an effort to explore viable fund-raising options, whether mine or someone else's.

George P. Bein '61
Buffalo, N.Y.

I would like to make some observations about the Rensselaer-Swiss Federal Institute of Technology (ETH) exchange program which I, along with Dr. Heinrich Medicus, initiated just over 20 years ago.

This successful program provides some answers to the vital questions posed by President Schmitt and the Alumni Survey [Dec. '92]. It shows how RPI can better interact with students, allow students to become well-rounded, culturally astute leaders, work in conjunction with another world-class research institute, and provide a perspective that few U.S. universities can provide.

I was the first undergraduate student from RPI to go to ETH. I did this during the 1971-72 academic year. I felt that such a year would broaden my perspectives and allow me to improve my German language skills. My adviser, Dr. Heinrich Medicus, an ETH alumnus, secured me a position at ETH and a stipend for living expenses. Through his efforts and subsequently those of Professor Belz, this program has continued for over 20 years.

I urge you to look at the elements of that exchange program. For in it, RPI helps establish its world-class reputation in technological research and education and also indicates how despite an environment of academic rigor RPI allows for a most well-rounded type of education.

I have an advanced degree in physics, a medical degree, and am active in cancer research. I have called on my RPI education many times and my experience in Switzerland helped prepare me immensely for life. I have very fond memories of RPI and continue to maintain contacts with others of the class of 1973. I turned down positions at Ivy League schools at the undergraduate and graduate level and have served on the faculty of at least one Ivy League school. I feel RPI prepared me as well or better than any of them could have.

Lawrence R. Coia '73, M.D.
Philadelphia, Penn.

Continued on page 4
I wonder how seriously the alumni survey pursued the reasons some alumni do not support RPI. I am one of those with very mixed feelings about the school, and I suggest that many of the alumni of my era may have similar feelings. Perhaps if these feelings are aired, it may help a new generation of administrators avoid the same or related mistakes.

In [my] entire four years at RPI, I never got meaningful counseling on anything. I feel that there was strong prejudice in favor of New York state students, students who had previous ties through parents, or who went far out of their way to cultivate faculty. There was, and I think is, something wrong with the ingrown academic community. I still deeply resent the way I was treated.

My experience with [the alumni organizations] has [also] been unhappy. Again, there seems to be a "club" of those with special faculty contacts and more RAH-RAH in their systems than I ever had, and they don't really want participation by anybody else.

Even so, for several years I did make regular annual contributions and filed the papers to get my employer to contribute also.

Then came the 10th class reunion. I took vacation, arranged [child] care, and came hoping to show [my wife] where I went to school. I left angry and unhappy. The place was locked up like a vault. No faculty around. I haven't sent a penny since, nor will I ever.

Why should I send money to a clearly elitist school which has never really tried to make me a part of the family? The alumni magazine could at least show some desire for feedback by indicating the address to which comments could be sent, in print big enough to read.

The formal science training I got at RPI was good for that era, but I feel that the school was, has been, and continues to be a dismal failure in human relations to their students and alumni.

I suppose I'm like survivors of many situations—proud to have made it in a tough situation, with very little understanding or help from anybody.

What could RPI have done differently? The biggest thing would have been some indication in every department that students were important and not just somebody to be coerced and pushed around.

L.R. Erwin '53, PE
Livonia, Mich.

Power to the Students

The "Rensselaer Experience" is unique. The student body is motivated, mature, diverse, and compelled to make a difference. The administration is energetic, responsive, visionary, and open to student desires.

It is only now that I realize the responsibility, trust, and growth opportunities Rensselaer gave me.

My first semester was a "gut check"—could I handle the pressure of such a prestigious school while playing football? For the first time my confidence was truly tested. The first semester proved to be a success and I began to explore other opportunities Rensselaer offered.

Each step I took was greeted [by] an administration that was willing to empower their students. This is quite possibly Rensselaer's single greatest asset. Students are taught how to solve problems, make decisions, and lead for themselves.

It is this method of teaching, self-empowerment, that separates Rensselaer's graduates in the business world.

I have witnessed time and time again instances in which Rensselaer better prepared me than my fellow employees. Rensselaer's high expectations in the classroom coupled with its ability to grant responsibility to its students gives its students the skill to undertake seemingly insurmountable tasks with vigor, responsibility, and a sense of knowing it will get done.

Brendan P. Keegan '90
Fairfax, Va.

Correction: Among the obituaries in the December issue, we mistakenly listed Jerome Reinert '56. It was Mr. Reinert's wife, Madeleine, not Mr. Reinert, who died on Feb. 4, 1992. We regret the concern this error caused Mr. Reinert's many friends and classmates.

Rensselaer wants to hear from you. In order to provide space for as many letters as possible, we often must edit them for length. Please address correspondence to: Rensselaer, Office of News and Communications, Rensselaer Polytechnic Institute, Troy, NY 12180—or fax correspondence to us at (518) 276-6091.
JOHN OLVER is not today's typical made-for-television politician. Though standing 6'3", he is often described as a bit stooped. On the campaign trail he frequently drew laughter by wiping one hand across his balding brow and noting that he was no blow-dried politician. His slogan was "a work horse, not a show horse."

Olver, a former chemistry professor and the only Ph.D. scientist in Congress, looks like he'd be more comfortable in a classroom than a political back room. But politics have been in his blood for a long time. He has a reputation for knowing where he stands and not backing away from the good fight. And like few others, he comes right out and describes himself as a liberal.

"I just happen to believe that we have a responsibility to use government to effect change."

Olver was first elected to Congress in a special election in June 1991, replacing the revered Sylvio Conte, who had died during his 17th term in office. Conte had been a native of the district and extremely outgoing. Olver is much more the quiet, thoughtful intellectual. On the surface, it didn't appear that it would be an easy transition. But with a loyal cadre of educators, women's rights activists, public employees, and environmentalists behind him, Olver was easily re-elected in his own right last November.

Olver is philosophical about any comparisons to his predecessor. "In a sense, he was so beloved, I am held up to an extremely high standard," Olver explains. "But I can't let that bother me. I'm comfortable knowing I'm doing the best I can. If I can become half the politician he was over a period of time, I will become quite successful."

"Conte was a native and lifelong resident of the blue-collar Pittsfield, a Catholic with immigrant parents who built his influence in Congress. Olver, a native of Pennsylvania who first came to the district to join the faculty of the University of Massachusetts at Amherst, is known for his intellect.... Uncomfortable at times in the media glare, Olver is often awkward with reporters. On the campaign trail he was known as less than a barnburner with crowds. But he has built a following in the liberal confines of Amherst, where his habits of handball, cross-country skiing and rock-climbing in a purple Grateful Dead T-shirt seem as fitting as Conte's cigar and Red Sox hat did in Pittsfield. If he lacks charisma, Olver excels in preparation and organization."

His schooling at Rensselaer may have had a lot to do with that. "RPI was an excellent preparation for politics," he says. "My scientific education was invaluable to me—in the way I think about problems and approach problems. This analytical thinking that Rensselaer excels in teaching, this excellent training in analysis, has served me extremely well."
Olver came to Rensselaer at the ripe old age of 15, and graduated with a B.S. in chemistry at 18. He was raised on a farm in the town of Honesdale, in the northeast corner of Pennsylvania—"about as close to Troy as Pennsylvania can get," he says. Olver does not recall that being young hindered his college experience in any way. "I think I was just too busy to worry about it," he chuckles. "I was fairly happy at RPI. I have no complaints about RPI—not even about the food in the dining hall. Maybe that's youth."

Olver holds many fond memories of his Rensselaer experience and formed many strong friendships. "There were only 40 or 50 students in those February classes," he says, "so we tended to become pretty close. I established some lifelong friendships that had strong influences on my later life." One of those classmates, Bernard Gottschalk, served as best man at Olver's marriage to Amherst professor Rose Richardson, and remains a close friend today.

After Rensselaer, Olver received a master's degree from Tufts, taught chemistry at a vocational school, and then went on for a Ph.D. at MIT. He spent several years as a chemistry professor at the University of Massachusetts at Amherst before jumping into politics at the state House level. After two years in the House he spent a decade in the state Senate before moving on to Washington.

Was it an odd career move for a professor to become a politician? "I've been in politics 24 years now, so my academic background seems in some ways irrelevant," he says. "But I will say that academic politics is at least as difficult as Congressional politics. But I'm not the first to say that. I know Woodrow Wilson talked about it."

For someone only elected to Congress in 1991—and just beginning his first full term—Olver has done very well for himself. This January, he was appointed to the prestigious Appropriations Committee. One of his subcommittees is Foreign Operations, Export Financing and Related Programs.

