

HIGGINS REDEDICATED ♦ A CENTENNIAL FOR ELECTRICAL ENGINEERING ♦ ALUMNI SPEAK OUT

WPI JOURNAL

SPRING 1996



The road to success just got shorter. Worcester Polytechnic Institute is coming to Waltham.



WPI is known for academic excellence in technical education, a practical application to the challenges of the marketplace, and a faculty of renowned academicians and industry experts who are full-time practitioners in their fields. Now we're adding a convenient Waltham location for professionals seeking career advancement or personal enrichment.

If you have a Bachelor's degree and are looking to advance your technical or management skills, our Waltham campus will offer evening **Graduate Certificate Programs** in **Computer Science** and **Management** in the following areas:

- Computer & Communications Networks
- Software Engineering & Interface Design
- Technology Marketing
- Management of Technology

Credits may be applied towards a WPI graduate degree. Formal admission to a Certificate Program is not required to take a course.

Or, you can enroll in WPI's accelerated **UNIX System/C and C++ Programming Certificate Program:**

- Full-time days or part-time evenings
- Hands-on, leading edge training
- Successful outplacement record

WPI's Waltham campus will also offer **Professional Development Seminars** in World-Class Manufacturing, Quality Improvement, Project Management and Management Development.

Classes at our Waltham

campus begin this September. Start preparing for your success now by mailing in the coupon or attending our next Information Session on Wednesday, August 7 in Waltham.

Information Session
Wednesday, August 7,
6pm, at our Waltham
Campus, 60 Hickory Drive.
Call 800-WPI-9717.

I'm interested. Please send me information about WPI's Waltham Campus.

- Graduate Certificate Programs
- UNIX/C and C++ Programming Programs
- Professional Development Seminars

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

PHONE - DAY: () _____ EVENING: () _____



Worcester Polytechnic Institute
Waltham Campus

800-WPI-9717
web: <http://www.wpi.edu>

Worcester Polytechnic Institute Waltham Campus, 100 Institute Rd., Worcester, MA 01609 Fax: (617) 466-8499, E-mail: jernberg@wpi.edu

WPI JOURNAL

CONTENTS



An Electric Century by *William R. Grogan '46*

Overcoming fierce faculty opposition, a physics professor held tight to his dream and propelled WPI into the Electric Age a century ago. Here is the remarkable story of the founding of WPI's electrical engineering program.

Page 6

Alumni Speak Out by *Michael W. Dorsey*

Did you know that 96 percent of graduates would recommend WPI to prospective students? That's just one of the findings of a recent wide-ranging survey of WPI graduates. Here's what else our alumni had to say.

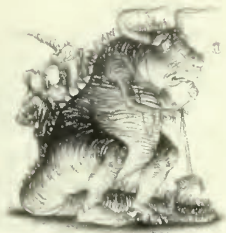
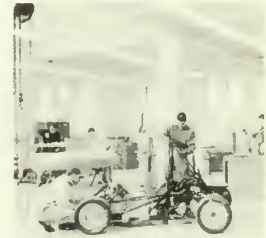
Page 13



A Mechanical Marvel by *Roger N. Perry Jr. '45 and Michael W. Dorsey*

Over the past 128 years, the Mechanical Engineering Department has had several homes on campus. But none can match the beauty and functionality of the recently renovated and expanded Higgins Laboratories.

Page 19



The Wizard of Asheville by *Roger N. Perry Jr. '45*

For generations of WPI students, John van Alstyne's inspiring teaching and compassionate counsel represented a special sort of magic. Now a children's book author and illustrator have turned Van A into a real wizard.

Page 28

DEPARTMENTS

Advance Word Happy Birthday, Mr. Salisbury, by *Michael W. Dorsey*. Page 2

Explorations Students Expand the Frontiers of Medicine, by *Bonnie Gelbwasser*. Page 4

Letters It's Time To Give WPI a New Name; Proud of Sacco's Achievement; Stealing the Goat Was a "Serious Act"; It Was Alpha Phi Omega. Page 31

Final Word Big Character Has Big Plans, by *Joan Killough-Miller*. Page 32

On the cover: The interior of Atwater Kent Laboratories as it looked not long after its completion in 1907.

The huge building was constructed for the Electrical Engineering Department, then just 10 years old.

This year WPI celebrates the department's centennial. Story on page 6. Back cover: The new addition to

Higgins Laboratories. WPI recently rededicated a completely restored Higgins Labs, home to mechanical

engineering for more than half a century. Story on page 19. Photo by Robert Benson.

Staff of the *WPI Journal*: Editor, Michael W. Dorsey • Art Director/Designer, Michael J. Sherman • Contributing Writers, Bonnie Gelbwasser, Joan Killough-Miller and Ruth Trask • Alumni Publications Committee: Samuel Mencow '37, chairman, Kimberly A. (Lemoi) Bowers '90, James S. Demetry '58, William J. Firla Jr. '60, Joel P. Greene '69, William R. Grogan '46, Robert C. Labonté '54, Roger N. Perry Jr. '45, Harlan B. Williams '50 • The *WPI Journal* (ISSN 0148-6128) is published quarterly for the WPI Alumni Association by the Office of University Relations. Periodicals postage paid at Worcester, Mass., and additional mailing offices. Printed by The Lane Press, Burlington, Vt. Printed in the U.S.A.

Diverse views presented in this magazine do not necessarily reflect the opinions of the editors or official WPI policies. We welcome letters to the editor. Address correspondence to the Editor,

WPI Journal, WPI, 100 Institute Road, Worcester, MA 01609-2280 • Phone: (508) 831-5609, Fax: (508) 831-5604 • Electronic Mail, wpi-journal@wpi.edu • World Wide Web:

http://www.wpi.edu/AboutUs/News/Journal/ • Postmaster: If undeliverable, please send Form 3579 to the address above. Do not return publication. Entire contents © 1996, Worcester Polytechnic Institute.

Happy Birthday, Mr. Salisbury

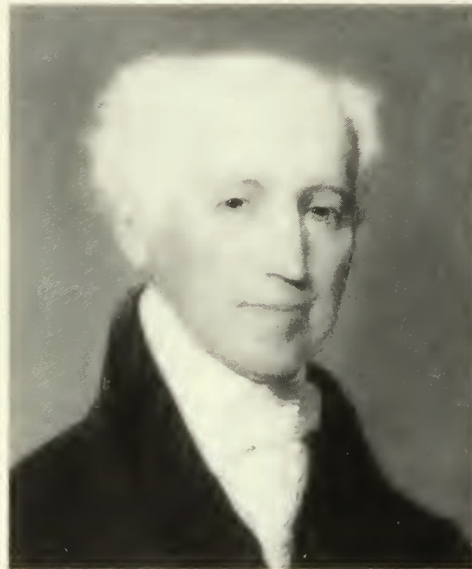
BY MICHAEL DORSEY

Anyone familiar with the founding and early history of WPI knows the name Stephen Salisbury. Salisbury was one of the primary forces that enabled the sketchy plan of tinware maker John Boynton for a new technical institute and the dream of prosperous wire manufacturer Ichabod Washburn of a training academy for mechanics to be blended into one of the nation's earliest and most innovative technological universities. Salisbury provided the land for the campus, supported the young institution generously, and presided over its board of directors until his death in 1884.

The Stephen Salisbury who figured so prominently in the birth of WPI was the second Worcester resident to bear that name. To a significant degree, he owed the fortune he shared with the young Institute and his position as the most prominent member of the Worcester community to the success and hard work of his father. Because Stephen Salisbury I played no role in WPI's history (he died more than three decades before its founding), his story is not as well known to members of the WPI community as those of the son and grandson who continued his name. This fall, Worcester will celebrate the 250th anniversary of the birth of the first Stephen Salisbury; we thought this might be a good time to learn more about this patriarch.

Stephen Salisbury was born in Boston on Sept. 25, 1746. He was the youngest of the 11 children of Nicholas and Martha Salisbury (six of whom survived to adulthood). Nicholas, son of a Boston mariner, made a living as a barber before his wife's inheritance enabled him to set himself up as a storekeeper. Martha's uncle, John Elbridge, who was comptroller of His Majesty's Customs House in Bristol, England, bequeathed his sister and her heirs £8,000—a veritable fortune at the time—which became the seed of the Salisbury family's wealth.

Nicholas Salisbury died when Stephen was just 2 years old. Martha, who by all accounts was a strong-minded and cantankerous woman, continued to operate the store and support their children. Stephen's older brother Samuel took his portion of the



Elbridge fortune (along with his inheritance from his father) and opened his own store in Boston. When Stephen turned 21, Samuel took him on as a partner, creating the firm of S&S Salisbury.

At that time, Boston was growing dramatically and many traders were setting up shops to serve the teeming city. Samuel could see that opportunities for growth for his business were limited unless he branched out beyond the city. Looking for a suitable location for a second store, he settled on Worcester. Though still a small agricultural community, it was the seat of a young but growing county and was well served by roads to Boston, Providence and Hartford.

In 1767 he set Stephen up as a trader in Worcester. Holly V. Izard, research curator for the Salisbury Mansion, a property of the Worcester Historical Museum, has studied the extensive collection of Salisbury family correspondence owned by the American Antiquarian Society. She says the letters from Stephen to his brother in those early days "reveal the younger man's reluctance to make the fledgling town his home.

"Stephen felt as though he'd gotten the short end of the stick," Izard says. "Worcester was quite rural—nothing like the busy, sophisticated city he'd grown up in. In his letters, he described Worcester as 'such a solitary place.' Though he desperately wanted to be back in Boston, he wrote to his

brother, 'I will accept this as my lot.' And of course, he didn't have much choice. He was dependent on his bother for his livelihood."

The Salisbury store was among the earliest in Worcester. It was certainly the first with a direct link to the wharves of Boston. Because the Salisbury brothers were their own middlemen, they could sell hardware, dry goods and produce at lower prices than their competitors. From the start, their store was a great success.

Stephen proved an able merchant, though he lamented the long hours and the habits of his customers, who, unlike Boston shoppers, seemed to have no concept of normal business hours. "They come just when it soot them at Break of Day Sometimes at Ten & Eleven o'clock at Night & sometimes Later....," he wrote to Samuel.

By 1771 the Worcester store was successful enough that the Salisbury brothers decided to invest some of their profits in land. Stephen had his eye on a large farm that Joseph Waldo had recently inherited from his father, Cornelius. But for unknown reasons (Izard says Stephen's hot temper may have been a factor), Waldo sold it instead to Boston's John Hancock. Stephen fired off an impassioned letter to his brother, who quietly negotiated behind the scenes and convinced Hancock to sell the land to him and Stephen.

In subsequent years, the brothers added to their land holdings, ultimately acquiring several hundred acres that stretched from what is now Lincoln Square in Worcester north to the border with the town of Holden. It was some of this land that Stephen II gave to WPI. The brothers also invested their money in bank stock, shipping stock, mortgages and personal loans. By one account, Stephen Salisbury I was the wealthiest man in Worcester County at the time of his death.

In 1772 Salisbury contracted with a builder in Hardwick, Mass., to construct a house on the farm. Designed to resemble Samuel's house, "it was, in plan, old fashioned inside, but it had a beautiful Georgian facade," Izard says. More than half of the structure was given over to the Salisbury

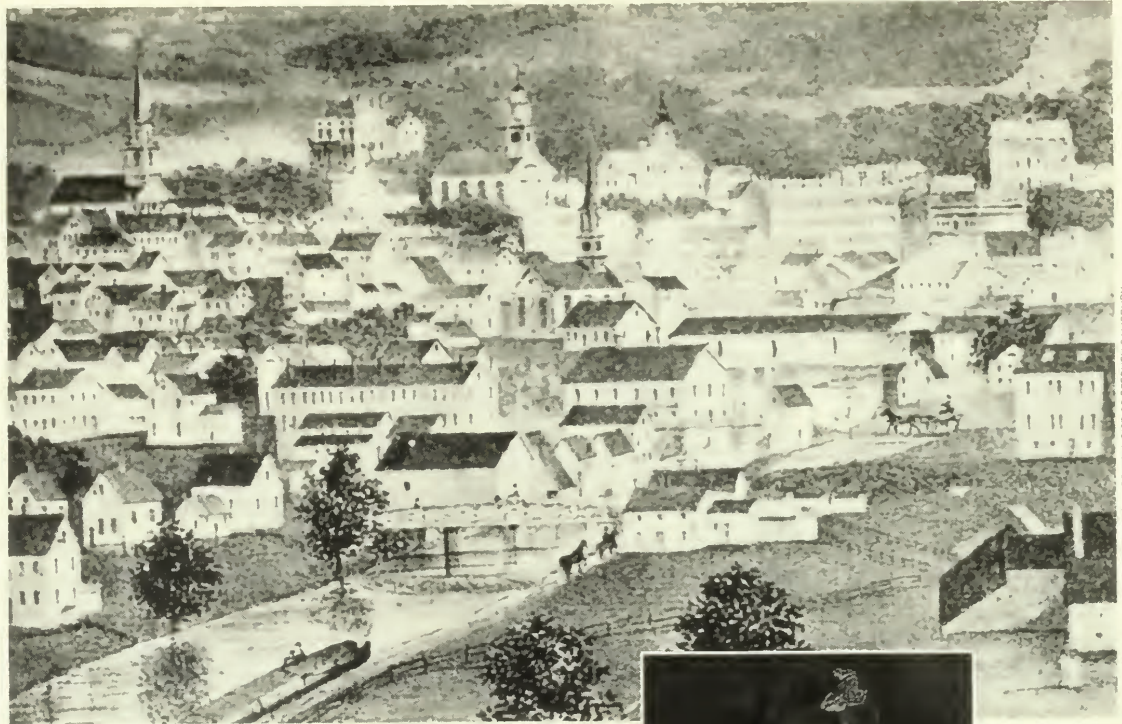
store, and Stephen shared the rest with his shopkeepers, hired girls and farm laborers.

As revolution began to foment, Boston became a dangerous place to live. In 1772 the Boston Assembly threatened succession from England. The following year, citizens protested an excessive duty by throwing boxes of tea into Boston Harbor. England responded in 1774 by closing the harbor, and the occupying British soldiers began looting and burning buildings in the city deserted by those who chose to flee.

In 1775 Samuel decided to close the Boston store and move his wife and children, as well as his mother and his unmarried sister Sally, out of town. The arrival of family and friends from Boston surely lifted Stephen's spirits, even as they crowded his house, Izard says. "During all of his time in Worcester, Stephen was never really of Worcester," she notes. "He remained a Bostonian. His social circle was confined to Boston evacuees."

After the war, Samuel returned to Boston with his wife and children, leaving Martha and Sally to live with Stephen in Worcester. Izard says Martha Salisbury had a difficult relationship with Samuel's wife, and may have chosen to remain with Stephen because he was single. It was not the town that drew her, she notes. "Martha disliked Worcester. She even tried to go back to Boston during the war, but Samuel persuaded her to stay."

Martha presided over the Salisbury Mansion until her death in 1792. A few years later, Stephen, while in Boston to help Samuel manage the business during the busy fall season, met Elizabeth Tuckerman, a member of a well-to-do mercantile family and 22 years his junior. They were married in 1797. Elizabeth found Worcester a lonely place and returned to Boston often to visit family and to acquire new furnishings and decorations for the house. Stephen also lavished attention on the mansion and grounds.



PORTRAITS: COURTESY WORCESTER ART MUSEUM. A GIFT OF STEPHEN SALISBURY

Right, Elizabeth Tuckerman Salisbury. Above, Worcester as it looked at the time of Stephen Salisbury I's death in 1829.



Stephen and Elizabeth had three children: Stephen II (b. 1798), Elizabeth (b. 1800) and Edward (b. 1803). Elizabeth died at the age of three and Edward at six, leaving only Stephen. After Stephen completed grammar school, he attended Leicester Academy for two years and then received private instruction from a local minister before entering Harvard in 1813.

In 1807 Samuel wrote to Stephen proposing that they dissolve the trading business, and in 1812, when America again went to war with England (and when England, again, cut off the flow of goods into Boston Harbor), the brothers no longer engaged in trade. Stephen, instead, devoted his energies to farming. With his hired hands, he continued to tend to his cattle, swine, apple and pear orchards, and field crops until his death in 1829.

Stephen II inherited his father's fortune and invested it in Worcester, a city that was poised to explode into a major industrial center. He turned over the operation of the farm to a foreman, as his interests lay more with the mills, machine shops and factories that were beginning to rise from the former Worcester farmland and forests. In 1833 he married Rebekah Dean; the couple had one son, Stephen III, who never married. The Salisbury lineage ended in Worcester with Stephen III's death in 1905.

But the Salisbury legacy continues to this day in the city. For while the first Stephen Salisbury never truly felt at home here, his descendants put down deep roots and made enduring contributions to the economic and cultural development of the growing urban center. The son and grandson provided venture capital for many nascent businesses, helping turn the city into a hotbed for manufacturing and innovation. Both led the board of trustees of WPI, which contributed still further to the city's growth. Institute Park, adjacent to the WPI campus, was a gift to the city from Stephen II, and Stephen III made possible the Worcester Art Museum and provided substantial support to the Worcester Society of Antiquity (now the Worcester Historical Museum) and the American Antiquarian Society. In short, Worcester owes an eternal debt of gratitude to the Salisburys, most especially, perhaps, to that young man who—so reluctantly—established this generous and enlightened family here more than two hundred years ago.

Students Expand the Frontiers of Medicine

"Flashes of Light" Help Breed a New Business

Stem cells are Morey Kraus' passion and profession. Kraus, a doctoral candidate in bioprocess engineering at WPI, has spent much of the last two years working with a class of stem cells known as tHSCs (Totipotent Hematopoietic Stem Cells). The body uses these unspecialized cells, which can be found in the blood and bone marrow and in the peripheral blood in the umbilical cord, to produce a variety of blood cells.

When cancer patients undergo chemotherapy or radiation, healthy stem cells are often destroyed along with the malignant cells targeted by the therapy. Without adequate stem cells, the body may be unable to manufacture enough disease-fighting blood cells to ward off infection. To help the body restore this capacity, doctors can harvest some of the patient's own healthy stem cells and freeze them before treatment begins. After therapy ends, the cells are reinfused into the patient.

But because stem cells make up only a tiny fraction of human blood (fewer than one cell per 10,000 cells in normal blood) and are difficult to grow outside of the body, this procedure can be difficult and expensive. At least that was the case before Kraus came along. As part of his studies, he invented a way to selectively breed tHSCs quickly and efficiently in the laboratory by culturing them in a bioreactor he designed.

Kraus came to WPI in 1988 to continue his education after earning an undergraduate degree in philosophy and running his own construction business in Pennsylvania. For his doctoral qualifying exam, he proposed a reactor that would mimic how stem cells grow in bone marrow. "It took me about six months and a couple of flashes of light to come up with the concept," he says.

Kraus' advisor, Judith Miller, associate professor of biology and biotechnology,

immediately recognized the project's potential. "I encouraged Morey to put his ideas into a proposal," she says. "Doctoral committees review a lot of concepts that are interesting in theory. Morey's was the first in a long time that seemed to have recognizable commercial potential and was also the first qualifying proposal ever, in my experience, to eclipse the originally planned doctoral research."



Jill Friberg and Morey Kraus work on their stem cell breeder at the offices of t.Breeders.

Kraus put the project aside for a semester, then presented it to Mason "Skip" Irving III, vice president of commercial development for the Massachusetts Biotechnology Research Institute. MBRI, an independent, not-for-profit organization, and its affiliated venture capital firm, Commonwealth Bio-Ventures Inc., have provided capital, laboratory space, equipment, supplies and management guidance to 20 companies since the two were established in 1984. As a result of Kraus' proposal, MBRI funded feasibility testing of the bioreactor and supported further research on Kraus' idea.

"We were impressed not only with Morey's invention, which we believe will have a great deal of commercial value, but with his business acuity and tenacity," says Irving.

In September 1994, Kraus opened his own business, t.Breeders Inc., in a large office at MBRI headquarters in Worcester. He serves as president and treasurer. Jill A.

Friberg, t.Breeders' vice president of operations, is also completing a Ph.D. at WPI.

Kraus and Friberg have applied for a patent for the bioreactor, which can grow a variety of cell types, including precursors of T-cells and red blood cells. Because only a small sample of a patient's blood is needed to breed large quantities of stem cells with the reactor, it represents a significant advance over the traditional method of collecting the cells, in which the patient must sit for prolonged periods while a centrifuge-like device extracts the cells from their circulating blood.

t.Breeders' product "significantly reduces patient discomfort and decreases the risk of further compromising their immune defenses, which are at risk because we've removed some of their stem cells," Kraus says. The system is also cost-effective. "We believe that the breeder can ultimately be mass-produced for one-tenth the cost of a separator system," he adds.

But perhaps the most important impact of the new procedure will be on cancer treatment itself, he says. "Our less expensive, more reliable and safer source of cells for replacing or supplementing blood-forming and immune system cells will significantly increase the number of patients that receive cellular therapy and most certainly lead to more aggressive and effective treatments for cancer."

—BONNIE GELBWASSER
AND RUTH TRASK

New Forceps Makes Suturing Easier

Two former WPI students, a University of Massachusetts Medical Center physician who graduated from the Institute, and a WPI professor recently patented a new forceps they invented to make suturing simpler and more cost-effective.

"Delicate surgical manipulation requires stability—often involving the use of two instruments," says Dr. Raymond M. Dunn,

associate professor of plastic surgery at UMass, who designed the Tissue-Spreading Forceps along with Marc Gomes Casseres '92, Richard Doppler '92 and mechanical engineering Professor Allen H. Hoffman. "By allowing the surgeon to stabilize the wound with the forceps with one hand and suture with the other, the forceps make possible more precise manipulation of tissue and needle placement."

The patented forceps (pictured below) has two gripping members (which resemble pairs of tweezers) that are pivoted at the end and secured to each other by a spring. When the surgeon applies pressure to the spring, it causes the grippers to close and hold tissue at two locations. Additional pressure makes the forceps spread apart in relation to each other, thereby spreading the tissue. "More sophisticated and delicate surgical procedures are routinely being developed," says Dunn. "Many of these require the redesign of traditional instrumentation and the development of new ones."

Dunn, who received his bachelor's degree in chemistry from WPI in 1978 and now directs the medical center's Plastic Surgery Research Laboratories, saw a need for an improved forceps and identified prototypes that could be used to make those improvements. Gomes Casseres and



Doppler were WPI seniors in 1991 when they began working with Dunn to develop the new device as part of their Major Qualifying Project. Hoffman, the students' advisor, helped them focus on their task and refine the product. WPI and UMMC funded the cost of securing the patent, which was assigned to both institutions.

"The factors that were considered in the design of the forceps were ease of manipulation, complexity of the closing and spreading mechanism, and cost to manufacture," says Gomes Casseres. "The Tissue-Spreading Forceps will enable the surgeon to concentrate on the complicated techniques

involved in surgery, rather than on the mechanics of the instrument."

After earning their bachelor's degrees in mechanical engineering with biomedical interest, Doppler and Gomes Casseres went on to earn master's degrees in mechanical engineering at WPI. Doppler is now vice president of operations at Reed & Prince Manufacturing Corp. in Worcester. Gomes Casseres is a mechanical engineer at Lockheed Sanders Inc. in Nashua, N.H.

—BG

Model Predicts Boston Marathon's Medical Needs

The 100th running of the Boston Marathon on April 15 was an exciting and memorable spectacle. But with nearly 40,000 runners participating—four times the number who typically compete and the largest field for any marathon in history—the race represented a huge challenge for its planners and organizers. Thanks to a computer simulation developed by WPI juniors Kevin Ciszewski, Timothy Caldwell and Joseph Danubio, those harried men and women were able to confidently plan for the medical needs of the runners.

"The students' work provided the cornerstone for the medical care plan for the 100th Boston Marathon," says Dr. Marvin Adner, medical director for the race. Adner, chief of hematology at MetroWest Medical Center in Framingham, Mass., was responsible for planning all of the medical support for the race. Last spring, he approached WPI's Management Department with a request for a computer simulation study to help prepare for the centennial.

"The finish line for the marathon is like a funnel and is not conducive to easy disbursement of the finishers," says Francis Noonan, associate professor of management, who served as the students' faculty advisor. "This marathon historically incurs higher casualty rates than other marathons—either because of the nature of the course or the fact that many runners elevate the status of Boston to a higher level than other races and are thus more likely to push themselves beyond their physical capabilities."

For their computer model, the students input data based on assumptions about the total number of runners across a discrete range of finish times; staffing levels for the various categories of the race (including the number of available medical support person-



Sylvia Mehl of Minnesota, one of the 1,400 casualties of the 100th running of the Boston Marathon, rests in a medical tent at the finish line.

nel); weather conditions; and casualty rates for each type of injury.

"The resulting model predicted that up to 1,000 cots had to be available in the three medical tents and that the medical team needed to stock about 850 intravenous lines," says Noonan. "We also provided information to Dr. Adner on the number of medical support volunteers he needed to call upon to assist finishers who required medical attention."

Ciszewski and Caldwell, chemical engineering majors, and Danubio, a civil engineering major, were present on race day to see how well their model predicted the actual medical needs. They found that some of their assumptions were a bit conservative; for example, only 2,000 "bandit" runners (runners not officially registered) joined the race (they had predicted 5,000) and it took 28 minutes for all the runners to clear the starting line (they'd estimated 40 to 45). In addition, the cool weather held down the number of heat-related medical problems. As a result, there were 1,400 casualties at the finish line, vs. the 2,100 the model had predicted, and the population in the medical tents never got beyond 350, while the model suggested it might hit 500.

"Being overprepared is better than being underprepared," Noonan says, "and the medical staff was most grateful for the early planning work from these students."

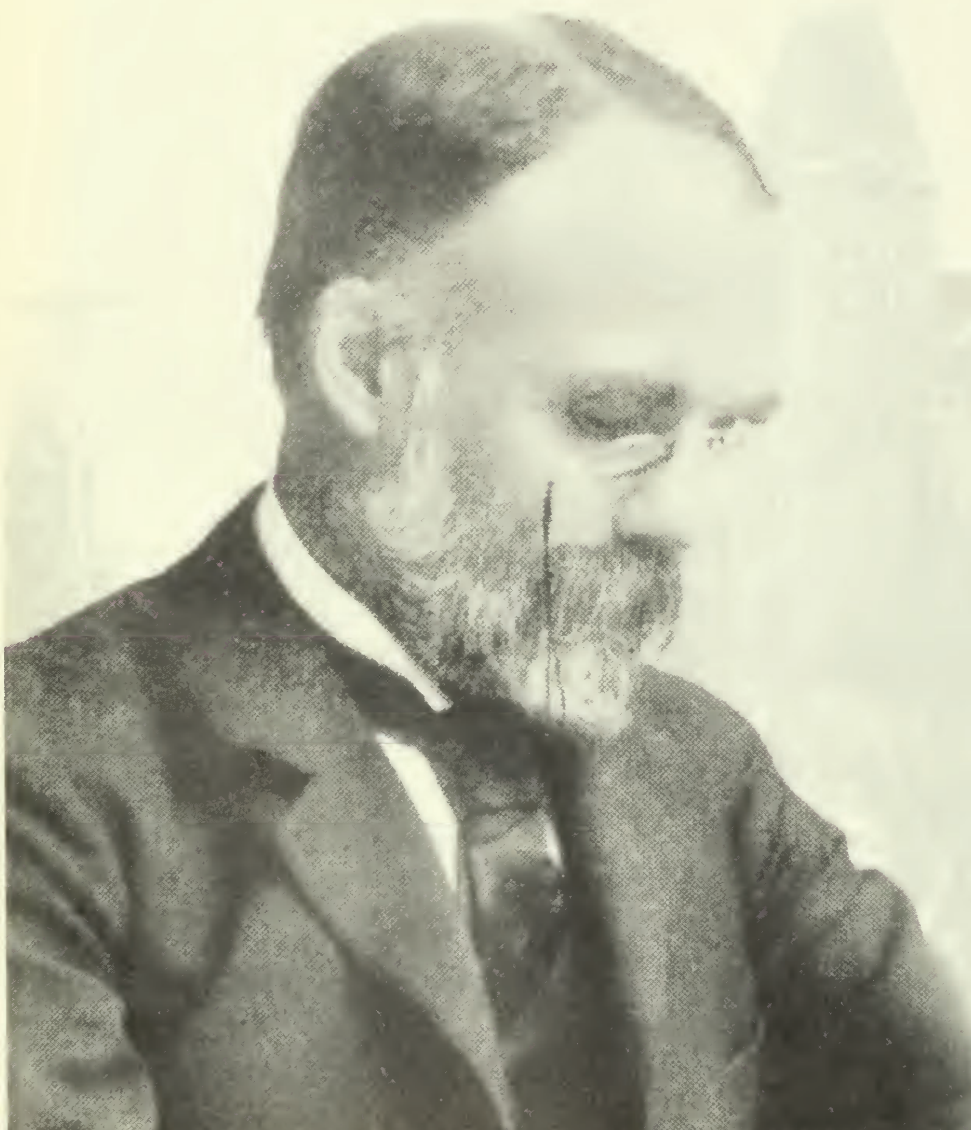
—BG

AP WIDE WORLD PHOTO

An Electric

More than 100 years ago, a young, determined professor of physics rose to do battle with the giants of mechanical engineering at WPI. When the dust settled, a new department was born and WPI would never be the same again. Here is the story of the birth of the Electrical and Computer Engineering Department.

BY WILLIAM R. GROGAN '46



In 1907 the year WPI constructed its electrical engineering building, Harvard historian Henry Adams published his autobiography. Adams was interested in everything. He loved to attend the major international expositions where the great technical advances of the day were displayed to an awestruck public. Of all the wonders he saw at these dazzling showcases, nothing captured his imagination like the dynamo.