His committee assignment will allow him to combine his dual interests in economic development and the environment, favorite topics he manages to weave into almost any subject that comes up. "For decades, emerging nations like Eastern Europe have been creating environmental havoc and health problems by the way they handle hazardous waste and use energy," Olver says. "I believe there are a great many opportunities for American energy and environmental cleanup companies to have a significant business presence in Eastern Europe and all over the world, cleaning up the kinds of messes that Americans had to face up to earlier."

As a former professor, Olver also has a soft spot in his heart for higher education. In fact, that is the one issue that has spanned his entire political career at both the state and national levels. (His previous Congressional committee assignments included a post on the Education and Labor Committee.)

"I was quite involved in higher ed in my position as Senate chair of the Legislative Ways & Means Committee in Massachusetts, and I continue my involvement in Congress,"
Army Corps of Engineers in August 1992. The Corps is responsible for construction of military installations and the Army's civil works program, which includes projects for flood control and navigation nationwide. The Corps provides engineering assistance in the wake of natural disasters and engineering support to 30 other federal agencies. As Chief, General Williams is the senior staff engineer for the Army, supervising worldwide facilities and advising on combat and topographic engineering.

Other alumni in Washington who are active in the public policy scene include DR. LOUIS C. IANNIELLO '54, Associate Director for Basic Energy Sciences in the Office of Energy Research in the Department of Energy; ARTHUR GAJARSA '62, Attorney at Law; DR. FREDERICK LEAVITT '51, Executive Director of the Council for Chemical Research; DR. WILLIAM OWCZARSKI '59 M.S., '82 Ph.D., Research Fellow with the Center for Research and Technology Development of the American Society of Mechanical Engineers; and ROBERT B. COSTELLO '47, '48 M.C.E., former Under Secretary for Acquisition in the Department of Defense.

he says. “I've played a strong role in financial aid legislation. Legislation that helps students go to school remains most prominent in my mind. And how we produce teachers in science and math and technology is equally critical to our economic future.

“The teaching of the students who will get to college is so important,” he continues, warming to the subject as he goes. “We must play a prominent role in making them more skilled technologically.

“I'm also a strong supporter of R&D for science—especially 'small science.' I believe small science raises all boats. Big science [Star Wars, Hubble telescope, superconducting supercollider, etc.] while important, is more indirect. It can't be touched by as many people.”

Like his alma mater Rensselaer, Olver is very interested in the role that colleges and universities can play in helping industry. “Last year I sponsored legislation to create a technology extension service that helps extend new technologies from universities to small companies to help them become more competitive. I believe we must become much more aggressive in pushing the technology-transfer concept.”

During his campaign, Olver was quoted as saying he would like to forge closer relationships between his Congressional district and Rensselaer and the University of Massachusetts, using those institutions as sources of new ideas to stimulate business.

Olver's technology-transfer legislation passed the U.S. House last year. He said he plans to reintroduce it in the new session and work hard to see it through both houses. He feels confident that his new committee assignment and the new tenor in Congress will help assure its passage.

Olver is not known for backing away from challenges or controversy. Over the years, he has "mixed it up" with political adversaries over such hot potatoes as a bottle deposit bill, abortion, taxation, gay rights, and prison furloughs, to name just a few. He has been described as having the courage of his convictions and that seems to hold true in his comments.

“I don’t avoid controversial issues,” Olver says. “And I don’t always make friends as a result. There have been some pretty heated battles—over hazardous waste, auto efficiencies, bottle deposits, and many, many social issues over the years—but if I believe in something I will move up front on it.”

R e m i n d e d of all the scandals and gridlock revolving around Congress in the last decade, Olver was asked whether he thought being a Congressman is still an honorable profession. “Well, my stock went up incredibly with November’s election,” he says. “The previous administration was quite out of touch. It had sunk into such an ideological position that it bred inaction and cynicism. The president was an ideologue.”

Would the former president say the same of him? Olver is quick to respond: “I don’t give a damn.”

A sponsor of campaign finance reform legislation in the past, Olver says he hopes that the upcoming Congressional session brings major election reform. “We are spending much too much money and effort on political campaigns,” he says. “It becomes a continuing exercise.”

What about the controversial Political Action Committees, or PACs? He answers without hesitation. “Oh, yes, I take PAC money. I believe that people should be able to band together to achieve ends. Pooling of resources, especially among people of modest means, like members of labor unions, is an entirely legitimate approach. Individual contributions give power only to the wealthy, some of whom can have an insidious agenda.”

Olver seems buoyant about the 103rd Congressional session and positively thrilled with the election of fellow Democrat Bill Clinton, though it might appear, at least on paper, that his politics are closer to Hillary's than Bill’s. “Oh, I think Bill is great,” he enthuses. “I think they’re both great...extremely bright, politically adroit, capable people. Clinton is going to be more like FDR than any president in this century.”

Was FDR an idol? “Well, Roosevelt was by no means a representative of true unreconstructed liberalism,” he says, “and besides, I was only 8 years old when he went out of office. No, my political hero was Hubert Humphrey.”

Asked how he will judge whether he has been successful in his political career, Olver again waxes philosophical. “People who go into this with a list of goals that they must achieve to feel successful will be doomed to failure. You must be pragmatic in this business. I do the best I can. I compromise. Issues evolve. When I see opportunities to improve the lives of people, create jobs, help the economy, create a better standard of living, I take them. I do what I can, as best I can. I'm happy with what I'm doing.”
New Board Member Brings Fresh Perspective

Janet Rutledge '83

"I bring a fresh perspective to the Rensselaer Board of Trustees—the combined minority, female, academic, and young alum perspective," says Janet Rutledge '83, who was elected at the February meeting.

Rutledge has come a long way from the high school student who was told that black women don't take calculus. After receiving her B.S. in electrical engineering from Rensselaer less than ten years ago and her M.S. from Georgia Institute of Technology in 1984, she received her doctorate, also from Georgia Tech, in March 1990.

An assistant professor in both the department of electrical engineering and computer science and the department of audiology and hearing at Northwestern University, she has patented a hearing device based on digital processing. Rutledge founded her own company, Digital Communications Research Inc., to develop and market the device.

As the keynote speaker at a recent Women's Forum at Rensselaer, Rutledge stressed the importance of "filling the pipeline" with qualified women and minority candidates. She emphasized that accomplished women should act as models, "existence proofs," that the struggle is worthwhile and success is possible. Women and minorities, she stressed, must not only be tolerated but welcomed.

Rutledge has been active in the Rensselaer Alumni Association (RAA). From 1990-1992, she was president of the Chicago chapter, which she helped to revitalize. She is also a current RAA Board member.

Crain's Chicago Business named Rutledge one of their "Top 40 under 40"—outstanding people in the Chicago metropolitan area. Her academic and research honors include membership in Sigma Xi (a scientific research honor society), Tau Beta Pi (an engineering honor society), and Eta Kappa Nu (an electrical engineering honor society). Rutledge is also a member of the Acoustical Society of America, the IEEE Signal Processing and Communications Societies, and the National Society of Black Engineers (National Vice Chairperson 1983-84). ☐

TROY BUYS TIME FOR WINSLOW BUILDING

The Winslow Building on Eighth Street will see another spring, thanks to an eleventh-hour proposal from the city of Troy.

Just as Rensselaer was preparing to announce that the century-old building would have to be razed—due to overwhelming stabilization and rehabilitation costs and the Institute's current budget situation—the city of Troy submitted a proposal asking to assume ownership and liability of Winslow.

Begun in 1865 and finished the following year, the building was first called the Winslow Chemical Laboratory in honor of Rensselaer's fifth president, John F. Winslow, who pushed for the addition of a chemical laboratory on campus and donated $5,000 toward that end.

Built in the aftermath of the great fire that destroyed much of Troy, Winslow was damaged by fire three times in its first 50 years.

In fact, a fire in 1904 that destroyed the main part of the building led to Rensselaer's first construction on the east side of Eighth Street.

Winslow became known as "the Shop" after it was converted for instruction in mechanical and electrical engineering in 1907.

The building has been unoccupied and used for storage since about 1970. This long period without heat and the yearly freeze-thaw cycle have taken their toll on the structure. Last spring, a section of brickwork fell from the east side, landing on the sidewalk along Eighth Street.

Under the terms of an agreement between Rensselaer and the city, Winslow will be leased to the city of Troy for $1 until Sept. 1. All of the burden of insurance, maintenance, utilities, safety, repair, and use falls to the city.