In *The Education of Henry Adams*, he wrote of the forces that drive civilization. Every force has its symbol, he noted. Just as the force that drove the age of the great European cathedrals was symbolized by the cross, the symbol of the more secular 20th century would be the dynamo. He saw the 40-foot-tall dynamos at the great Chicago Exposition of 1893 as a moral force and was dazzled by the sense of power that radiated from these scarcely humming wheels—wheels that seemed to make the old-fashioned, deliberate revolutions of the Earth itself pale in comparison. This silent, infinite force would transform the world, he wrote. How right he was.

As Adams wandered among those dynamos in Chicago, the Electric Age was about to dawn at WPI. And just as Adams might have predicted, the arrival of the upstart discipline of electrical engineering would shake things up there, as it did everywhere else. In the century since, WPI's Electrical Engineering Department (today the Electrical and Computer Engineering Department) has participated in a wild torrent of discovery, development and application that has steadily accelerated in its rate of diversification and social impact. And through it all, it has educated generations of brilliant young men and women. This is the story of how it all began.

Century

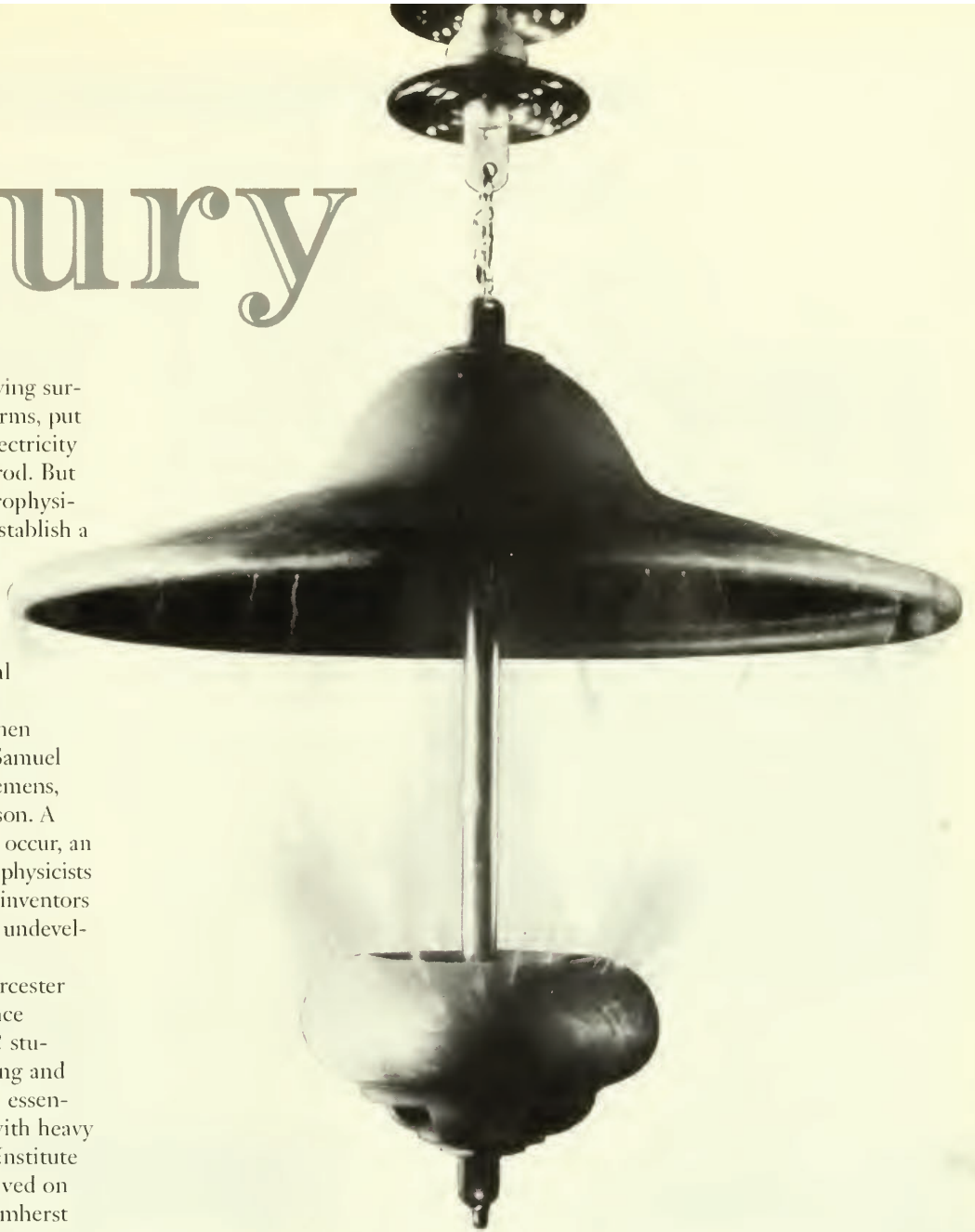
As early as 1750, Ben Franklin, having survived flying kites into thunderstorms, put his empirical understanding of electricity into practice by inventing the lightning rod. But nearly a century would pass before electrophysicists appeared on the scene to begin to establish a scientific basis for electrical phenomena. They were rewarded by having their names—Oersted, Ampere, Faraday, Ohm, Lagrange and Laplace—forever attached to the units of measure electrical engineers know so well.

Next came the age of the inventors, men like Carl Friedrich Gauss, Ernst Weber, Samuel Morse, Sir Charles Wheatstone, E.W. Siemens, Alexander Graham Bell and Thomas Edison. A new technological explosion was about to occur, an era in which the discoveries of the electrophysicists and the industrial needs identified by the inventors would be formally linked through the yet undeveloped discipline of electrical engineering.

Chartered on May 10, 1865, the Worcester County Free Institute of Industrial Science opened its doors on Nov. 11, 1868, to 32 students. While programs in civil engineering and chemistry were offered, the Institute was essentially a mechanical engineering school, with heavy emphasis on shop work. In 1871, as the Institute graduated its first class, there quietly arrived on campus a 27-year-old A.B. graduate of Amherst College who was to create WPI's electrical engineering program. Alonzo Smith Kimball always had an intense interest in electrical phenomena. As a physics professor, he developed laboratories and courses in electricity.

After continuous effort, Professor Kimball was allowed to introduce the first graduate course in electrical engineering at WPI in 1889. His next proposal, to offer an undergraduate course, was met with fierce faculty opposition. The opponents were led by mechanical engineering giants Professors Milton Higgins and George I. Alden. Higgins, superintendent of the Washburn Shops, and Alden, first head of the Mechanical Engineering Department, were ardent supporters of the shop model of engineering education that WPI had pioneered and both had national reputations. Kimball withdrew his proposal, but interest in the field continued to grow. The force that Henry Adams predicted would dominate the coming century could not be denied.

(Continued on page 9)



Opposite, Alonzo Smith Kimball, founder of the electrical engineering program at WPI. Above, experimental work in high-voltage electrical transmission was a focus of research in the early days of the department. In the background, the campus as it looked in 1896, when the department was established. Boynton Hall, far left, and Salisbury Laboratories, far right, housed the electrical engineering program before it gained its own building in 1907.

The Big E

By 1905, just a decade after its founding, the Electrical Engineering Department had become a victim of its own success. Enrollment in the EE program had grown like wildfire and its meager facilities in Salisbury Laboratories were bursting at the seams. In an urgent note to President Edmund Engler, Department Head Harold Smith warned that the department was in danger of "complete strangulation."

Not long after that, the trustees authorized the expenditure of \$200,000 for the Electrical Engineering Building, which was completed in 1907, occupying a prominent spot at the corner of West and Salisbury streets on what had been part of the Salisbury family farm. Built in the shape of an E, the new structure was a showcase for the most advanced electrical technology. There were dynamos and motors and electrical apparatus of all sorts for students to use, all controlled from a 40-foot-long, 7-foot-high switch panel.

A large open bay served as a general purpose lab and contained the largest pieces of equipment. A 10-ton traveling crane moved over the lab on huge I-beams to lift the huge generators and motors. Two wings housed offices, classrooms, a lecture hall, the department library, and a large lab for high-voltage work. In all, the building enclosed 900,000 cubic feet.

This space proved adequate for the department's needs for 50 years, though the changing nature of electrical engineering—including the electronics revolution created by the invention of the transistor—ultimately led to a decision to renovate the building in 1958. About 7,000 square feet of new space was created by flooring over the large bay, and research labs were established for growing fields like electronics, computers, microwaves and high-frequency circuits. The building also gained a new entrance facing the campus.

The building was ready for its next expansion and refurbishment in the early 1980s. An 8,000-square-foot addition was built with a modern facade facing Salisbury Labs. The space was needed not only for the expanding Electrical Engineering Department, but for a relatively new neighbor, the Computer Science Department, which shared the building until it gained a home of its own in Fuller Laboratories in 1990.

For its first 42 years, this structure was known simply as the Electrical Engineering Building. In 1949, upon the death of Atwater Kent '00, the Institute decided to formally name it for the radio pioneer. As part of the renovations in the 1980s, the large lecture hall was named for longtime faculty member Hobart Newell.



AN ELECTRIC CENTURY

(Continued from page 7)

Meanwhile, some alumni and trustees were becoming concerned that the Institute was requiring too much shop work and for too long. MIT (which graduated its first electrical engineering major in 1889) and Cornell had already begun to de-emphasize shop work and develop the scientific component of their academic programs. They had also lengthened their three-and-a-half-year program to four years. Despite a show of force from Alden and Higgins, the WPI trustees voted to extend WPI's program to four years.

Kimball saw his chance. He devised a program that came to be known as the "Kimball Plan." It consisted of two and a half years of mechanical engineering, a half year of "breadth" subjects, and a year of electrical engineering. Once again, Alden's protests that the college was becoming "too scientific" were overruled by the trustees, who quickly approved the plan. The electrical engineering program started when the first four-year term began in September 1893. It was directed by Kimball, who by then was head of the Department of Physics. Meanwhile, Kimball's health, never very good, was getting steadily worse.

A corner of the Boynton Hall basement became WPI's first electrical engineering laboratory. A dynamo was set up there, driven by shaft-



ing that passed through a tunnel from the Washburn Shops. Stephen Salisbury II, having become fascinated with electricity, was a strong supporter of the program, donating dynamos, motors and all sorts of measuring equipment to the college. He was also instrumental in the building of the magnetics laboratory (now Skull Tomb), which contained no iron in its construction. Later rendered useless for its primary purpose by the vibrations from the Boynton Street trolley line, the tiny building became an electrical engineering laboratory. When Salisbury died in 1884, his son,

Stephen Salisbury III, honored his memory with a \$100,000 gift, which the Institute used to construct Salisbury Laboratories, completed in 1889. The EE Department was granted limited space in the new building, which enabled it to abandon the Boynton basement room.

The program in electrical engineering proved extremely popular and grew rapidly. Space became a critical problem, and the program needed full-time management. In 1896, electrical engineering was established as a full department; Harold B. Smith, a human dynamo then just 27 years old, was named its head. That same year, Professors Higgins and Alden left WPI to pursue their immensely profitable commercial interests, amassing fortunes in the process. Alonzo Kimball, possibly one of the greatest unsung heroes of WPI, died a year later, at the age of 53.

Harold Smith was dynamic and determined. A graduate of Cornell and already recognized for his brilliant work in the field of transformers and insulators, he served as director of the new school of electrical engineering at Purdue for two years before he came to WPI. Smith seemed to be everywhere—teaching, recruiting students, actively consulting on transformers with Westinghouse, and diligently courting Edmund Engler, WPI's fourth president, and the Board of Trustees, impressing on them the fact that his visionary plans were limited by a terrible lack of space. Thus, when Stephen Salisbury III's legacy arrived in 1905, the trustees had no problem deciding what to do with it. Smith wanted the new electrical building to be the largest and finest in America—and it was (see story, opposite page). Larger than any college engineering building ever built, it was big enough to accommodate WPI's 1907 Commencement. The building's equipment included the renowned WPI Electric Test Car, the Institute's regional trademark for 20 years (see story, next page).

In 1910, Smith's wife drowned in a swimming accident. He remarried the following year, took a two-year leave of absence, and embarked on a cruise around the world. Upon his return, he pursued the development of the department with even more energy, and his reputation (and that of WPI) in high-voltage power transmission soared. A 100-kV line was constructed along Boynton Street. This was later replaced by a 500-kV line

(Continued on page 11)



Harold Smith, above, was named head of the Electrical Engineering Department upon its founding in 1896. The department's original faculty also included Joseph Phelon, in apron at left, who began his WPI career in 1887 as a professor of physics.

Testing the Rails

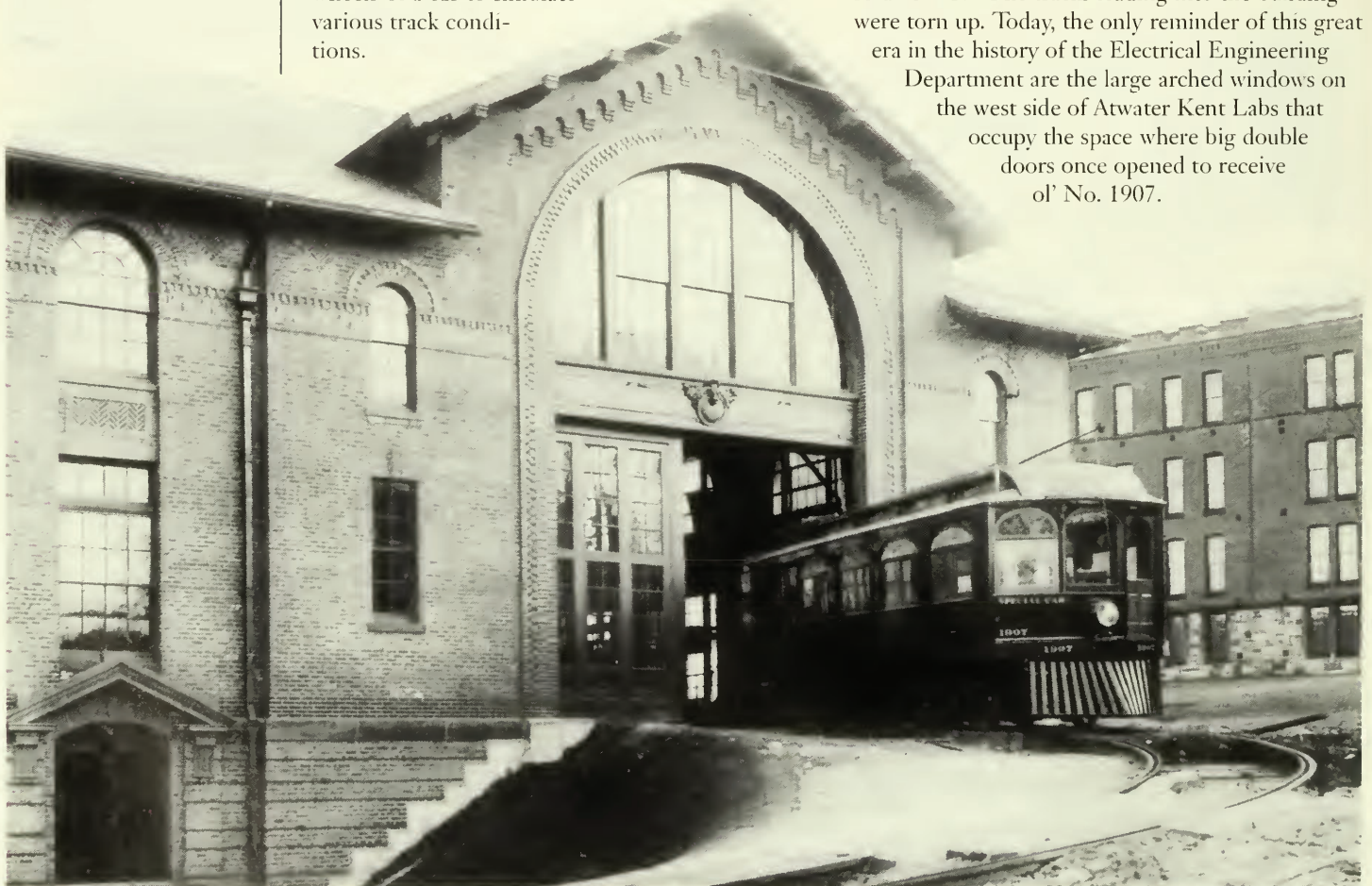
In 1905 the Electrical Engineering Department hired a young assistant professor named Albert Richey. His specialty was electric railway engineering, and he came to the Institute fresh from a post as chief engineer of a traction railway company in Indiana. Electrically powered trains were one of the most exciting and fastest growing applications of the still young field of power engineering. In the decades ahead, inner- and intercity rail lines would crisscross the landscape like a steel spider's web.

Richey brought this emerging field to WPI by establishing a program in electric railway engineering. Two years later, generous space was provided in the west end of the new Electrical Engineering Building for an electric car testing plant. The plant included a 56-foot-long pit with a set of rails mounted on tall I-beams for inspecting railway cars. Alongside the inspection track were four pairs of wheels mounted on adjustable pedestals. The wheels were attached to flywheels, which simulated the starting inertia, and electric generators, used to place variable loads on the wheels of a car to simulate various track conditions.

One car that made frequent appearances on the test stand was No. 1907, the Institute's own electric test car. Its exterior was painted green and adorned with a WPI seal and the name of the Institute in gold leaf. The inside was finished in oak and packed with instruments made by WPI students, as well as electric fans, ice coolers, lamps, desks, easy chairs and other amenities needed on long trips.

On those frequent sojourns, the car, one of only a few like it in the country, tested the continuity of the tracks used by the many electric street rail companies in New England. The companies paid for this service, which was typically performed during the summer months. The test crew usually consisted of a faculty member and two or three student assistants. Electrical engineering majors could choose this work as an option during the senior year, and many did.

The rise of the automobile and "autobus" brought about the gradual demise of electric street railways. The test car, no longer in demand and having been damaged by fire, was dismantled and sold in 1927. The tracks leading into the building were torn up. Today, the only reminder of this great era in the history of the Electrical Engineering Department are the large arched windows on the west side of Atwater Kent Labs that occupy the space where big double doors once opened to receive ol' No. 1907.



AN ELECTRIC CENTURY

(Continued from page 9)

supplied by a transformer designed and built at WPI. The work involved cutting-edge research on insulators and transformer insulating oils. The citizens of Worcester came to Boynton Street at night to gasp in wonder at the sparks and corona the line produced.

Smith insisted, based upon his industrial experience, that every EE major devote half of his senior year to the study of business methods, and he required a course in engineering economy (the course would continue to be offered in the department until the 1960s). During World War I he worked on submarine development in New London, Conn. Meanwhile, WPI's EE graduates were populating every corner of electrical engineering, and the EE industry responded. Westinghouse donated an elaborate high-voltage lab to WPI and paid for its complete installation, while General Electric donated an array of rotating machines.

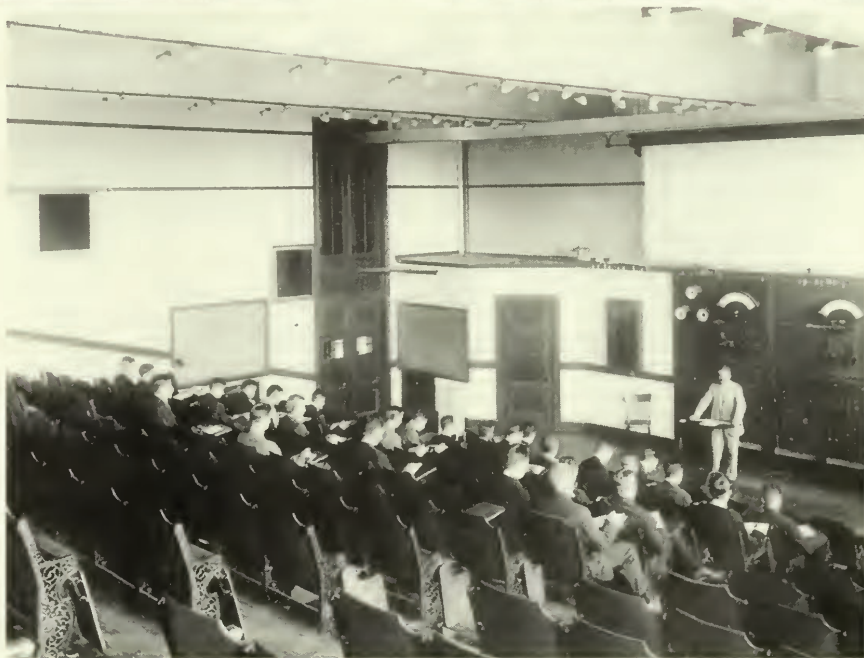
At least half of the EE program remained in mechanical engineering, since it was generally thought at the time (by Smith and by leaders at most engineering colleges) that one could not master the concepts of electrical design until one had become quite familiar with the principles of the established mechanical design process. That assumption would not change until World War II.

In 1927, EE Professor Clarence Pierce became the first faculty member at WPI to be granted a one-year sabbatical leave; he received a stipend of \$1,000. The WPI test car was sold that year, victim of the decline of the electric trolley lines. As a sign of the changing times, a communications lab, with Professor Hobart Newell (who brought WPI into the age of electronics) in charge, was established through a grant from AT&T, and the Radio Corporation of America gave the department a complete radio station.

Newell was a radio pioneer who helped develop the nation's first commercial radio station and the first FM transmitter. Two WPI alumni would make major contributions to the emerging radio industry: Atwater Kent '00, who designed and manufactured a popular line of radio receivers (and who gave his name to WPI's EE building), and Harold Davis '18, who was the first board chairman of NBC.

The department was at a zenith of educational achievement and was nationally recognized for its excellence. Smith was elected president of the American Institute of Electrical Engineers (forerunner of IEEE, the Institute of Electrical and Electronics Engineers), and for two years he trav-

eled the country extensively, speaking to a wide variety of engineering and business groups. Growing weary, he retired on July 1, 1931, after serving as department head for 35 years. Theodore H. Morgan from Stanford University took over. Smith died on Feb. 9, 1932, marking the end of a golden age for the Institute.



The era of electronics slowly (perhaps too slowly) supplanted the era of the dynamo. In turn, it was supplanted by the era of computers and computer communications. Today, in fact, the symbol that best defines the state of electrical engineering is the computer screen. One might ask what awesome new force will appear in the 21st century to take the place of this ubiquitous flickering presence. Will it lift humanity to greater heights of grace and understanding, or will it drive us all to the wall of frustration and isolation? The only certainty is that it will not take another 100 years before we discover the answer.

Grogan is professor emeritus of electrical engineering and dean of undergraduate studies emeritus at WPI.

Clockwise from top left, the "electricals" pose before one of the large electrical control panels in the EE Building; Hobart Newell '18, standing, a pioneer in radio who would go on to create WPI's educational and research program in electronics; Harold Smith at the podium in the lecture hall that would later be named for Newell.

The Father of Negative Feedback

In its first 100 years, WPI's Electrical and Computer Engineering Department has produced thousands of graduates, many of whom have gone on to do extraordinary things. There was Atwater Kent '00, who made one of the most popular receivers in the early days of radio; Yi Chi Mei '14, who became president of one of China's best known and most distinguished universities; Hobart Newell '18, a pioneer in radio who became a legendary professor of electrical engineering at WPI; John Lott Brown '46, who made a name for himself as a researcher in psychology and a university president; William Grogan '46, also a distinguished professor at WPI and one of the founders of the WPI Plan; Paul Allaire '60, who is chairman and CEO of Xerox Corp.; Robert McIntosh '62, a pioneer in microwave remote sensing; Donald Foley '66, an entrepreneur and business leader who was once deputy director of the Defense Advanced Research Projects Agency; and Ronald Zarrella '71, who went from the presidency of Bausch and Lomb to a vice presidency at General Motors (where he is in charge of the corporation's North American Sales, Service and Marketing Group).

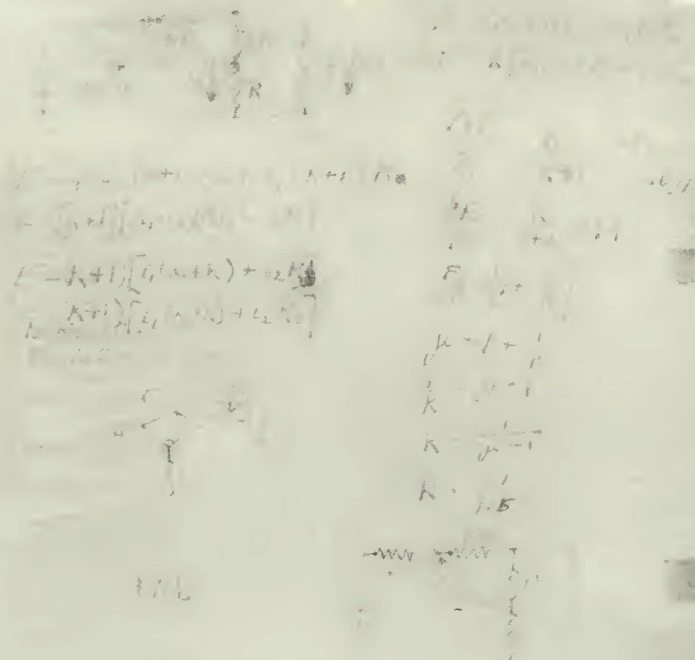
But perhaps the department's most stellar graduate was Harold S. Black '21, whose negative feedback theory is widely recognized as one of the most important and fundamental concepts in electrical engineering. The theory enables distortion in a communication signal to be corrected by feeding part of the signal back to the amplifier and comparing it to the original signal. The theory was first applied to long-distance telephone service, but has since found applications in fields as diverse as control engineering and psychology. Indeed, the term "feedback" has become entrenched in the popular lexicon.

The story of how Harold Black discovered negative feedback theory is legendary. In 1927 he was taking the Hudson River Ferry to his office at Bell Laboratories in New York City when he suddenly thought of a solution to the problem of distortion in amplified signals (a fundamental obstacle to economical long-distance telephone service). Having nothing else to write on, he sketched his idea on a copy of *The New York Times* and then signed and dated it. The patent he won for the negative feedback amplifier was one of 63 U.S. and 278 foreign patents he earned in a long and distinguished career at Bell Labs.

For his contributions to electronics and communications, Black earned numerous awards and honors. They included the IEEE's Lamme Medal, WPI's Robert H. Goddard Alumni Award for Outstanding Professional Achievement, and induction into the Inventors Hall of Fame.

THE NEW YORK TIMES

SATURDAY, AUGUST 6, 1927.



Alumni Speak Out

By MICHAEL W. DORSEY

Each spring, the WPI community gathers for a ritual filled with tradition and marked by dignity and emotion. In a ceremony that has transpired 128 times since WPI opened its doors, the members of the graduating class, adorned in black robes and mortarboard caps, stride one by one across a gaily decorated stage to receive their diplomas and march off into the ranks of alumni.

Commencement is both an end and a beginning. Just as it brings down the curtain on a student's campus days, distilling into memories the many hours spent studying, learning and building friendships with classmates, it opens the door on a new type of relationship with the Institute. For

some, it is an active affiliation, filled with homecoming week-ends, class

reunions and annual support of the WPI Alumni Fund. For others, the connection is more passive,

sustained largely by the continual stream of news about WPI and fellow graduates delivered by the Institute's publications.

But whether graduates stay in touch with their alma mater or keep their distance, they represent the Institute's single most important constituency. Alumni provide WPI with about 85 percent of all the dollars it raises from individuals. Graduates play an important role in recruiting new students, either actively as Alumni Admissions volunteers or indirectly as ambassadors for WPI in their communities. Alumni help students launch their careers by providing opportunities for internships and co-op experiences, by participating in career fairs and job shadowing programs, and by hiring fellow graduates. More and more, alumni are making a difference in WPI's educational efforts by advising or sponsoring student projects and helping out with the creation and management of oversees project centers. Many alumni volunteer time to the Institute as trustees or members of many Alumni Association and campus committees. And all graduates, by talking about the university to friends, fellow employees and young people, help build and expand WPI's reputation.

Given the many ways alumni contribute to the Institute's success, one might guess that WPI

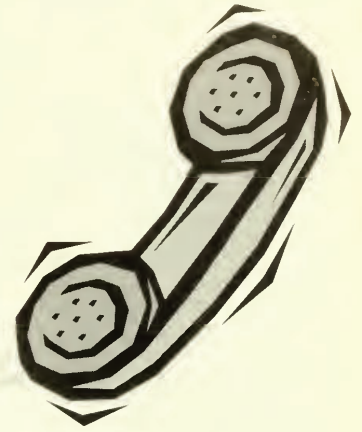
would know a great deal about what this important group thinks about a wide range of issues. In reality, of course, tapping into the thoughts and opinions of more than 22,000 men and women who live and work all around the world is no easy task. Last summer, for the first time ever, the WPI Alumni Association decided to do just that. To take the pulse of this widespread group, the association, in concert with the University Relations Office and the Provost's Office, contracted with the Gallup Organization to conduct a comprehensive survey of the alumni body.

"There have been a few surveys—both formal and informal—over the years that have questioned different groups of alumni about specific topics," notes Sharon Davis, director of alumni affairs. "But until now, there has never been a comprehensive study of our entire alumni body that asked not only what they think about their relationship with the Alumni Association, but how they view their WPI educations and the management and future directions of the Institute. This survey really broke new ground and provided some quite interesting and useful results."