In the event that no long-term use has been fully developed, planned, and funded by the deadline, Rensselaer will spend up to $35,000 of its own funds to demolish the building on or about Sept. 10.
therefore, core samples taken from the stream bed and river banks, tissue samples from plants and animals, and water samples taken upstream and downstream provide a detailed chronicle of what the system has experienced and how it responded.

Bopp says, "because we can track certain compounds rather precisely, we are also gaining tremendously important knowledge about how a river flows, how sediments deposit, how chemicals move from water to air and from air to water, how the food chain works, what effect thaws and floods have on transport of particles, and much more."

Scientists can then use those findings to predict what can be expected from future releases of toxic materials or from proposed repudiation plans, he said.

Bopp is studying the PCB contamination in the upper Hudson River to compare current levels with what he found in an exhaustive study completed in 1986.

THE GREAT JUICE-OFF

Sophomore engineering students enrolled in Introduction to Engineering Design—challenged to use their creativity and knowledge to solve a societal problem—built working prototypes of an automated powdered-drink dispenser. The course stressed team-building skills. The finished products were displayed at the "Great Juice-Off II." Pictured is a team from professor Yannick LeCox's class: (from left) Monica Steward, Kirsten Rosso, Ecron Thompson, Michael Stefanini, Breyt Coakley, Joseph Porter Jr. and Roger White (not pictured), all class of '95.

Pollution Runs Through It

Injecting a foreign substance such as barium or iodine into the body gives doctors a better X-ray. Similarly, an unpleasant dose of chemicals can give a clear picture of how a stream or river works, according to Richard Bopp, associate professor of earth and environmental sciences at Rensselaer.

Researchers can document the time and place of significant release of pollutants. And contaminants such as PCBs, DDT, and nuclear fallout endure in natural systems for many years. In a stream with a history of pollution,

U.S. Representative Gerald Solomon (R-Queensbury) inserted in the Clean Air Act of 1990, "This appropriation was not unexpected," Solomon said of the funds, which will be used to monitor the impact of Clean Air Act controls on reducing acid rain. "But it's good to see that any last-minute barriers to releasing the funds have been cleared. It's important to know how well we're doing in reducing this threat to our forests, lakes, and streams."

The project, now in its earliest stages, is expected to take six to 10 years. In January, researchers from top universities and government agencies met on campus to review completed and continuing research programs, identify major knowledge gaps where new research is needed, and recommend a collaborative research strategy.

"This program would not have been possible without the strong support of Congressman Gerald Solomon," said Larry Snavley, vice president for government relations.

The Fresh Water Institute, with research facilities on the main campus and at the field station on Lake George, provides hands-on opportunities to study a number of ecosystems and conduct basic and applied research on environmental problems.
Reacting To Chemistry

Rensselaer graduate student Ruth McEvoy, this year's recipient of a prestigious award from the American Chemical Society, took a rather circuitous route into the field of chemistry.

McEvoy is not your typical Ph.D. candidate—at least when it comes to her past experience. McEvoy didn't envision a career in the sciences when she obtained her original undergraduate degree in English literature. It wasn't until after she took time off to care for her young children that her thinking began to change. Even then, her decision to pursue training in medical technology was motivated by practical concerns.

"One of the reasons I wanted to go into medical technology," McEvoy says, "was that I could get a degree fast and go to work part time to help pay for my husband's Ph.D. work."

It was a course in chemistry that turned her on to the idea of getting a Ph.D. herself. "Of course," she says, "that meant that I had to go back and get a whole new undergraduate degree."

McEvoy is the recipient of the Paul Flory Fellowship. Administered by the Rubber Division of the American Chemical Society, which provides $10,000 for one year and an option to renew for a second year, the fellowship supports McEvoy's research, aimed toward understanding the physical interactions between plastics and compatibilizers, which may lead to improving plastics recycling.

"What I'm really looking at," McEvoy says, "is the physical interaction at surfaces and at interfaces between compatibilizers and plastics. Once we know what that is, perhaps we can develop better and more effective compatibilizers."

McEvoy was nominated for the fellowship by Sonja Krause, professor of chemistry.

In addition to pursuing her graduate work, McEvoy is teaching at Siena College this year. She hopes to complete her Ph.D. in the spring of 1994.
 Delivering The Goods

When you call an overnight delivery service, you usually don’t ask how much of the trip will be by truck, rail, or plane. The service takes care of the details. If a problem arises, a modern information system tracks the package.

When planning a trip, you call a travel agent with on-line access to a unified reservation system. The agent gives you the options as to time, cost, and service.

George List says that if the United States is to remain competitive, a seamless “intermodal” transportation system must offer similar service to freight shippers. By that he means highway, rail, water, and air transportation should no longer be seen as distinct, but as part of a unified system that provides service appropriate to the needs of a shipper.

List, associate professor of civil engineering at Rensselaer, co-authored a white paper on the subject for the U.S. Department of Transportation.

The United States has the components, List says. Highway, rail, air, pipeline, and water networks are well-developed. But connections are needed.

His white paper outlines steps the federal government can take. These range from revising regulations to investing in specialized connections like rail-to-water links and special-use freeway ramps.

Also needed: operational standardization (standardized containers, for example) and adoption of common data formats to send information over a new high-speed network.

ROBERT C. BLOCK, professor of engineering, has been appointed associate dean of engineering for academic and student affairs. Block joined the Rensselaer faculty in 1966, and has served as department head of nuclear engineering and engineering physics since 1987. He is a fellow of the American Nuclear Society and a recipient of the Glenn Murphy Award for Excellence in Nuclear Engineering Education. Block replaces Paul M. DeRusso ’53, who is on sabbatical and will retire effective Sept. 1.

SAM KIM, associate professor of computer science, is the first recipient of the Computer Science Teaching Excellence Award. The award, which is co-sponsored by IBM, recognizes and encourages high-quality teaching of undergraduates in computer science.

SAL RESTIVO, professor in the department of science and technology studies, has been voted president-elect of the Society for Social Studies of Science, an international organization of approximately 600 scholars devoted to the promotion of research, learning, and understanding in the social analysis of science. Restivo, a founding member of the society, becomes president in November.

STEPHEN ROECKER, associate professor in the department of earth and environmental sciences, was honored recently by the U.S. Geological Survey for having submitted the best technical article in 1991. Roeker received the award for a report on research designed to more accurately determine the location of an earthquake. The paper was published in the Bulletin of the Seismological Society of America. It was co-authored by Joan Gomberg and Kaye Shedlock of the U.S.G.S., Golden, Colo.

JULIAN COLE, Margaret Darrin Distinguished Professor of Applied Mathematics, has received the AIAA’s Fluid Dynamics Award. He was recognized for “outstanding and pioneering contributions . . . that have provided the foundation for numerous advances in aeronautics.” Cole came to Rensselaer in 1982.

MICHAEL PODOWSKI has been named head of the nuclear engineering and engineering physics department. First a visiting professor and then associate professor in nuclear engineering at Rensselaer, Podowski received his M.S. and Ph.D. from Warsaw Technical University. He is a recognized authority in two-phase flow and heat transfer, and reactor dynamics and safety.

DON MILLARD, assistant director of the Center for Manufacturing Productivity and Technology Transfer; ROBERT C. BLOCK, chairman of nuclear engineering and engineering physics; and KARL UMSTADER, a graduate student in engineering physics, have been honored for developing a non-contact technique for testing printed wiring boards. Organizers of the International Electronics Manufacturing Technology (IEMT) symposium selected a presentation by the researchers as “Best Paper” for the 1991 symposium.

NIMAI MUKHOPADHYAY, professor of physics, has been elected a fellow of the American Physical Society. He joined Rensselaer’s faculty in 1981, and has held visiting professorships in several institutions in the U.S. and Europe.

JOYCE R. MCLAUGHLIN, professor of mathematical sciences, has been appointed the Ford Foundation Professor of Mathematical Sciences. Her research area is in the application of inverse spectral theory, and she is recognized for establishing a new research field called “inverse nodal problems.”

ROBERT G. LOEWY ’47, Institute Professor of aeronautical engineering and mechanics and director of Rensselaer’s Rotorcraft Technology Center, has been elected an honorary fellow of the American Institute of Aeronautics and Astronautics (AIAA) for 1993. Loewy was honored for, among other things, “seminal engineering contributions to the science of aerospace design.” He joined Rensselaer in 1973 as academic vice president and provost and has been Institute Professor since 1978.
Funding Renewed For Rotorcraft Center

The U.S. Army Research Office (ARO) will continue funding the Rensselaer Rotorcraft Technology Center as a Center of Excellence for another three years.