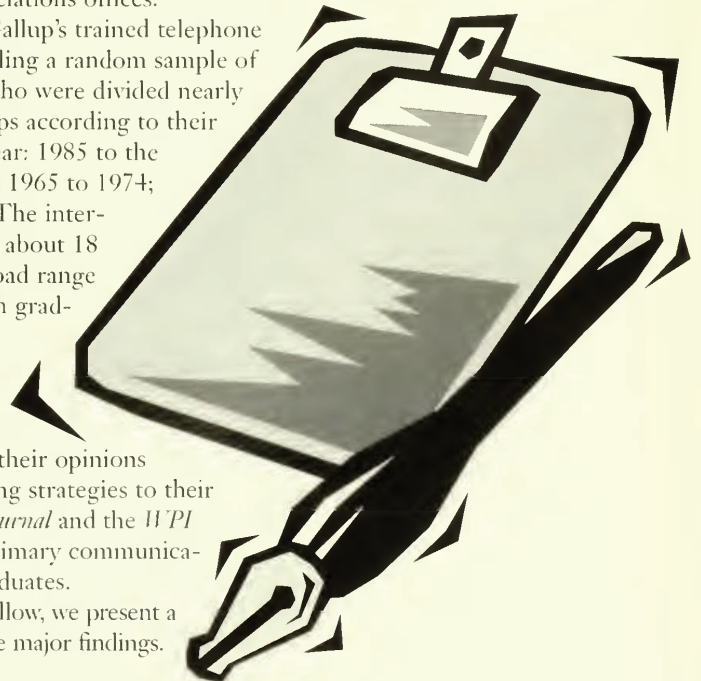
The survey was overseen by a subcommittee of the Alumni Association Executive Committee. Chaired by Patricia G. Flaherty '75, the subcommittee also included Joel P. Greene '69, Joseph J. Maggi '67, Robert E. Maynard '63, Samuel Mencow '38, Patrick T. Moran '65 and Katherine M. Vignaly '84. The questionnaire was designed by Gallup with considerable input from the committee and from WPI's Alumni, Provost's, Student Life and University Relations offices.

In August 1995, Gallup's trained telephone interviewers began calling a random sample of 841 WPI graduates, who were divided nearly equally into four groups according to their undergraduate class year: 1985 to the present; 1975 to 1984; 1965 to 1974; and 1964 and earlier. The interviews, designed to last about 18 minutes, covered a broad range of topics, ranging from graduates' perceptions of WPI's quality to their memories of their educational and social experience at WPI to their opinions about WPI's fundraising strategies to their satisfaction with the *Journal* and the *WPI Wire*, the Institute's primary communications links with its graduates.

In the pages that follow, we present a summary of some of the major findings.



What's on the minds of WPI's 22,000 graduates? What do they think about the education they received, the state of affairs at their alma mater today, the programs and services of their Alumni Association, and the Institute's fund-raising practices? To find out, WPI conducted a major survey of alumni last summer. Here are the results.



DONT KNOW

POOR

FAIR

GOOD

EXCELLENT



%	%	%	%	%
3	1	7	23	66
15	2	12	28	43
1	1	23	48	27
11	2	24	42	20
24	2	24	34	16
7	2	34	44	13
23	2	44	25	5
43	3	43	9	1
12	17	66	5	1

How WPI Ranks

Recognizing that WPI graduates represent an important adjunct to the Institute's efforts to expand and enhance its reputation and name recognition, the survey sought to find out how alumni rate their alma mater and how they think the public at large perceives of the university. Overall, respondents compared their alma mater quite favorably to some of the top universities in the nation, and said they believe that the public at

Rate these schools in terms of overall quality.

MIT
Cal Tech
WPI
Cornell
Carnegie Mellon
Rensselaer
Georgia Tech
Clarkson
UMass - Amherst

large holds a positive opinion of WPI, as well (those who have heard of the Institute, that is).

Respondents were asked to rate WPI and eight other universities (including some of the Institute's most important competitors for students) on a five-point scale. The results are presented in Table 1; they show that alumni placed WPI ahead of some of the nation's top technological universities. In fact, only MIT

and California Institute of Technology earned higher mean ratings than WPI. By very slight margins, alumni who graduated in 1965 or earlier rated WPI higher than more recent grads, and male graduates, overall, ranked WPI slightly higher than female graduates. Regular donors to WPI (those who have given within the last five years) assigned the Institute higher marks than those who have not supported WPI regularly.

Alumni were also asked which university they believe to be WPI's closest competitor. Overall, 84 percent named Rensselaer Polytechnic Institute or MIT, with Rensselaer accounting for about two thirds of the replies. Cal Tech and Carnegie Mellon were each mentioned by about 2 percent of respondents. According to the WPI Admissions Office, Rensselaer is, indeed, WPI's most important competitor. About 33 percent of students who apply to WPI also apply to Rensselaer. Other major competitors are, in descending order, Boston University, Northeastern University, Tufts University and the University of Massachusetts. Carnegie Mellon, Cornell and MIT all rank just below these schools.

Asked to place themselves in the shoes of the general public, 62 percent of respondents said they think the average person has a favorable impression of WPI; 14 percent said they believe the Institute is viewed extremely favorably, while 16 percent said WPI is "OK" in the public eye. Some 6 percent of respondents said they believe the public, as a whole, does not know WPI at all.

Two questions asked graduates to name what they consider to be WPI's strongest and weakest

programs. Confusion over the meaning of the word "program" in the question may have contributed to the wide range of responses received, though the answers do provide a clue as to what alumni tend to think of first when they ponder academics at WPI.

For example, while the Institute has made the WPI Plan, its innovative, project-based undergraduate program, the focus of much of its marketing efforts—particularly in its communications to prospective students—only 9 per-

cent of respondents said the Plan is WPI's strongest program. However, 15 percent placed projects—the centerpiece of the Plan—at the top of the list. When combined, these two responses were mentioned by 24 percent of respondents, placing the Plan No. 2 on the list. (When the 3 percent of alumni who named the undergraduate program are added in, the Plan rises to the top.)

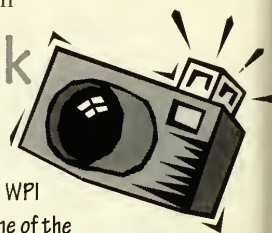
Of the top six programs mentioned, five are academic disciplines. They are electrical engineering (26 percent), mechanical engineering (23 percent), computer science (12 percent), engineering in general (11 percent), and chemical engineering (9 percent). Biology and Biotechnology was mentioned by 6 percent of respondents, environmental engineering by 4 percent, and fire protection engineering by 2 percent.

More than a third of respondents said they could not name WPI's weakest program; another 8 percent said WPI has no weak programs. The percentage of alumni who did not name a specific program increased steadily with the length of time since graduation. Where 17 percent of alums in the classes of 1985 to the present answered "don't know," 29 percent of members of the classes of 1975 to 1984, 39 percent of those in the classes of 1965 to 1974, and 52 percent of grads in the Class of 1964 and earlier gave that answer. The only program cited as weak by a substantial number of alumni was the humanities (26 percent, overall), with 37 percent of recent graduates singling out this discipline.

Experiences, Positive and Negative

Another set of questions asked participants to reflect, in general terms, on the experience they had as students at WPI. Table 2 lists the answers given most frequently to the question, "What was the best single experience you had at WPI?" The answer

Quick Take



- Alumni place WPI ahead of some of the nation's top technological universities.
- 62 percent of respondents said the public has a good impression of WPI.
- 84 percent of alumni said RPI and MIT are WPI's closest competitors.
- More than a third of grads could not name WPI's weakest program.

given more often than any other was "graduating." For alumni who graduated since the start of the WPI Plan, project work was the top choice, given by 20 percent of alumni in the classes of 1975 to 1984 and a third of those who graduated more recently. Earlier Plan graduates gave equal weight to graduating and to passing the Competency Exam, the do-or-die graduation requirement that was phased out about a decade ago in favor of departmental distribution requirements. Interestingly, the social side of campus life—friendships with classmates and faculty members, meeting one's future spouse, extracurricular activities, and sports—was mentioned by few alumni.

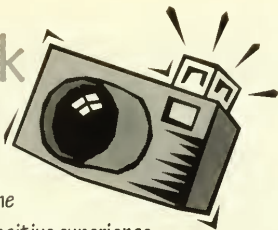
In fact, asked to list two positive experiences they remember from their student days, alumni, by a wide margin, pointed to academic experiences (project work, academic excellence, helpful professors, academic environment, and hard work and discipline) more often than social experiences (fraternity and sorority life, social events, friendships, and extracurricular activities), as Table 2 shows. Overall, fewer than half of respondents recall negative experiences related to WPI (this percentage dropped dramatically with time since graduation, ranging from 52 percent for the most recent graduates to 29 percent for those who graduated in 1964 or earlier).

Of the alumni who had a negative memory, most attributed it to an individual professor. "Bad social scene" was the top answer for graduates from the classes of 1975 to 1984, and "hard work/high pressure" was mentioned by 13 percent of graduates from the classes of 1965 to 1974. Other factors listed by more than 5 percent of respondents were financial problems (mentioned more frequently by recent grads), "fraternity/sorority" and poor grades. Prejudice was cited by 12 percent of women who reported negative memories, but only 2 percent of men. Men were more likely than women to cite a bad social scene, while women were far more likely than men to point to the lopsided ratio of male to female students.

The Alumni Experience

One of the most important roles of the Alumni Association is to keep graduates engaged with their alma mater by offering a range of programs and services tuned to graduates' interests, needs and schedules. Informal feedback from alumni who partake of those

Quick Take

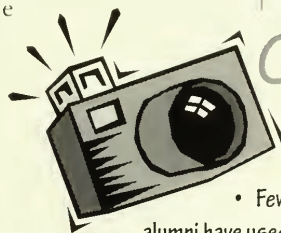


- Asked to name their most positive experience at WPI, most said "graduating."
- Younger alumni cited project work as their most positive experience.
- Alumni rated their academic experience higher than their social experience.
- Fewer than half of respondents had negative associations with WPI.

services and programs, and the raw numbers—how many people participate and how many don't—offer some guidance to the alumni staff about which programs are useful and enjoyable. Through the survey, the association sought to probe deeper.

The survey revealed that fewer than half of graduates have ever used an alumni association program or service. Not surprisingly, graduates who live in the Northeast were the most likely to have taken advantage of what the association offers, while grads in the western and south central U.S. were the least likely (international alumni were not polled). The participation level increased somewhat with time since graduation, and active donors and graduates who received both their bachelor's and advanced degrees from WPI were much more likely to have used the association's services than nondonors and those who earned advanced degrees elsewhere.

Of those who said they had joined in association activities, about a third said they'd attended either Reunion or Homecoming. Homecoming was most popular with younger alumni (more than half of graduates of 1985 to the present have attended this event; only 16 percent of those in the classes of 1964 and earlier have), while the popularity of Reunion (an event for classes celebrating major reunions, beginning with the 10th) appears to grow with the passage of the years (about 40 percent of grads from the classes of 1965 to 1984 have attended a reunion; 54 percent of members of the classes of 1964 and earlier have come back to campus for this spring event).



Quick Take

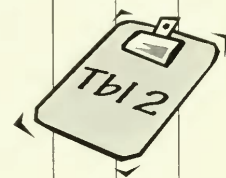
- Fewer than half of alumni have used Alumni Association programs and services.
- Of those who have, about a third have been to Reunion or Homecoming.
- More than three-quarters said alumni programs are effective.
- Those who don't partake cite distance from WPI and busy lives as reasons.

What was the best single experience you had at WPI?

	SINCE 1985	1975 TO 1984	1965 TO 1974	1964 OR EARLIER	%
graduating	17	18	17	26	20
project work	33	20	9	4	16
fraternity / sorority	7	9	8	5	7
passing competency exam	5	18	0	<1	5
academic class	3	3	8	6	5
friends made	4	3	4	4	4
friendship with faculty member	1	3	5	5	4
other	22	17	24	29	23
don't know	8	8	22	16	14

Categories of experiences that hold the most positive memories of WPI

Academic	54	61	49	49	53
Social / recreational	37	30	34	31	33



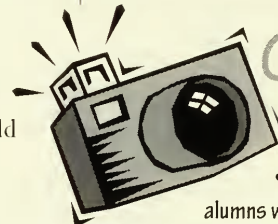
MEAN SCORE
AGREE OR
STRONGLY AGREE



Of those who had attended Alumni Association events, more than three quarters found them to be at least somewhat effective (somewhat effective, 49 percent; very effective, 27 percent). Those who did not rate the programs "very effective" were asked why they weren't more effective, and all respondents were asked how alumni events could be improved. The most prevalent answers centered on low attendance at the events, inadequate advertising or advance notice for events, and a need for better content or content more in tune with the interest of alumni.

To get a better feel for why alumni do not attend events, or attend more often, the survey asked participants who had not been to an event for at least five years (or who could

not remember attending an event) what kept them away. More than 40 percent said the events were simply too far away. Another 26 percent said they were too busy with work, family and other responsibilities. Thirteen percent said they had no interest in the events or didn't feel they needed to attend, while 8 percent said they didn't know what was going on or didn't feel connected to WPI. Interestingly, the percentage of alumni giving each of these responses varied little among the four age groups, although women were more likely than men to say they are



Quick Take

- 96 percent of alumni would recommend WPI to prospective students.
- More than 90 percent had high praise for the WPI faculty.

too busy to attend events. Not surprisingly, the farther away graduates live from Worcester, the more likely they were to say that events are too far away.

Agreement with statements about WPI in general

%	*	
96	4.5	I would recommend WPI to prospective students.
90	4.4	WPI's current emphasis on project-based education is the right approach for success in today's world.
94	4.3	WPI provides a positive community in which to learn.
91	4.2	The faculty provides a positive learning environment for the students.
87	4.2	The faculty really cares about the students.
85	4.1	The WPI faculty is the highest quality.
86	4.0	If I were to give money to WPI, I have confidence that the money would be used wisely.
85	4.0	WPI is well-managed, with a clear set of goals.
76	3.8	WPI provides a positive social community in which to live.
74	3.8	WPI should provide merit-based scholarship aid to outstanding students regardless of financial need.
69	3.8	WPI's focus on international and global issues is the best approach for success in today's world.
		Agreement with statements about WPI when alumni were students
96	4.3	The faculty at WPI taught me well.
89	4.2	My WPI education prepared me well to contribute quickly to projects and problem-solving tasks at work.
91	4.2	My WPI education prepared me well for my career.
83	4.0	My WPI education gave me skills that have proven valuable in my career, such as teamwork, leadership and the ability to communicate professionally.
80	3.8	My WPI experience contributed to my interpersonal, social and leadership skills.
71	3.8	I feel better prepared for the challenges of my career than colleagues who graduated from other universities.
60	3.7	WPI's career development office offers adequate support to students who are looking for a job.
60	3.3	I received adequate training in writing and verbal skills to prepare me for professional life since graduation.
54	3.2	As a result of my WPI education, I am concerned about social issues and the social consequences of my work.

* computed using numeric values of responses: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Perceptions of WPI

To gauge alumni opinions on a wide range of topics relating to WPI today, participants were read a list of statements and asked whether they agreed or disagreed. Some of the results are displayed in Table 3. Most encouraging, 96 percent of alumni surveyed said they would recommend WPI to prospective students. At least 90 percent of respondents said they agreed that WPI's project-based educational program is the right approach for students today, that WPI is a positive community in which to learn, and that the faculty helps students learn.

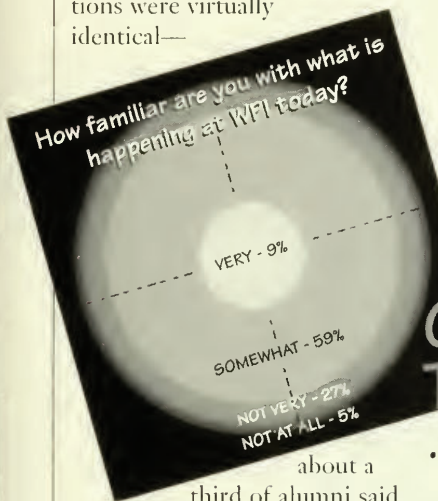
A few questions were asked only of graduates of the WPI Plan era. For example, 71 percent of this group felt women students are comfortable at WPI (women were not admitted as students until 1968) and 16 percent said they believe faculty members' research takes too much time away from teaching (WPI has had a significant research program only in the last few decades).

Another group of statements focused on the student experience at WPI (see Table 3). Again, alumni gave high marks to their WPI education. More than 90 percent of alumni said the WPI faculty had taught them well and helped them learn. Participants also said, by margins of at least 80 percent, that their education prepared them well for their careers and prepared them to work quickly, to solve problems at work and to work well in teams. Eighty percent said their education contributed to their interpersonal, social and leadership skills. Only 54 percent of alumni said they agreed that their education had made them more concerned about social issues, although students who graduated under the Plan (with its emphasis on the interaction between science, technology and society) were more likely to feel WPI had made them socially aware.

Keeping Informed

If the survey results are a good indication, WPI alumni do not feel as well informed about WPI as they'd like (see graphic below). About a third described themselves as not very familiar or not familiar at all with what is happening at the Institute today. Only 9 percent described themselves as very familiar with the current state of their alma mater. Most respondents said the bulk of the news they receive about WPI arrives in their mailboxes in the form of publications, mailings from the Alumni Association, and class and department newsletters (only 3 percent overall learn about WPI through their local newspapers).

Because of the importance of these printed communication vehicles, the survey devoted several questions to perceptions about the *WPI Journal* and its sister publication, the *WPI Wire*. In the interest of time, half of those surveyed were asked to comment on the *Journal* and half on the *Wire*. Readership patterns for both publications were virtually identical—



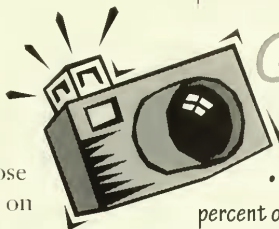
about a third of alumni said they read them thoroughly and about two thirds page through them. Only 2 percent of respondents said they never read WPI's alumni publications.

Readers of both publications said they enjoy getting news about other alumni, particularly their classmates, and keeping up to date on current events and activities at WPI. At least 10 percent of *Journal* readers said they also like the topics the magazine covers, the variety of articles and the coverage of the faculty. About 70 percent of readers had no suggestions for how either publication could be improved. Those who did offer suggestions asked for more information on alumni, current events and students, and more variety in the articles. Five percent of *Wire* readers would like to see the tabloid published more frequently.

Financial Matters

Contributions from alumni help WPI meet its expenses, offer new programs, provide students with financial aid, and expand, renovate and maintain its physical plant. Currently, about 30 percent of graduates make contributions in any given year, while 46 percent have supported their alma mater during the past five years. To understand why more alumni are not regular donors, and to get insights into what makes WPI graduates want to give—or not want to give—the survey included several questions about fund raising.

More than 80 percent of respondents reported that they usually support organizations and causes with financial contributions, and just over 70 percent said they recall

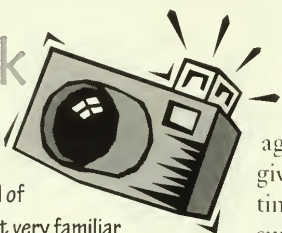


Quick Take

- More than 80 percent of alumni support organizations and causes.
- About 70 percent recalled supporting WPI within the past five years.
- Financial reasons and gifts to other causes were cited most often as reasons for not giving to WPI.
- The majority of alumni said WPI's fund-raising efforts are effective.

Quick Take

- About a third of alumni are not very familiar with WPI today.
- Most alumni get their WPI news from printed communications.
- Most alumni read the *Journal* and *WPI Wire* thoroughly or page through them.
- About 70 percent of readers had no suggestions for improving these publications.

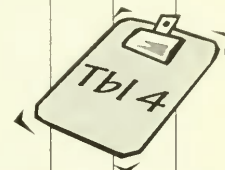


SINCE 1985

1975 TO 1984

1965 TO 1974

1964 OR EARLIER



Why do you contribute to WPI?	%	%	%	%	%
I appreciate my education	13	24	33	34	27
to help others	25	20	18	6	17
WPI is a worthwhile cause / school	9	13	11	12	11
to help out / help programs	11	9	9	4	8
I received financial aid	10	7	3	7	7
to give back what I received	9	5	5	5	6
obligation / responsibility	7	5	3	7	5
loyalty	3	4	4	8	5
WPI is doing a good job	1	5	7	4	4
WPI is deserving	1	3	5	5	4
other	43	41	44	43	43

supporting WPI during the last five years. The percentage who give in general and give to WPI rose steadily with time since graduation. Table 4 summarizes the reasons offered by the survey group for giving to the Institute.

People who reported making no contributions to WPI in the last five years were asked if there was a specific reason they had not donated. Of these, 12 percent refused to answer or said there was no specific reason. More than half of these nondonors cited financial reasons or gifts to other organizations. Sixteen percent cited discontent with WPI—a poor undergraduate experience, a feeling that WPI is not deserving or as deserving as other groups, and a lack of agreement with WPI. A poor undergraduate experience was cited by 10 to 12 percent of grads in the classes of 1975 to 1984 and 1964 and earlier.

The majority of respondents said WPI's fund-raising efforts and materials are at least somewhat

1964 OR EARLIER

1965 TO 1974

1975 TO 1984

SINCE 1985

effective (somewhat effective, 51 percent; very effective, 28 percent). The 72 percent who did not find those efforts and materials to be very effective were asked why. About a quarter could point to no specific reason. Ten percent said solicitations occur too often. Other reasons cited included the need for more creativity, a need to define better how WPI will use funds alumni donate, and the need to communicate in a more effective, more personal and "less pushy" manner. When asked what type of communication would be most likely to make them want to give, more than a third said a contact from a classmate. Fund-raising publications, a call from a student and a letter from the Alumni Association were other popular suggestions.

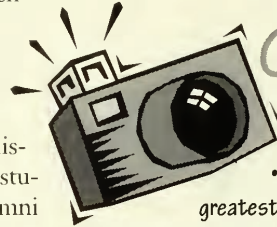
Dear WPI...

Before the phone interviews drew to a close, interviewers asked alumni, first, what that believed to be the greatest challenges WPI faces today, and, second, whether they had any advice for those who manage WPI's day-to-day affairs. The top answers to both questions are printed in Table 5. More than 35 percent of the responses to the first question focused on the challenge of maintaining the quality of,

improving, or broadening the Institute's educational programs. More than 20 percent focused on financial issues (keeping costs down and offering students adequate aid), while nearly 20 percent thought the biggest challenge is maintaining adequate and up-to-date facilities. About 10 percent said WPI's effort to expand its reputation and create a national image for itself were at the top of the list.

About a third of alumni had no advice to offer or simply asked WPI to keep doing the good job they say it is doing.

Twenty percent suggested WPI keep its focus on students and maintaining the quality of its programs. Maintaining the quality of the WPI Plan was a special concern for younger alumni.



Quick Take

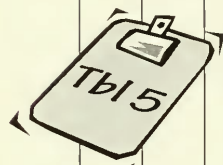
- Alumni said WPI's greatest challenge is maintaining the quality of a WPI education.
- About a third of alumni advised WPI to just keep up the good work.

What's Next?

All too often, major studies like the survey of WPI alumni are completed, read and placed on a shelf to gather dust. "That won't happen with this study," Davis says. "There are some provocative findings that will be of use to many people and departments at WPI. We've already shared the survey results with everyone who may find them of value, including the Admissions Office and the Provost's Office. In particular, the level of satisfaction alumni feel with their education and with the educational focus of the Institute should be important input to our marketing to prospective students and our efforts to improve our educational programs. The results on fund raising have already proved valuable to the members of the Alumni Fund Board, which recently approved a new five-year plan for the Fund."

Davis says the Alumni Association will use the survey as the foundation of a major effort to draft a new five-year master plan for alumni activities and programs. The plan is expected to be approved during the next academic year. To expand upon the findings concerning attitudes about alumni programs and services, the association recently completed a follow-up survey designed by a committee that included, in addition to the members of the original survey subcommittee, Christian Baehrecke '56, Kimberly Bowers '90, Kevin Doyle '89, Stephen Jackson '89, Douglas Nashold '95, Edwin Shivell '54 and Joseph Vignaly '82. Davis says the results are still being tallied.

"Like all of WPI's programs and departments, the Alumni Office has a limited budget with which to provide a wide range of services," Davis says. "It makes sense for us to use those funds to provide services that our graduates truly enjoy and want, and that are in tune with the kinds of lives they lead today. With the help of the follow-up survey we should be able to reshape our offerings to keep alumni involved in and informed about their university."



If you could say one thing to the leadership at WPI, what would it be?

%	%	%	%	%	
15	27	12	7	7	keep it up / continue as you are
10	6	12	12	13	challenge students/provide quality education
7	13	6	5	4	doing good job / great job
6	6	9	5	5	maintain quality of programs
4	6	3	5	3	concentrate on reputation
4	1	4	4	6	focus on students
4	<1	2	4	9	keep / improve projects
What are WPI's greatest challenges and needs?					
15	12	17	18	16	improve education / prepare students
14	12	16	14	13	maintain quality of programs
13	10	8	17	17	keep technology up to date
10	9	16	8	8	keep costs down
10	9	13	11	8	recruit top students
9	11	13	7	4	financial stability / adequate budget
6	5	6	7	6	keep curriculum up to date
5	5	4	6	4	create national / international image
5	4	5	4	5	improve reputation
4	6	1	3	5	keep good faculty
4	2	6	1	5	compete with other schools

A Mechanical Marvel



KYLE A. BROWN

A major renovation completed last fall transformed Higgins Laboratories, WPI's home for mechanical engineering for more than half a century, into a dramatically new and highly flexible center for education and research.

BY ROGER N. PERRY JR. AND MICHAEL DORSEY



JANET WOODCOCK

As they have done for more than 50 years, students and faculty members swung open the doors of Higgins Laboratories last fall and set about the business of teaching, learning and exploring in mechanical engineering. But the building they entered was dramatically different from the one the Institute dedicated in 1942, having undergone a dramatic restoration and redesign, and having been expanded through the construction of a 17,000-square-foot addition. In the new Higgins Labs, one can find reflections of the past, present and future of one of WPI's original academic departments. WPI was one of the first institutions in the U.S. to offer a program in mechanical engineering, and its early graduates went on to found the corporations and create the inventions that helped drive the American Industrial Revolution. Since those early days, the department has made its mark through its innovative approach to education, its groundbreaking research, and the accomplishments of its thousands of graduates. And now, with a modern, attractive and functional building, the department stands ready to face the challenges of education and research in mechanical engineering today and well into the 21st century.

When the Worcester County Free Institute of Industrial Science opened for business in November 1868, only a handful of disciplines were offered. Of these, the board of trustees noted, "the first in importance is mechanical engineering." Post-Civil War America was dominated by the machine and by dreams of an ever more mechanized and productive world. The new discipline of mechanical engineering was the key to turning that vision into a reality.

The third private college of science and technology in the country, WPI was also among the first to offer a course in mechanical engineering. Its mechanical engineering students and instructors became pioneers in a new model of engineering education. WPI was the first technological school to emphasize the importance of laboratory methods and the first to establish the workshop as an essential part of training in engineering.

The Washburn Shops contained a model manufacturing facility, by 1868 standards. It was there that students, working with journeymen factory hands, turned out products for sale on the open market. Profits from the shop helped to support the new school, which initially charged no tuition. At the same time, students became familiar with manufacturing processes and the expectations of the workers they would find in industry following graduation.

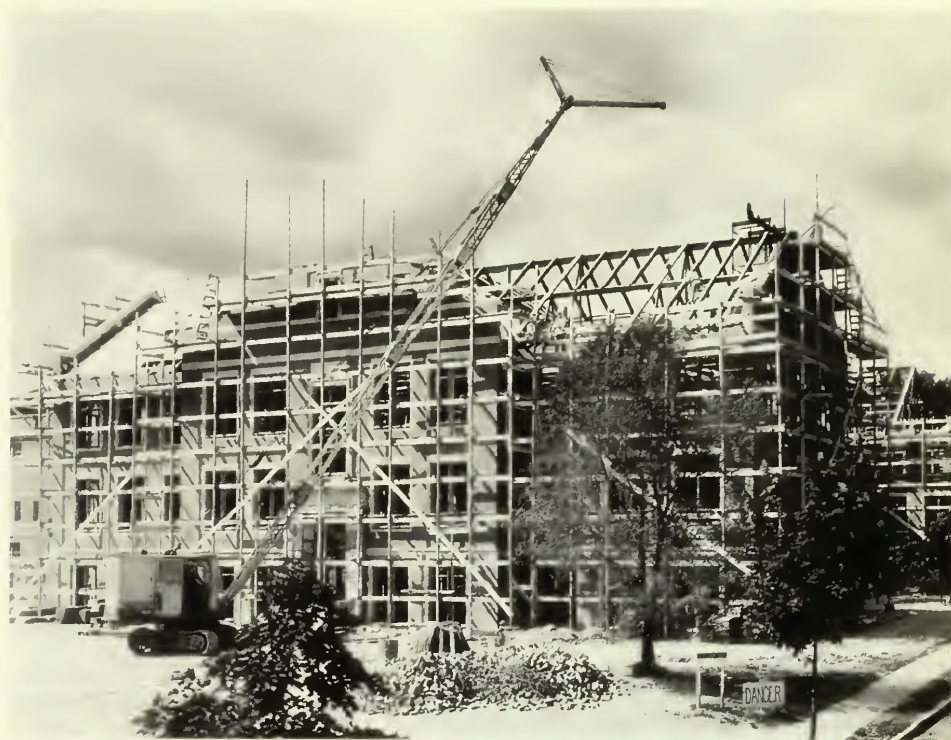
WPI's theory and practice philosophy became a model for many of the well known engineering schools developed in the latter part of the 19th century, including Georgia Institute of Technology and Rose-Hulman University. Although changing times have relegated commercial shops to the pages of history, the hands-on philosophy pioneered in the Washburn Shops is still the hallmark of a WPI education.