The ARO will provide $200,000 per year for the center. With matching funds from industry, total funding for the center will be approximately $575,000 a year, or $1.7 million for the three-year period, according to Professor Robert G. Loewy '47, Institute Professor and director of the Rotorcraft Center.

Loewy says industrial support comes from four major U.S. helicopter manufacturers—Bell Helicopter, Boeing Helicopter, McDonnell Douglas Helicopter, and Sikorsky. The Rotorcraft Center also has contracts with major helicopter companies independent of the renewal contract and matching funds, Loewy says. The Rotorcraft Center at Rensselaer was one of three established by ARO in 1982 after a nationwide competition. Other centers are at Georgia Institute of Technology and the University of Maryland.

The initial five-year contracts were renewed for five years in 1987. In 1992, another national competition was held, after which the Army agreed to renew all three centers for three more years.

Research at Rensselaer’s center tends to concentrate on structural dynamics, composite structures, and aeroelasticity, according to Loewy. “But our educational programs in rotorcraft technology must be comprehensive, so students will be well prepared for leadership roles in the industry,” he says.

The strength of Rensselaer’s educational programs can be seen from the success students have had in national competitions, Loewy adds. Each year, Rensselaer students win scholarships in the competitive program of the Vertiflite Foundation of the American Helicopter Society (AHS), he says.

Rensselaer students also score well in the annual nationwide design competition sponsored by the AHS; last year they took first place in the undergraduate group, and this year, second place at the graduate level.

STRATEGIC INITIATIVES: RENSSELAER MAKES STEADY PROGRESS

A little over a year ago, Rensselaer adopted a bold plan for achieving pre-eminence in the 21st century. This plan—the Strategic Initiatives—calls for focus in three areas: interactive learning; manufacturing, materials, and design; and energy and environment. It also calls for the creation of an enriched and supportive campus environment.

Significant strides have already been made. In a recent report on the initiatives, Provost James Meindl heralded progress all across campus. Here are just a few of the most noteworthy accomplishments in each of the Strategic Initiatives:

INTERACTIVE LEARNING
• Our flagship program, computer calculus, has been successfully extended to all freshmen.
• An NSF blue-ribbon panel said Rensselaer’s groundbreaking project “will have a profound impact on [mathematics education] reform efforts.”
• Over 25 courses incorporating new interactive learning principles were introduced or redesigned this year.

• The Anderson Center for Innovation in Undergraduate Education and the Mary Jane and Hugh Archer ’37 Center for Student Leadership Development have supported curricular efforts with expertise in communication skills, multimedia technologies, and group exercises.
• Plans are under way for the Center for Interactive Learning—a building that will act as a home and...
showcase for the best innovative pedagogical efforts.

**MANUFACTURING, MATERIALS AND DESIGN**
- A $4.5 million award from New York state is funding research in the new Center for Polymer Research and will assist with the renovation of the Materials Research Center.
- Faculty received new awards totaling over $10 million, including a five-year $4.3 million award for work in composite structures.
- New curricula include a master's in Manufacturing Systems Engineering and a manufacturing track in the Management and Technology MBA.
- The Center for Manufacturing Productivity and the Design Research Center announced a new venture, the Design and Manufacturing Institute.

**ENVIRONMENT AND ENERGY**
- New programs and courses include an undergraduate degree in environmental studies, an MS in Environmental Management and Policy, an MBA concentration in Environmental Management, and an environmental studies tract in Science and Technology Studies.
- An $800,000 EPA grant under the Adirondack Destruction Assessment Program will help launch groundwater systems programs.

**CAMPUS CULTURE**
- Improvements to campus diversity include increased numbers of women, who now constitute 11 percent of the faculty and number 357 in graduate programs, and greater minority representation—almost 30 percent of the undergraduate student body is from culturally diverse backgrounds.
- Improvements in how we serve students can be seen in recommendations for merging the bursar, registrar, and financial aid functions, and for including the chief student affairs officer in the faculty promotion and tenure process.
- A Total Quality Education Program, approved by the board of trustees, is resulting in greater efficiency and increased responsiveness to students.
- The faculty evaluation process is being improved to better reward teaching excellence.

**Focus on**

**High-Tech Management**

American companies can successfully contend in the toughest global markets if they pursue "total leadership," according to Joseph Morone, director of the Center for Science and Technology Policy at Rensselaer.


Contrary to the perception that U.S. firms are failing to compete in technology-intensive industries, Morone found examples of American companies dominating high-tech markets: Motorola Communications, GE Medical Systems, and Corning.

According to Morone, their success lies in a commitment to strategic focus and "total leadership."

“Ameri&..."
The first half of the 1992-93 season has had its ups and downs for the Rensselaer Polytechnic Institute hockey team.

The Engineers started on the down side with two Eastern College Athletic Conference (ECAC) losses (Harvard 4-3 and Brown 5-3) and two non-league ties (Boston University 2-2 and Merrimack 3-3).

Rensselaer rebounded with six consecutive wins, all at home. The streak, the longest in head coach Buddy Powers' career, prompted a ninth-place national ranking in the Albany Times Union's Top Ten.

The streak ended in the championship game of the RPI Invitational, the oldest tournament in the country, with a 5-4 overtime loss to Providence College. The Engineers pulled goalie Neil Little for a two-man advantage late in regulation, and sophomore Wayne Clarke netted the tying goal with just 21 seconds left.

That loss sent the Engineers into a tailspin. The team lost two of its next three games and fell from ninth place in the national rankings.

The team's sophomores have proven that their late-season flurry last year was no fluke. Clarke leads the Engineers' scoring along with fellow sophomores Craig Hamelin and Kelly Askew.

Freshmen Bryan Richardson and Tim Regan were scoring leaders throughout the first half of the season.

Little has started all but two games and has kept his goals-against average below three goals a game with a 90 percent or better save percentage. He had 48 saves and two assists in a 4-4 tie with Princeton. Little was also named ECAC player of the week after stopping 57 of 61 shots in wins over St. Lawrence (3-1) and Clarkson (4-3).

Three key players returned to the team in January after stints with national teams: Adam Bartell (U.S. National Junior Team), Wayne Clarke (Team Canada), and Xavier Majic (Team USA).

**MEN'S BASKETBALL TEAM RIDES WIN-LOSS ROLLER COASTER**

The men's basketball team also had its share of ups and downs through the first nine games of the season.

After edging Union College (78-76) in the opening round of the Capital District Tournament, the Engineers lost the next night to the University at Albany, 84-70, in the championship game.

The team won its home opener against Williams, which was ranked as the best team in New England, then turned around and lost its next game to Middlebury College, 87-85. Three days later, the men crushed Skidmore College and former Rensselaer coach John Quatrrocchi, 85-72.

The second semester started with the Engineers traveling to Roanoke, Va., for the Domino's Classic Basketball Tournament. Rensselaer lost to host Roanoke College (79-77) and defeated Allentown College in the consolation game (87-75) to capture third place.

As the Engineers began the Empire Athletic Association schedule, the pattern continued as the Engineers lost to RIT (81-71) on the road and beat Hobart College the next night, 84-77.

**WOMEN'S BASKETBALL OFF AND RUNNING**

The women's basketball team rebounded from a season-opening loss to the University at Albany (72-56) in the opening round of the Capital District Tournament to defeat Union College in the consolation game, 63-54.

That win over Union sparked a six-game winning streak for the Engineers, with wins over Russell Sage (67-61), St. Joseph's College (74-40), Union College (68-59), Utica College (73-47), and RIT (55-48).

Reality struck as the Engineers lost to two of the toughest teams in New York, William Smith College (71-54) and Hamilton College (74-62).

The top three scorers for the women's basketball team also played fall sports. Sophomore Sue Bator, the team's top scorer, played goalie for the women's soccer team; Kris Canavan, third on the scoring list, also started for the soccer squad. Another sophomore, Nancy Kelly, the second-ranked scorer, played field hockey.

**SWIMMERS SETTING RECORDS**

The early portion of the 1992-93 season for Rensselaer's swim teams was cause for excitement. Senior Rob Unruh has dominated in freestyle events. At the Empire Athletic Association Championships, hosted by Rensselaer Dec. 5-6, he finished first four times and set two meet records. He set the EAA standard in the 200-meter individual medley (1:57.11) after earlier setting the record in the 1,650-meter freestyle event. Unruh also won the 500-meter freestyle and teamed with Pierre Hollis, John Brodersen, and Matt Arnold to win the 400-meter freestyle relay.

Unruh was selected as the outstanding male swimmer for the championships as Rensselaer placed third among eight EAA schools.

Athletic Association Championships. At the Empire Athletic Association championships, the pattern continued as the Engineers lost to RIT (81-71) on the road and beat Hobart College the next night, 84-77.

**BASEBALL RANKED IN THE PRE-SEASON**

Rensselaer's baseball team, winners of more than 100 games in the last four years, have been ranked 18th in the country in the pre-season poll of the College Baseball Weekly magazine.

Three Engineers were named to the magazine's pre-season "Players to Watch" team for NCAA Division III: pitchers Doug Drum and Steve Fatiganti and outfielder Rick Aldrich.

**Turning Technology Into Profit**

Critics of U.S. competitiveness often bemoan poor communication between engineers and managers in technological companies. A Rensselaer management professor and colleagues have developed an unusual multimedia computer game to bridge the gap.

In her course on design and manufacturing, Susan Walsh Sanderson, research associate for the Center for Science and Technology Policy, introduces a mixed group of engineering and management students to manufacturing realities by asking them to simulate the design, manufacture, and marketing of a "FONY Slideman," a hand-held slide projector.

The students study SONY's spectacular success integrating design, manufacturing, and marketing of Walkman products. Then, with a computer-driven learning environment that combines homemade videocassette, text, photos, and animation, the students learn about batteries, optics, and other relevant technology so they can decide how they'll design, manufacture, test, price, and market their product.

A sophisticated algorithm calculates how many units—and how much profit—students would make. There are no right answers, and many combinations of options can be profitable.

**Computer Design**

There are no right answers, and many combinations of options can be profitable.
“Most students start out losing a bundle,” Sanderson says. “Then they systematically vary their parameters until they find a combination that works. Some groups eventually turn modest profits; others have found ways to earn as much as $4 million a month.

“We want students to think about design and manufacturing with an eye to making money,” she says. “Most engineering students don’t know a thing about management, and most management students don’t understand technology. Students sometimes think they can learn the hot buzzwords and then make products and make money. They can’t—they haven’t got a clue about how you design a good product and make money with it.”

**Engineering Dean Search Begins**

Alumni are invited to participate in the search for a new Dean of the School of Engineering at Rensselaer. Applications and nominations are now being accepted for the position.

The School of Engineering includes 3,000 undergraduates and 900 graduates with a distinguished faculty of 150. Annual external sponsored research expenditures are approximately $30 million.

The new dean will be expected to demonstrate innovative leadership in promoting and maintaining an effective collegial relationship among faculty, students, staff, and administrators, and to provide vigorous support of research and academic programs to external agencies.

Applicants should send a curriculum vitae and the names of three references to: Professor James W. Modestino, Chair, Dean of Engineering Search Committee, Electrical, Computer, and Systems Engineering Department, Rensselaer Polytechnic Institute, Troy, New York 12180.

Rensselaer is an affirmative action/equal opportunity employer.

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**Student Senate Reviews ‘The Movies’**

Most alumni will remember Grand Marshal Week—that annual celebration in early April when special events and student-government elections provide a welcome diversion from all the hard work.

Some alums will also remember a long-standing GM Week tradition—the showing of pornographic movies in campus facilities.

In recent years, the tradition has become a “hot” topic on campus. The growing number of female students and faculty, coupled with a heightened sensitivity toward the feelings of other segments of the community, has made “The Movies” the focus of serious discussions.

This December, the Student Senate spent nearly eight hours listening to arguments, both for and against showing the films.

Recognizing that many students, both male and female, consider pornography offensive and degrading, the Senate concluded that publicly showing such media is inappropriate.

While it supports students’ rights to show the movies, the Senate does not wish to sponsor them and it has expressed the hope that all students and student organizations will follow suit.

The issue of freedom of speech was at the center of many of the debates. Because it is a private university, U.S. Constitutional laws regarding free speech do not directly apply to Rensselaer. However, the Senate feels the Student Handbook clearly prohibits censorship and protects freedom of expression.

“The Senate’s guidelines are better than they were before the meeting,” says Grand Marshal Bill Wheeler. “I am happy with the Senate’s performance. They gathered information and came up with what they felt was the best solution.”

The most recent exhibition of a porn film during GM Week was in 1990.
THE IMAGE OF HAL, the on-board computer talking to the astronauts in Stanley Kubrick's 2001: A Space Odyssey, is firmly etched in the minds of a whole generation of Americans. Such close human-machine interaction was only a sci-fi scenario back in the late '60s. But the year 2001 is now less than a decade away and the boundaries between humans and computers are crumbling. Today, Kubrick's vision is closer to fact than fiction.

Researchers all over the country and here at Rensselaer are exploring new and exciting ways for man to interact with computers—ways that go far beyond conventional keyboards, joysticks, and mice. We can now don special goggles, a glove, and even a datasuit to transmit our head, hand, and body movements to the computer.

This new way of interacting with the computer was coined "Virtual Reality" (VR) by Silicon Valley researcher Jaron Lanier, the founder and former head of VPL Research, Inc. His company produces much of the VR equipment—the stereo eyeglasses and dataglove—that can transport us into a "virtual" 3-D world inside the computer.

While most of VR research is done in laboratories, the real-world origin of VR can be traced to early flight simulation and a fog-shrouded Long Island runway. In fact, VR was "born" in 1929 when Lt. James H. Doolittle of the U.S. Army Air Corps flew the first completely instrument-based flight mission and landed his plane in zero visibility. Computer flight simulation eventually evolved into the sophisticated animation and graphics that Hollywood uses today to make such films as Lawnmower Man.

Because VR can immerse you in a highly realistic imaginary world (called cyberspace by some), its wilder applications in the entertainment and game industries—like virtual travel and virtual sex—have garnered significant media attention. But serious scientists and researchers are using other, more practical appli-
cations as they search for the “silver bullet” that will propel this still fledgling technology into the commercial mainstream.

**DESIGNING SPACE IN CYBERSPACE**

A good example of the pragmatic implications of this interesting technology can be found in the field of architecture, “which neatly encapsulates what is happening on a broader scale in VR research and development,” says Christopher Allis. Allis is one of the world’s leading experts on VR and multimedia developer relations manager for Autodesk, a Sausalito, Calif., software company.

In contrast to applications in financial analysis or abstract data analysis, “architecture is easy for people to visualize: it is real-world based and very physical because architects try to re-create a real space,” says Allis. “VR is a way of actually experiencing full immersion with models and graphics. It’s a way of grasping the scale of things, being able to move around at will within a model. Because you’re using your entire body to move around within the space and to interact with the space, it becomes more real,” he says.

Allis, a member of Autodesk’s Cyberspace Team (the pioneering researchers who test-piloted VR software), visited Rensselaer’s School of Architecture for three days last spring. He brought with him a complete VR system—a powerful personal computer, a high-speed graphics card, stereo eyeglasses and a mouse. Architecture students in Rensselaer’s “Computer Drafting II” class had developed a 3-D model of the Parthenon in Greece. With his VR system, Allis took more than 100 Rensselaer students and faculty (including Rensselaer’s President, Roland Schmitt) on a 3-D trip through the students’ re-created Parthenon.

“It’s like a piece of magic in the computer,” says Assistant Professor of Architecture Bill Glennie about his VR experience. “It’s a great way to explore a 3-D model. You can actually go through doorways. You start to treat it as real space. We’ve gone from looking onto the computer screen to ultimately reaching out and grabbing the door. Now you can manipulate space while you’re in it,” says Glennie.

“VR is better than any other simulation method, such as movies or a computer screen. This technology enables us to create a simulation of how to build a building, so we are able to walk through a virtual design before the building is designed,” says Donald Watson, dean of Rensselaer’s School of Architecture. Watson predicts that VR will change the nature of design and improve integration and coordination of architecture, engineering, and construction by pre-construction simulation and testing.

**THE NEXT BEST THING TO BEING THERE**

Because they can try out plans before they’re on paper, architects can use VR walk-throughs to better communicate their ideas to clients. “Because of our architectural training, we can perceive things in 3-D and envision a design in our minds, but our clients can’t. So getting a client to understand a design is sometimes difficult,” says Creighton Nolte, a San Diego architect and computer expert.

Using virtual reality equipment, both architects and clients can experience a day in a new building and uncover traffic, storage, and other design problems. This potential to solve problems before they happen offers great promise of improved communication between architects and their clients.

A good example of the success of virtual reality walk-throughs can be found at the new Veterans Administration Hospital near Chicago. Riding in their virtual wheelchairs, the architects discovered that the countertops were too high for future patients to reach. This is information that the architects never would have received from traditional pencil and paper drawings. “You don’t get that kind of information unless you’re inside the building,” says Glennie. “Architects have to do that with their imaginations now.”