From the beginning, mechanical engineering was the most popular discipline at WPI, and its growing enrollments made space in Washburn tight. By 1894, a new facility was under construction to relieve the overcrowding. The four-story brick building on West Street was known simply as "the ME building" for half a century, until it was named for Charles G. Stratton of the Class of 1875. Rated among the finest mechanical engineering buildings in the East, Stratton was soon joined by a new power plant, an adjacent working foundry, and a hydraulics laboratory five miles away in Holden. The Alden Hydraulics Laboratory would become world renowned for its pioneering work in fluid flow; it was spun off as an independent research consulting laboratory about a decade ago.

Guiding the fledgling department through its formative years were George Ira Alden, the first department head, and Milton Prince Higgins, superintendent of the Washburn Shops. These close friends were highly regarded in the engineering community. In the 1880s they took a

leave of absence to help establish Georgia Tech, and both declined offers to remain on the faculty there. Both men left WPI in 1896 to devote full time to the Norton Emery Wheel Co., which they and others purchased in 1885.

Ralph Earle, who became WPI president in 1925, had a vision of developing the west half of the campus. In 1926, Sanford Riley Hall, the Institute's first residence hall, joined Alumni Gymnasium and Alumni Field on that nearly empty parcel of land. The Great Depression delayed the next



element of Earle's plan (Alden Memorial) until 1940. With the gradual growth of the student body and continued interest in mechanical engineering, a need for a new mechanical engineering building arose. Earle lived to see plans for Higgins Laboratories approved, but died before construction could begin.

Higgins Labs was nearly complete when America was suddenly plunged into World War II. Fortunately, most critical materials, furnishings and equipment had already been delivered, enabling the building to open on schedule for the spring semester in 1942. No elaborate ceremonies marked the wartime dedication.

The department flourished in its new home. With its spacious, well-lighted drawing rooms, ample laboratory space and a roomy lecture hall, Higgins Laboratories served the department well in the post-war "GI Bill" and "Baby Boom" years. But by the time the Baby Boomers were ready to send their own children to college, the Mechanical Engineering Department had once again found itself short of room and in need of modern facilities.

Above, Higgins Laboratories rises inside an envelope of scaffolding in 1941. Opposite, workers assemble the new 17,000-square-foot addition in 1994.

(Continued on page 23)

The Name Continues



Above right, Milton Prince Higgins; from top, his wife, Katherine, sons Aldus and John, and daughters Katherine and Olive.

In 1941 WPI chose to name its new mechanical engineering building Higgins Laboratories. It was a well deserved tribute to a man whose vision was instrumental in shaping the educational philosophy of this highly regarded institution.

Milton Prince Higgins supervised the construction of the Washburn Shops and served as its first superintendent. Under his direction, the shops became a model manufacturing facility where students combined their theoretical studies with practical, on-the-job training.

Proof of the value of this approach was quick in coming, as early graduates moved into key industrial positions. By the turn of the century, Worcester was a major manufacturing center that relied heavily on the engineering skills of WPI alumni.

With George Alden, Higgins and others purchased the rights to a fledgling grinding wheel business and in 1885 Norton Emery Wheel Co. opened for business. Alden and Higgins continued in their WPI posts for another decade, supervising their company on a part-time basis. By then, Norton Co., which Higgins served as president until his death in 1912, was well on the way to becoming Worcester's largest employer.

The Higgins home long stood on the corner of West and Salisbury streets, now the site of Goddard Hall. Here, Milton and Katherine Higgins raised four children. Sons Aldus and John graduated from WPI in 1893 and 1896, respectively. Daughter Katherine married R. Sanford Riley '96; daughter Olive Higgins Prouty became

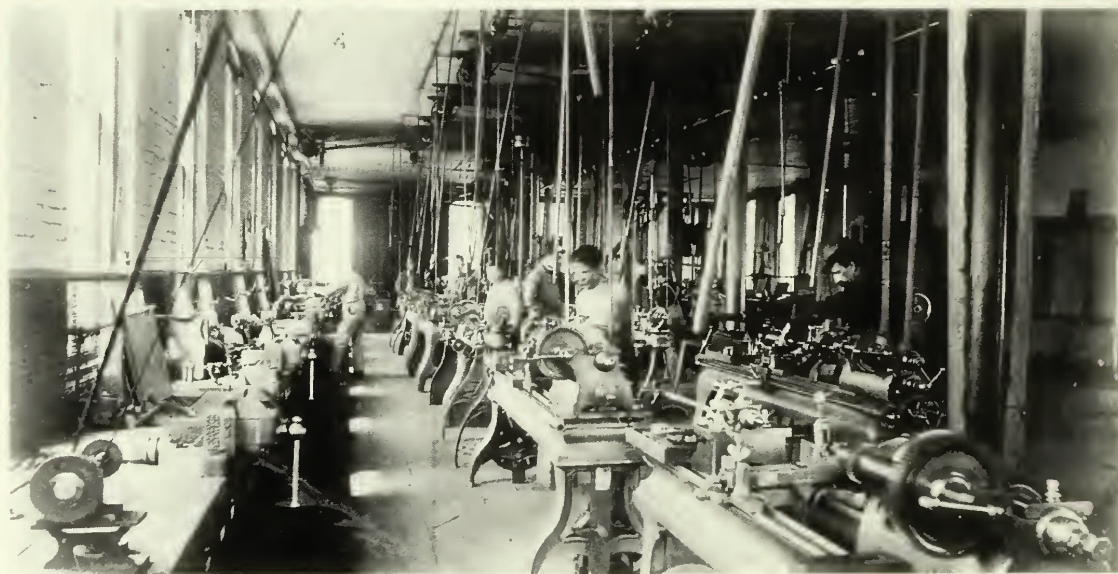


a noted author whose works include the best selling novel *Stella Dallas*.

The four children jointly gave one of the largest gift units in Higgins Laboratories, but this was only a part of the family's generosity to WPI. Katherine Higgins Riley was the largest contributor to the construction of Sanford Riley Hall in 1926, which was named in memory of her late husband. John W. Higgins established a scholarship in 1936 and endowed a special professorship in mechanical engineering. Aldus C. Higgins is best remembered for his gift of the Higgins House to his alma mater, though his gift to the college of a parcel of land adjacent to Alumni Field indirectly cleared the way for Higgins Labs to be built on its current site. Olive Higgins Prouty is commemorated on campus through the Olive Higgins Prouty Library Fund. The fund, originated by a bequest from Mrs. Prouty and augmented by generous gifts from her son, Richard Prouty, supports WPI's collection in the humanities.

Although not an alumnus, Aldus Higgins' son, Milton P. Higgins II, served WPI as a trustee for 31 years, six of them as chairman during the implementation of the WPI Plan in the early 1970s. In 1986 WPI established the Milton P. Higgins II Distinguished Professorship in Manufacturing in recognition of his many contributions to the welfare of the Institute. The lecture hall in the Washburn Shops, where his grandfather made his mark, is also named in his honor.

—ROGER PERRY



A MECHANICAL MARVEL

(Continued from page 21)

The need of the Mechanical Engineering Department can be stated very simply. It has the largest enrollment and greatest space requirements of all departments. Yet, for years its major activities have been crowded into an inadequate and ill-arranged laboratory." That was how Wallace Montague '12, chairman of the ways and means committee charged with carrying out President Earle's expansion plans, described the rationale for a new mechanical engineering building in 1940. It is also an apt summary of the problems the department faced five decades later.

Adequate for a mechanical engineering program of the 1940s, Higgins Laboratories was unable to fill the needs of the much larger and technically advanced program of the 1990s. Undergraduate enrollment in mechanical engineering had quadrupled over that period, and the faculty had grown threefold. The department's graduate program had increased by leaps and bounds, a reflection of a major increase in sponsored research (the department's \$3.5 million in external funding places it among the top 20 departments in the nation). This growth left Higgins severely overcrowded. In fact, a 1989 study ranked WPI's ME Department last among 14 similar institutions in space per faculty member, a common basis for comparison.

The need for more space hampered the growth of many vital research areas, including applied and stochastic mechanics, biomechanics, biomaterials and rehabilitation, computational mechanics, materials science, structural control and earthquake engineering, thermo-fluid and thermal processes, and vibrations and controls. With the creation a quarter century ago of the WPI Plan (the Institute's innovative, project-based undergraduate curriculum), student projects—more than 60 percent of which are now sponsored by corporations—became a vital element in the department's educational efforts. However, there was no dedicated space in Higgins for student project work, and students found themselves laboring in closets, in garages, and on a loading dock. The department's plans to implement a completely new undergraduate mechanical engineering curriculum, one designed to prepare students for the demands and opportunities of the profession well into the 21st century, were stymied by a lack of modern classrooms and teaching labs.

Higgins was also showing its age. Its exterior needed refurbishment and the interior was becoming threadbare, making a poor impression on prospective students and faculty members. The building's electrical service and heating, ventilation and cooling system had also become inadequate for the growing demands of a modern

research program, and some of the building's structures and systems (including the lack of an elevator) were not up to current building codes.

To remedy these problems, a major renovation and expansion was planned, to start in the spring of 1994. The project would include the top-to-bottom refurbishment and reorganization of the interior spaces of the 85,000-square-foot building, the construction of nearly 20,000 square feet of new space in an addition and through the use of part of the attic, and the complete upgrading of the building's utilities. The result would be an entirely new Higgins Laboratories.

A project as large and as complex as the \$8.5 million renovation of Higgins Laboratories must be planned to the last detail before the first shovel of earth is turned. Planning for the Higgins restoration and expansion was carried out by a large group of interested parties, including the faculty of the ME Department, the Mechanical Engineering Advisory Committee, the WPI Plant Services Office, the Physical Facilities Committee of the Board of Trustees, and the architects and engineers of Cutler Associates, the Worcester firm that would complete the design, engineering and construction.

Over the course of more than a year, the current and future plans and dreams of the department and its faculty (with their concomitant space requirements), the physical constraints of the building and building site, and the financial resources available to complete the project were carefully weighed, as plans for the project were drafted and redrafted.

In the spring of 1994, construction equipment arrived to begin excavating for the new addition, which would be carefully fitted into the west side of the H-shaped building. In this space would rise a four-story, 17,000-square-foot structure designed to symbolically bridge the past and future of mechanical engineering at WPI by combining the stately brick facade of the original building with dramatic three-story windows and a modern, glass enclosed entryway.

The addition would give Higgins a new entrance on the Quadrangle and provide considerable interior space for laboratories. Its subbasement would house all of the mechanical, electrical and plumbing support systems for the renovated building, freeing up space that had once contained transformers and other electrical and mechanical equipment. Additional space was gained by using a portion of the original building's attic for graduate student offices and laboratories.

(Continued on page 24)



JANET WOODLOCK

The renovation of Higgins Laboratories involved the complete rebuilding of most of the interior of the 54-year-old building.

A MECHANICAL MARVEL

(Continued from page 23)

The completion of the addition was the critical first step in the renovation of Higgins Laboratories, for unlike a typical refurbishment project, this one would proceed while the building remained in full operation. The next step was to move some of the occupants of Higgins into the addition and to renovate the space thus emptied. As space in Higgins was refurbished, other occupants were moved in to fill it, opening up still more space for renovation. The work continued in this manner, culminating with the refurbishment of several common spaces, including the first-floor lecture hall and the Heald Discovery Classroom on the second floor.

The renovation was completed on schedule in the fall of 1995. The product was a building that retained the character of the original structure (albeit with new energy-conserving windows, upgraded utilities, new heating and cooling system, and a service elevator), while meeting the needs of the Mechanical Engineering Department today and well into the 21st century. Accomplishing the latter task required extensive reorganization of existing facilities and the creation of new spaces.

This reorganization included the clustering of all faculty offices by area of interest into three suites on the first and second floors, and the relocation of the main department offices to the southwest corner of the building. In addition, several research areas received expanded facilities. The Center for Holographic Studies and Laser Technology, for example, now conducts research and education in areas ranging from fundamental studies of laser light interaction with materials to sophisticated applications in micromechanics and mechatronics in 10 new state-of-the-art, climate-controlled laboratories. Its activities are internationally recognized in this field.

A suite of bioengineering laboratories, for work in biomechanics, biomaterials and rehabilitation engineering, was created on the first floor, supporting faculty and graduate student research and student projects in these fields. The Richard A. Lufkin Fluid Dynamics and Thermal Processes Laboratories, on the basement level and third floor, include facilities (such as a water tunnel and a wind tunnel) for work in thermo-fluids, hydrodynamics, fluid mechanics, heat transfer and microgravity studies. A remodeled and expanded lab on the lower level will support work in vibrations and controls.

Some of the most exciting spaces in the new Higgins Laboratories were created specifically for education. They include the remodeled lecture hall on the first floor, rebuilt as a multimedia classroom complete with video projection facili-

(Continued on page 26)