The Japanese are taking the concept of VR walk-throughs one step further and have already found a commercial application for this new technology. The Matsushita Electric Company is now using VR to sell kitchens to customers via 3-D. A Japanese housewife can don a data-glove and stereo eyeglasses that take her on a “test drive” of sorts through her new $100,000 kitchen. Using this VR equipment, she can open virtual cabinets, turn on the virtual faucet in the sink and just feel the space of her soon-to-be-real kitchen.

**THE REALITY OF VIRTUAL REALITY**

With VR’s many possibilities looming on the horizon, are architects really ready to abandon their pencils, paper, and drafting tables to jump onto the VR bandwagon? “Most architects are still using computers like a $5,000 pencil. Only ten percent of today’s working architects are doing their drawings in 3-D, but it is becoming more common,” says Glennie.

Experts agree that it will take some time before VR is widely applied by professional architects. As with most technology that is still in its infant stages, the high cost of VR equipment is now out of reach for most architectural firms. “Unlike mechanical design and engineering firms, architectural firms are small (usually one to five employees) and they don’t have much money to play with. They are more conservative in how they spend money and adopt new technology,” says Autodesk’s Allis. In fact, a full one-third of American architectural firms is run by sole practitioners, according to the American Institute of Architects' 1991 Firm Survey Report, and they can ill afford the high cost of owning VR equipment.

Instead of individual investment in expensive VR equipment, experts like
Allis and Glennie recommend that architects form service bureaus where they can bring clients for a 3-D walk-through of their new home, office, or hospital.

"I see technology like this moving into a service bureau where the technology is available to architects without a full investment on their part," says Allis. And Allis, who has logged more hours in cyberspace than anyone, predicts that there will be a significant market for VR among architects "five or ten years down the road, or perhaps sooner as clients' demands for ever more realistic walk-throughs and industry pressures propel VR out of research labs and into architects' studios."

**INTO THE NEXT CENTURY**

With the next generation of architects fast on their heels, today's architects may have no choice but to join the VR revolution in architecture. Rensselaer's Glennie predicts that today's students will be an important catalyst. "The impetus that will move architecture into the 21st century is clients and entry-level employees who have been trained to design on computer. When clients ask for 3-D models, firms will adopt this technology," says Glennie. He is motivating his students to increase the demand for 3-D images and help move this technology into the marketplace.

Rensselaer's potential to positively impact the field of architecture and help speed its technological development will be fueled by the imagination and talent of its graduates. "Three-dimensional modeling and VR walk-throughs are sudden developments in the world of architecture," says Glennie. "Now, most architects just don't know how to use the technology. That's why they will demand students who know how to use it."

One new architect who will soon impact the marketplace is Glennie's student, Michael Stesney. As a fifth-year architecture student, Stesney is taking the concept of VR one step further and designing a virtual space. Glennie defines virtual space as the element which ties together individual VR environments, enabling the user to step outside VR models and move between them.

"Designing in VR makes you come to grips with what all designers must deal with—doorways, windows, etc.—and really think about what they mean," says Stesney, who envisions his virtual space as a way to pass through those doorways and into the next environment.

And in light of today's tight job market, Stesney may really be on to something. Autodesk researchers Randy Walser and Eric Gullichsen predicted that in the near future there will be a need for architects who are able to design and orchestrate the construction of virtual spaces and scenarios. "The talents of a cyberspace architect will be akin to those of traditional architects, film directors, novelists, generals, coaches, playwrights, and video game designers. The job of the cyberspace designer will be to make the experience seem real," says Walser. "The job is as artistic as it is technical, for experience is something manufactured spontaneously in the mind and senses, not something that can be built, packaged and sold like a car or a refrigerator."

**NOTE ON THE AUTHORS:** Christine Lapham and Elizabeth Nappi are graduate students in Rensselaer's Communication program. This article was researched and written as a final project for Dr. Lee Odell's "Writing and Editing" class.
John Rigas ’50 brings the choices of cable television to over one million people from Michigan to Florida. He runs his cable empire from a small, rural town in Pennsylvania where it all started 40 years ago. By R. Bruce Adams
A thousand feet wide and 25 feet deep, the Allegheny River surges into Pittsburgh. In Coudersport, Pa., it's just a brook.

Along Route 49, a wooden sign that marks the headwaters of the Keystone State's great waterway is wider than the stream itself, gurgling through a Potter County pasture. "It has to start somewhere," my companion comments quietly. So quietly, in fact, I almost miss his point—not just about the genesis of rivers, but his own beginnings.

Founder of a multimillion-dollar corporation, John Rigas '50 began his career in Coudersport—a town whose entire population wouldn't fill the Houston Field House for a Rensselaer hockey game.

Forty years later, Rigas is still here, 30 miles south of Wellsville, N.Y., where he was born above his father's chili dog restaurant, the Texas Hot, in 1924.

His company, Adelphia Cable Communications, is the nation's 10th largest cable television system. Surprisingly, it's headquartered in a converted white frame Coudersport church. A quaint banner still arches above the place where the pulpit used to be. With missionary zeal it urges—perhaps appropriately for a company that already serves subscribers from Michigan to Florida—"Reach as many as possible."

FROM HOT DOGS TO THE SILVER SCREEN

The cable television business was practically unheard of and certainly far from Rigas' mind when he graduated from Rensselaer. The new alumnus returned to Wellsville, where, as the oldest son of Greek immigrants, he tried to do his part behind the counter of the Texas Hot. But Rigas had little appetite—or aptitude—for restaurant work and looked for a chance to go into business for himself.

In 1951, a movie theater came up for sale in nearby Coudersport, Pa. With no knowledge of motion pictures, no established credit, and no resources, Rigas couldn't convince a bank to help him offset the outrageously high asking price of $72,000 ($360,000 in today's dollars). He bought the theater anyway, with money borrowed from relatives and a hefty promissory note to the seller.

Fortunately, he also got an engineering job at Sylvania's corporate headquarters in Emporium, Pa. Each morning, Rigas would drive 60 miles to his job at Sylvania. At 5 in the evening, he'd hurry to Coudersport, half way between Emporium and home, to make popcorn, sell tickets, and meet with waiting salesmen offering bargain prices on Necco Wafers and Tarzan movies.

When weather or weariness prevented his late-night return to Wellsville, Rigas would curl up on a back-room cot. Lying there, he'd chuckle to himself. Rigas knew the ribbing he'd get if his fraternity brothers learned that the past president of Phi Mu Delta was sleeping in such unglamorous surroundings.

DEAR OLD RENSSELAER

World War II was well under way when John Rigas—captain of the high school baseball, basketball, and track teams—graduated from Wellsville High. Along with many young men in that Class of '42, Rigas was drafted into the Army. He served in the 20th Armored Division and saw combat in France and Germany.

After his discharge, and with help from the GI Bill, Rigas entered Rensselaer in 1946. Amazingly, five
Throughout his career, Rigas has picked good openings and... DARINGLY PLUNGED THROUGH.

other fellows from the little town of Wellsville, most of them Greek, were also enrolled: Jack Cretekos, Jim Giopulos, Bill Potrafke, Greg Theoclitus, and Tony Toporas. The six of them ended up in Phi Mu Delta, a fraternity revived by returning veterans who put up $1,000 each to buy and remodel a house on Eighth Street in Troy.

“I started in mechanical engineering,” Rigas recalls, “but I noticed that many of my fraternity brothers would turn off their lights at 11 o’clock. At 1 in the morning I’d still be working. They were getting As and B’s and I was getting Cs. I realized that I wasn’t meant to be a pure engineer.”

He switched to engineering management, but the academic work still came hard. “In those days, if your average was high enough, you didn’t have to take the final exams! I had to take all the exams!”

Rigas was captivated by his new courses in management, but it was the grueling technical discipline that would teach him something he’d later value above all else.

“As I look back over my business career, and meeting after meeting, I see that I just unconsciously ask: What is the problem? What do we know? What don’t we know? That sequential, engineering approach became one of my strengths in business. I could reach the heart of a problem a lot quicker than many others.”

PLAY IT AGAIN, SAM

On his cot in the Coudersport theater, Rigas needed all those problem-solving skills to figure out a way to get Sam Milberg off his back. Milberg was a blustery RKO salesman who had befriended Rigas and generously taught the novice movie mogul the ins and outs of booking motion pictures.

“Sam was one of those individuals who, if you’d go to breakfast with him, he’d spill egg on his tie, insult the waitress, light up a big cigar that smelled up the place, and expect you to pay the bill,” Rigas recalls. “But I really admired Sam and I always found it difficult to say no to him.”

Milberg had been pressuring Rigas to diversify and get into cable television.

It was 1952, and roof-top television antennas were practically useless in mountainous, rural regions like Coudersport. Most families there had never seen I Love Lucy, Texaco Star Theater, or You Bet Your Life.

In some remote parts of Pennsylvania, a new industry had begun. Forward-thinking entrepreneurs were erecting sophisticated antennas and signal processing centers to provide television reception to their communities through coaxial cable strung on telephone poles. Such a venture demanded technical know-how, capital, and a franchise from the town.

“John, you gotta get into this!” Milberg preached, month after month.

But Rigas had no money. He was living with his parents above the Wellsville Texas Hot. He was working two jobs and trying to keep up loan payments on the struggling theater. He didn’t need another risky undertaking. But Milberg persisted.

Finally, to quiet his insistent friend, Rigas called about the franchise. He was surprised to find he could have it for a hundred dollars. Recklessly, Rigas overdrew his checking account and signed the papers.

Almost immediately, he was offered a deal. A Coudersport businessman, a doctor, and a state senator said they would borrow $40,000 to build the cable system. If Rigas contributed the franchise, he could be an equal partner and manage the system. Rigas accepted.

Because it appeared that cable television might be short-lived and become a victim of ever-growing competition from the broadcast industry, the new company charged
There are drawbacks for a major company headquartered miles and miles from any city, but most Adelphia employees $150 for a hook-up (approximately $735 in today's dollars) and a monthly fee of $2.75. Despite the cost and dire predictions, demand grew; within three years the company had 450 customers and was making a profit.

In 1955, Rigas teamed up with his brother Gus to build the system in Wellsville. The two men just kept on borrowing and building, purchasing franchises or struggling cable companies in neighboring communities. Eventually, they incorporated as "Adelphia" from the Greek word for "brothers."

Early customers received two or three broadcast signals from cities in New York and Pennsylvania. As microwave technology became available, subscribers could tune in five, then seven, then as many as 12 distant stations. With the birth of satellite communication in the mid-'70s, the way was opened for the emergence of HBO, ESPN, CNN, and scores of other top programming services.

Today, with assets surpassing $2.5 billion, Adelphia Cable Communications serves 1.2 million customers in 11 states and employs 2,500 people, 310 at the headquarters in Coudersport.

Gus Rigas sold his share in Adelphia 10 years ago, but John's three sons are now major shareholders and executives. Adelphia continues to be managed by brothers.

GIVE THE BALL TO RIGAS

Rigas is quiet and gentle, not aggressive or outspoken. He doesn't like the spotlight and modestly claims that "just being in the right place at the right time" has been the secret of his success. But even he will tell you it's been more than luck.

"When I was a little fellow, I played football with the older boys. I was small but I was fast. I had to be fast, because when these great big guys tackled me, it hurt.

"Later on, I played football in high school. And the coach would yell, 'Give the ball to Rigas!' I didn't want the ball. I knew I was gonna be smeared. But every now and then a hole would open up. And I had to decide immediately if it was the right hole, because it would close up fast."

Throughout his career, Rigas has picked good openings and daringly plunged through. "But it wasn't all John Rigas!" he asserts, acknowledging a deep indebtedness to others, including Rensselaer.

"As a student, I really didn't appreciate what a great reputation Rensselaer enjoyed in the engineering and business world. Now I recognize how fortunate I am to have been part of an institution that has maintained its standards and continues to attract extremely bright students and faculty."

And, although he's not good at keeping in touch with Rensselaer classmates, Rigas constantly talks about his fraternity days and how the brothers at Phi Mu Delta made a lasting impact on his life.

But he says that the greatest reward of being in business has come in remembering the support he received from family, neighbors, community leaders, bankers, vendors, employees, and customers—when he had nothing but a dream.

PAYING THE DEBT

In the early '60s, when the sheriff showed up and it wasn't even an election year, Rigas knew he was in trouble. The sheriff said that the bank in Punxsutawney was foreclosing on a note Rigas had co-signed to help two seemingly reliable men get a start.
in business.

"He had orders to collect $50,000 or put my property up for sale. I didn’t have $50,000! I had no way of getting it. I was sure to lose my company, my house, everything! No doubt about it."

Rigas is anxious to share his business success with his hometown. He’s restored several of Coudersport’s historic buildings, underwritten appearances by celebrities, and he still operates the old movie house where Adelphia families are admitted free.

Then Rigas got a call from Betty, the office manager at Adelphia’s Punxsutawney branch. Betty wanted to help. "I thought that was very nice, but how could she help? When I gave her a job she was practically destitute." But Betty explained that she had received an inheritance the week before and was willing to loan it all to pay off the note.

"Now, before I hire anyone," says Rigas with a twinkle, "I tell them that, with inflation, they’ll have to have $250,000 if they want to work for me. You never know when I might need it!"

In gratitude for the people who stood by him, Rigas remains determined to keep Adelphia’s corporate headquarters in Coudersport. He has purchased and restored several of the town’s old buildings. He has underwritten appearances by musicians, singers, authors, movie stars, and other prominent visitors to this remote community of 3,000 people. And, no longer hoping to profit from popcorn and Popeye, Rigas still operates the lovely old movie house. It’s the only surviving theater in Potter County. Adelphia families are admitted free.

Newspaper editor Paul Heimel of The Leader Enterprise—who says he has "all the cynicism that goes with being a journalist"—claims there are only good things to report about Rigas. "He is a genuinely munificent individual who remembers his roots and is anxious to share his business success with his hometown," says Heimel.

With Doris, his wife of 40 years, Rigas still lives in the house they bought in 1963. Three of their four children have come back after college. And Rigas is proud that Adelphia employees—including three recent Rensselaer grads—bring to the small community a wealth of new ideas, enthusiasm, and leadership skills.

There are drawbacks for a major company that’s headquartered miles from any city, mall, or four-lane highway. Attracting highly trained personnel—especially minorities and people whose spouses are career professionals—has sometimes been difficult. True, some university graduates miss the social, educational, and cultural opportunities they had in urban areas. But most Adelphia employees treasure the awesome beauty and serenity of this region, which locals call "God’s Country."

That Rigas is a grateful, caring man does not amaze Steve Zenos ’49, a classmate and fraternity brother who had no idea what happened to his old friend after graduation. "I just remember him as a very, very nice fellow, who always got along with everybody. I’d be surprised if he changed at all," Zenos says.

"John Rigas just likes people, believes in people, and trusts people," says childhood friend and fraternity brother James Giopulos ’44 ’47, who retired after a long career with General Electric and has since joined Adelphia as part-time coordinator of special projects.

For his part, Rigas would simply remind you that the Allegheny River doesn’t grow from a brook into a commercially important waterway on its own. It’s nurtured by the Hemlock Creek and the Brokenstraw, the Conewango and the Mahoning, and a hundred other streams along its 352-mile journey from Coudersport to Pittsburgh.

"I’m always amazed that people think I have some kind of magic. I just took one step at a time, one challenge after another, and had a lot of help along the way."

The author wishes to acknowledge help from Theodore Carnavos ’49 ’50, Chris Christopher ’50, Jack Cretekos ’44 ’47, Andrew Holdgate of Jones Intericable’s Mind Extension University, Lionel Lemeriy of Allegheny National Forest, The National Cable Television Association, P. J. O’Connell of WPSX-TV/Penn State, Stratford Smith of Penn State’s National Cable Television Center and Museum, and, of course, the folks at Adelphia Cable Communications.
Undeterred by his failure to make the Major A draft, he quit high school, determined to give hockey his all. He worked harder than ever, his sights set on the NHL's 18-year-old draft. Once again, he was passed by.

Suddenly taking stock of the situation as he pumped gas and struggled to work his way up from the semi-professional juniors, Adam Oates '91 realized his window of opportunity was closing fast.

Many players in this situation turn to college in the hopes of being drafted after graduation. But Oates had never finished high school, and he had lost his amateur status after playing semi-professional hockey.

Watching Oates on the ice today—a star center for the Boston Bruins at the height of his nine-year NHL career and graduate of a prestigious university—it's hard to imagine that high school dropout with little hope of playing professional hockey.

Perhaps the struggle helped him develop his strength of character.

Those who know Oates confirm this assessment. According to RPI head hockey coach Buddy Powers, who has met Oates though he never coached him, "Oatesie's got a sort of quiet, self-confident air about him. He's established himself as one of the top players in the NHL, and he carries himself in a very professional manner."

"Adam has presence," concurs Powers' assistant, Mike Satapre '85, who played with Oates for three years. "He's very intelligent and perceptive. He's a very level-headed guy."

It's easy to admire Adam Oates. He has learned from his mistakes, worked to improve his weaknesses, and remained loyal to those who offered him a second chance.

That chance came when Paul Allen, an assistant to then Rensselaer head hockey coach Mike Adessa, presented Oates with the possibility of a place with the Engineers if he could get his amateur status reinstated. Oates leaped at the opportunity.

Appealing his amateur status, however, was the easy part. "Just winning the appeal didn't mean I was accepted to RPI," Oates recalls. "I had to go back to high school, and I had to do a lot better than before."

Though it helped that, this time, school was directly connected to his dream of a professional hockey career, Oates also had learned a lesson about the dangers of throwing all his eggs in one basket. He finished high school and entered Rensselaer in 1982. Thus began his eventful, three-year RPI hockey career.

What happened next, of course, has become legend at RPI. Joining the likes of Ken Hammond '85, Darren Puppa '87, and George Servinis '86, all NHL-destined players, Oates led one of the most talented lineups in Engineers' history, the famed ECAC National Championship team of 1985.

At long last Oates caught the attention of the NHL. So impressed was the organization that it permitted Oates the unheard of opportunity to act as a free agent. The supplemental draft system designed to catch such late-blooming players did not yet exist.

Offers too good to pass up poured in. In June 1985 the Detroit Red Wings offered him a $1 million contract, the highest ever offered to a rookie.

Oates was one year away from a Rensselaer degree when he signed on the dotted line and joined the Red Wings. Had he been any number of star athletes, history might have been ripe to repeat itself. His dream of an NHL hockey career seemingly achieved, he could, once again, have simply kissed school goodbye.

But Oates rarely makes the same mistake twice. He understood now that million-dollar contracts come with no guarantees and he left Troy pledging to complete his degree. Concerned faculty and fans watched to see if he'd really make good on the promise.

Sure enough, when the off-season rolled around, Oates was back on campus hitting the books. And he was back the next summer and the next, in a pattern that continued for six years. In the summer of 1991, his requirements finally completed, Oates became the proud holder of a bachelor of science from Rensselaer's School of Management.

"I don't know who was happier," laughs Oates, "me or Barry Taylor, my adviser. He was with me the whole time and he was really getting sick of me. He used to say I was on the '10-year-plan.'
Making it big in the NHL, completing his degree at Rensselaer, and succeeding in the business world.

BY KATHY WESTBROOK

As Brian Cook, a longtime friend and adviser to RPI hockey players like Oates, notes, “It’s very infrequent in professional hockey that someone keeps returning to his own school to complete his degree.” While there are players who graduate from college after joining the pros, he says, most of them transfer to a university closer to their team’s location.

Oates admits that the trek became harder as the years passed and he found fewer friends remaining in Troy. But, he says, “My father pushed me to come back, and I wanted an RPI degree. I had great memories of Troy.”

Since graduating, Oates has shown an eagerness to put his degree to work. When an opportunity arose to get some business experience, he gave up plans to take his first summer off in nearly 10 years.

A visit with Richard Deagazio, president of the investment firm Boston Capital Partners, led to a job. Oates spent the summer of 1992 helping the company bring in new business.

Continuing this work is difficult during the hockey season, but Oates checks in with the firm whenever possible. “The people at Boston Capital have been really good to me, and I’d like to stay with them for as long as I can.”

Making a place in the business world might not seem necessary for one of OATES LED ONE OF THE MOST TALENTED LINEUPS IN ENGINEERS’ HISTORY, THE FAMED ECAC NATIONAL CHAMPIONSHIP TEAM OF 1985. HE HAS GONE ON TO BECOME ONE OF THE NHL’S BEST.

These are simply opportunities for Oates to give something back to a community where he has done so well, and lay the foundation for life after hockey.
ALUMNI NEWS

BIG RED FR
A sellout crowd of 5,217 rocked the Houston Field House at the 16th annual Big Red Freakout Feb. 6. More than 500 alumni returned to campus for a day full of activities including career development seminars, the Society of Women Engineers job fair, a new Freakout festival, and a pre-game dinner, followed by the hockey game against Brown. Fans crowded the Heffner Alumni House after the game to congratulate the players on their 5-2 victory.
Class Notes Deleted for Privacy Concerns
New Opportunities in Government Relations

Vice President for Government Relations Larry M. Snavley administers Rensselaer's first comprehensive program for public policy advocacy. The Government Relations Office works with the campus community to assess resource needs, set government funding goals and strategies, and advance the Institute's agenda with elected officials, government agencies, and state and national associations. Snavley holds degrees in law, history, and sociology. Prior to coming to Rensselaer in 1987, he directed similar offices at Syracuse University and the University of Toledo.

As the nation ushers in a new president, Rensselaer and universities throughout the country are considering what changes in Washington will mean in the competition for increasingly scarce public funds.

For Rensselaer, there are some encouraging signs. President Clinton seems to understand the vital role that technology plays in economic growth. His early appointment of John Gibbons, longtime director of the Congressional Office of Technology Assessment, as chief science adviser, coupled with Vice President Gore's strong interest in science, indicates the central role science and technology issues will occupy in the new administration.

Clinton's proposal of national service as a means for college students to repay school loans is exciting, too. This idea has great potential for making a Rensselaer education more affordable for middle income families while providing valuable services for communities throughout the United States. Of course, deficit-driven budget constraints will dictate how quickly the new administration can initiate ambitious student financial aid programs or match the significant increases in funding for basic research achieved in recent years.

Many alumni are pleasantly surprised to learn that research support from government sources nearly doubled between 1987 and 1991 and that New York state support is over four times its 1987 level. Total government funding activity, including financial aid and direct institutional support, has risen from approximately 28 percent of the overall Rensselaer budget in 1987 to 34 percent last year.

A big reason for this success is the solid support Rensselaer enjoys on Capitol Hill. Local members Gerald Solomon (R-Queensbury), who serves as Ranking Republican on the powerful House Rules Committee, and Michael McNulty (D-Green Island), who recently won a seat on the influential House Ways and Means Committee, are longtime friends of Rensselaer. The pages of this magazine frequently highlight programs and funding that would not have been possible without their help. Two examples in this issue are the Adirondack Destruction Assessment Program [page 9] and the extension of funding for the Rotorcraft Center [page 12].

Also in this issue, you've met alumnus John Olver '55 (D-Mass.). We're looking forward to a long and productive relationship with Congressman Olver as he tackles issues in education, technology, and economic development.

Maintaining Rensselaer's successful track record in government will be difficult in today's economic climate, even with the help of friends like these. Alumni can play an important role here. Alumni who are active in the public policy arena can provide valuable insight as Rensselaer positions itself to take advantage of opportunities to support our strategic initiatives.

In fact, a major goal of our office in 1993 is to be much more proactive in reaching out to Rensselaer graduates working in government agencies. I welcome the input of interested alumni and encourage you to help Rensselaer develop its long-term public policy agenda and strategies. Call me at (518) 276-6120. I'd enjoy hearing from you.
The Office of Alumni Relations is introducing the Rensselaer Alumni News Network (RANN) in March. This service will give alumni and friends of Rensselaer computer-network access. You can communicate with the campus and each other, sharing information such as:

- Campus news—even hockey scores!
- Bulletin boards for all sanctioned groups on campus
- Career services including job search and resume sharing
- Electronic mail

Participating alumni will receive a user ID, password and an instruction manual for an annual membership fee.

The Rensselaer Alumni News Network is another example of the Institute's desire to strengthen ties between our alumni and the university. Call Susan Dinon in the Office of Alumni Relations, (518) 276-6205 for registration information.

To register for electronic access, call (518) 276-6205.
CAPITAL GAINS A PROBLEM?
GIVE YOURSELF A TAX BREAK AND HELP RENSSELAER, TOO.

With capital gains taxed as high as 28%, you can lower your taxes significantly by giving stock or property directly to Rensselaer.

The fair-market value of donated stock or property held longer than one year is fully deductible. That means if you paid $500 for stock or property now worth $1000, you could not only avoid capital gains tax on the profit, but also deduct the total $1000.

You can target your gift to the Rensselaer program that is most important to you—The Rensselaer Fund, scholarships, the new athletic field and track, the Center for Interactive Learning, or other important areas.

For more information, contact the Development Office at (518) 276-6055 or fax us at (518) 276-8700.