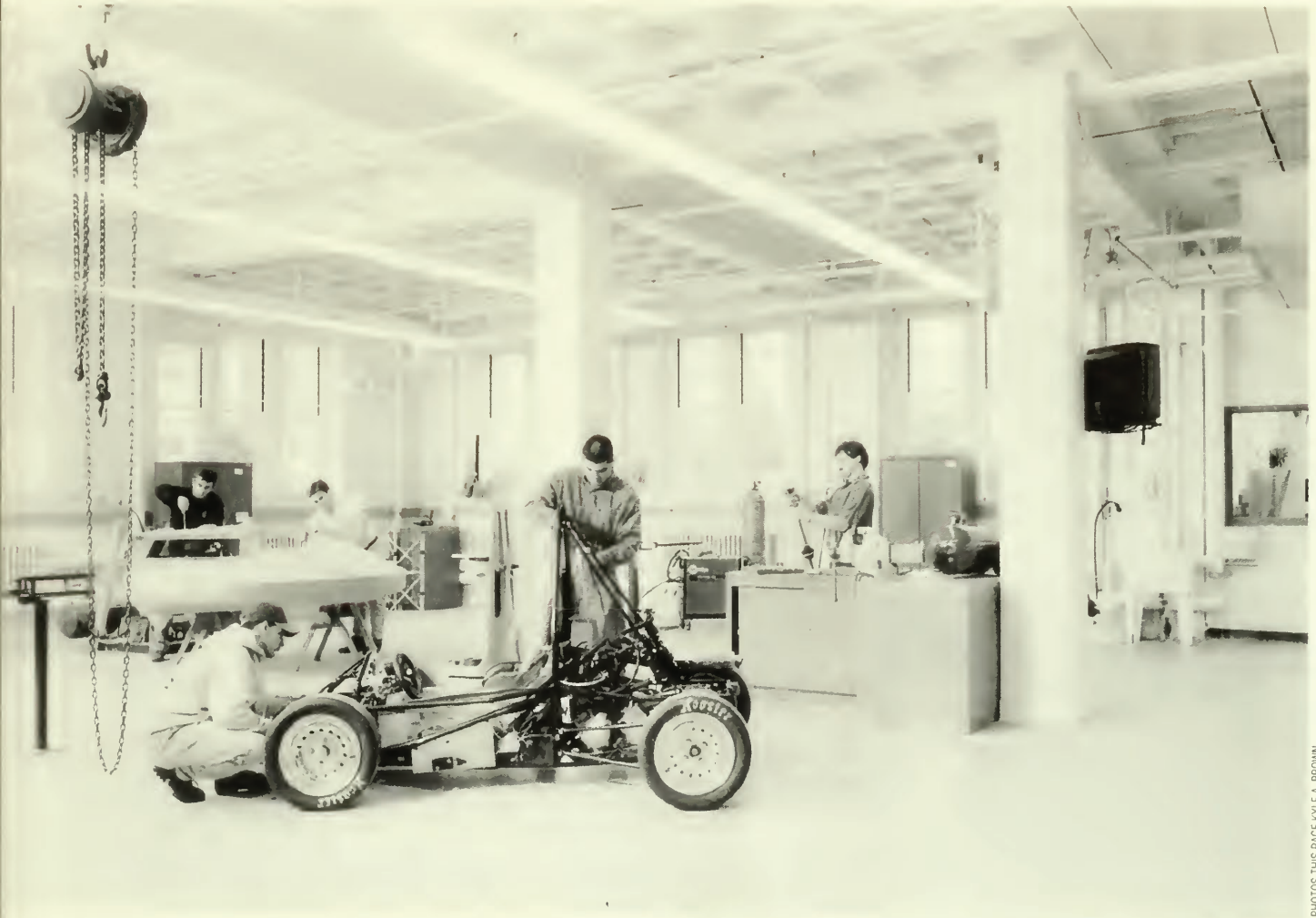


ROBERT BENSON

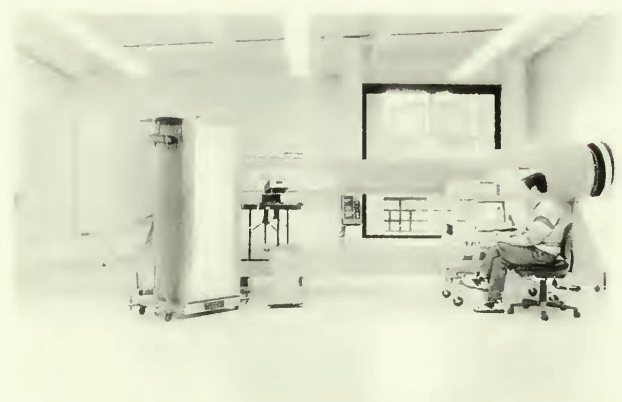


KYLE A. BROWN

Clockwise from above, the attractive and functional offices of the Mechanical Engineering Department; the new addition includes a modern entryway and an elevator; the large project laboratory in the lower level of Higgins has ample room for building larger MQPs (like the race car and hovercraft under construction here) and direct access to the machine shop; a wind tunnel lab, part of the new Lufkin Fluid Dynamics and Thermal Processes Laboratory; the Higgins Design Studio, an element of the innovative new W. M. Keck Design Center.



PHOTOS THIS PAGE KYLE A. BROWN



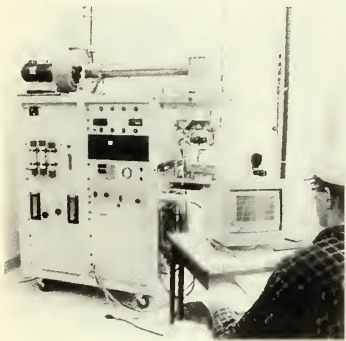
A MECHANICAL MARVEL

(Continued from page 24)

ties. The Heald Discovery Classroom on the second level is a showcase of modern educational technology. A computer network makes it possible for students to take part in interactive class lessons. A large video screen is equipped with telecommunications and video link capabilities. When it is not being used for classes, the room is available to students who wish to explore self-paced computer learning modules.

COROLLARY

A New Home for Fire Protection, Too



The cone calorimeter in the Fire Science Laboratory.

Mechanical engineering graduates of the 19th century, including Henry Phillips, Class of 1893, and George Rockwood, Class of 1888, made major contributions to the field of fire safety, never knowing that many years later WPI would offer degrees in fire protection engineering. The Institute began offering the world's first master of science degree in the discipline in 1979; it offered the first Ph.D. in fire protection engineering beginning in 1991.

Today, WPI is the world leader in fire protection engineering education. Higgins Laboratories has been home to the program since its inception. The recent renovation project not only gave the program a modern new home, but created a new state-of-the-art Fire Science Laboratory.

Adjacent to the Discovery Classroom is the W.M. Keck Design Center, the heart of a new approach to teaching engineering (an approach WPI is exploring as the lead institution in a five-university consortium funded by an \$8.7 million grant from the federal Technology Reinvestment Program). The center's components are the Computer Laboratory, where students use personal computers and computer-aided design software to learn the techniques of modern design; the Computer Simulation Laboratory, a general purpose microcomputer lab for work in modern dynamic and geometric simulation techniques; and the Higgins Design Studio, where students can use high-end workstations and video link facilities to design and remotely manufacture prototype products—discussing their work in real time with remote sponsors and watching their designs produced on remote rapid prototyping facilities. In the Design Center, students apply what they learn in the classroom by making real products, just as students did generations ago in the Washburn Shops.

Two new rooms answer the department's need for dedicated space for student project work. On the third floor is a laboratory for work on smaller

projects that do not require extensive space or specialized support facilities. Occupying more than 2,000 square feet on the lower level of the building is a general-purpose lab for work on larger Major Qualifying Projects. Room is available for assembling, testing and storing large machines and devices. The lab has ready access to the department's machine shop, with its team of technicians and instructors.

Nearly 130 years ago, WPI's first Mechanical Engineering Department head and the first superintendent of the Washburn Shops pioneered a novel approach to engineering education, one that balanced the formulas and theories students learned in the classroom with the grit and elbow grease of real manufacturing. The model George Alden and Milton Higgins established has served WPI well ever since, and continues today in the innovative WPI Plan.

Now WPI's Mechanical Engineering Department stands at the brink of a new century. Like all engineering educators, the mechanical engineering faculty must look ahead to the challenges and opportunities the new millennium will bring. According to Mohammad Noori, who has been head of the Mechanical Engineering Department since 1991, they include

- the challenge of building partnerships with business and industry, and the opportunities those partnerships represent to sharpen the department's curriculum and further build its research efforts.
- the challenge of integrating undergraduate and graduate education, and the opportunity to expose undergraduates to state-of-the-art research and to enrich the graduate education experience.
- the challenge to build a multidisciplinary mechanical engineering curriculum and the opportunity to prepare students for the new careers and fields that will emerge in the years ahead.

With the renovation and improvement of Higgins Laboratories, the Mechanical Engineering Department now has the modern, well-equipped and flexible facility it needs to pursue these goals and to build on the foundation of excellence it has established over the past 130 years. With a larger and improved facility, it can expand its program of research. With a host of state-of-the-art educational facilities, it has the tools to create an innovative curriculum that will prepare its graduates to be the leaders of the 21st century and serve as a model for colleges and universities across the country. But most of all, the Mechanical Engineering Department can launch a new era in its history in a building befitting its proud heritage and its exciting future.

A Campus To Be Proud Of

Higgins Laboratories is many things to many people. But at its core it is a physical structure—a collection of bricks, steel beams, roof tiles, pipes, cables, doors and windows—that provides shelter from the elements, encloses functional spaces for learning and research, and delivers the services—light, power, water—that its occupants need to go about their business. It is one element in a complex physical plant that now comprises more than 31 major buildings and 38 houses (some 1.3 million gross square feet of interior space, in all) on an 80-acre campus.

Maintaining those buildings—and the miles of sidewalks, roads, parking lots and green spaces that connect and surround them—falls to the nearly 80 employees of WPI's Plant Services Department. Those many tradespeople, custodians, groundskeepers and other specialists report to John E. Miller, director of physical plant, who has since 1982 overseen the gargantuan task of keeping up—and continually improving—the physical environment that supports the Institute's primary missions of creating new knowledge and educating future generations.

The Higgins Laboratories project is just the latest in a series of major construction and renovation projects that have come to fruition under Miller's direction. Shortly after his arrival on the WPI campus, the Institute began a top-to-bottom restoration of the Washburn Shops, one of its first two buildings. The project involved the nearly complete gutting of the structure's shopworn interior and the construction within its brick facade of a modern facility for work in manufacturing, materials and management.

The following year, WPI built a 230-student residence hall between Boynton and Dean streets. Founders Hall received the Boston Society of Architects Export Award and a design citation from *American School and University* magazine. Around the same time, WPI's outdoor athletic facilities underwent a complete reconstruction—including the installation of a synthetic-surfaced playing field and track; and Higgins House, the Tudor-style mansion donated to WPI by Aldus Higgins, was remodeled into a campus conference center and a home for the Alumni Office.

More recently, Miller supervised the construction of the \$10 million Fuller Laboratories, home of the Computer Science Department, the College Computer Center and the Instructional Media Center, and the transformation of Alden Memorial into a modern and beautiful home for the performing arts at WPI. The \$2.7 million Alden

project was honored with the prestigious Silver Hammer Award from the Worcester Area Chamber of Commerce. This summer, Miller will oversee the renovation of Sanford Riley Hall, the Institute's first residence hall, the conversion of part of West Street into a pedestrian mall, and the refurbishment of several biology and biotechnology research laboratories in Salisbury Labs.

These major projects are only the tip of the iceberg for Plant Services. Over the last decade or so, dozens of laboratories, classrooms and offices have been created or renovated, houses have been refurbished and turned into offices for several campus departments (including Plant Services itself), and thousands of hours have been spent just maintaining the existing physical plant in an attractive and functional state.

"Throughout his tenure at WPI, John Miller has worked to address maintenance issues before they become crises," says Stephen J. Hebert '66, vice president for administration and treasurer. "WPI probably has the same deferred maintenance backlog as any similar college or university. But John has stayed on top of it by being innovative in his management of the physical plant and creative with his budget during these tight fiscal times."

"We tend to take WPI's physical plant for granted," Miller says, "but it plays an enormously important role in the success of the Institute. Attractive, well-designed and well-maintained buildings and grounds make WPI appealing to prospective students, make possible our work of teaching, learning and research, and create a positive and comfortable atmosphere for our entire community."

Adds Hebert, "John Miller and his people have given WPI a competitive advantage. They believe that quality, whether it be with daily maintenance or with new construction, is the top priority. They provide a campus and a work and learning environment we all can be proud of."

—MICHAEL DORSEY

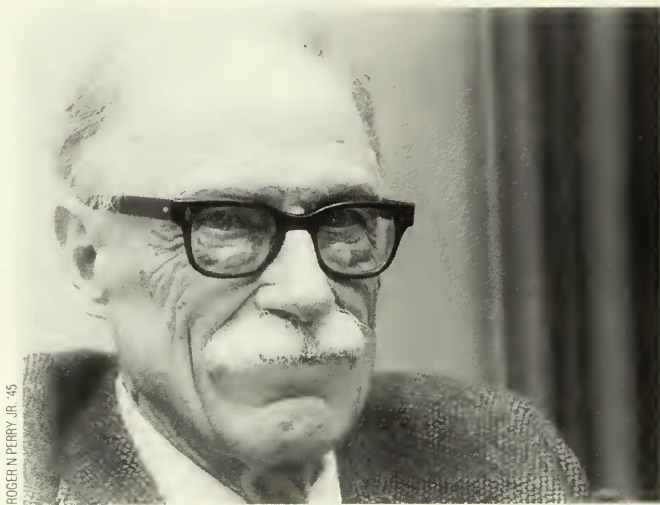


MICHAEL DORSEY

John Miller, left, confers with Jamie Fontaine, foreman for Monaco Renovations. The company is completing the restoration of the exterior of Sanford Riley Hall (in background).

The Wizard of Asheville

BY ROGER N. PERRY JR. '45



ROGER N. PERRY, JR. '45

EDITOR'S NOTE: *John van Alstyne is a familiar figure to several generations of alumni. He came to WPI as a professor of mathematics in 1961, intending to stay just one year; he departed 28 years later, having also served 10 years as director of academic advising. Few faculty members in WPI's history have been so devoted to their students, and few have been so beloved by them. When he stood to say an early good-bye at Commencement in 1987, the standing ovation he received shook the rafters in Harrington Auditorium. Roger Perry recently visited van A in North Carolina and filed this report on his busy retirement.*

Many were the WPI freshmen struggling with their first college-level mathematics courses who concluded that Professor John van Alstyne must have been a wizard as he stood at the blackboard whipping through a calculus problem. Now retired and living in Asheville, N.C., van Alstyne has become a real, celebrated wizard of sorts.

"One of the first things I did after retiring in 1989 and moving to Asheville was sign up for several courses at the College for Seniors," he says. "This is a program for retired people held at a branch of the University of North Carolina. I've been involved there ever since—as a student, as a teacher and, for several years, as registrar.

"It was in one of these classes that I met Bill Brittain, who, I learned, was a writer of more than 90 published mystery stories. He formerly lived in New York state, as did I. We hit it off quite well. One day he said, 'I've got an idea for a children's story. Would you have any objection if I dedicated it to you?' I was very pleased and told him to go ahead. He didn't tell me I was going to be in it!"

Van Alstyne heard nothing more about the book for a year. "Then I went to the annual board meeting of the College for Seniors, of which Bill's wife, Ginny, was a member. The meeting had just about ended when the head of the program said, 'Ginny wants to make a presentation.'

"She said her husband had been writing some books, working with an illustrator named James Warhola, who, I learned later, is the nephew of Andy Warhol. She said he had done two special paintings for Bill, and that Bill wanted them to go to me in appreciation for everything I'd done for the college. Then she held up two beautifully done pictures, in full color, each about 10 by 15 inches. They were portraits—of me!"

Several months later, Bill Brittain presented van Alstyne with a copy of the first book, *The Wizards and the Monster* (HarperCollins Children's Books). The main character, a substitute fifth-grade teacher named Mr. Merlin, bears an uncanny resemblance to van Alstyne. "Bill told me that Warhola had created the artwork strictly from Bill's description of me," van Alstyne says. "I told him I thought the illustrations were wonderful and looked just like me. He passed my comments along to the worried artist, who earlier had asked, 'He's not going to sue me, is he?'"

A second book featuring Mr. Merlin, *The Mystery of the Several Sevens*, came out a few months later. Since then, van Alstyne says, he's autographed many copies of both volumes for children of former students. "My own grandson was born at just about that time," he says. "I thought, 'what a nice gift the portraits and the books will be for him to enjoy when he grows older.'"

Brittain's books take Mr. Merlin, Becky and Simon, two of his brighter students, back to the

legendary times of King Arthur. There, Mr. Merlin, a.k.a. Merlin the Wizard, guides them through a series of adventures that, not unexpectedly, involve mathematics.

"I gave copies of the books to the librarian at the Country Day School, where I teach," van Alstyne says. "About two weeks later, as I walked across the campus, I passed a group of elementary students who were not in my class. They were smiling and pointing at me, so I knew they'd seen the books. Then I started teaching at a city middle school, and the kids there would also smile and point. So now I'm famous. They don't know who I am, but they know I'm the one in the book. And since they *think* I am, I guess that makes me a wizard."

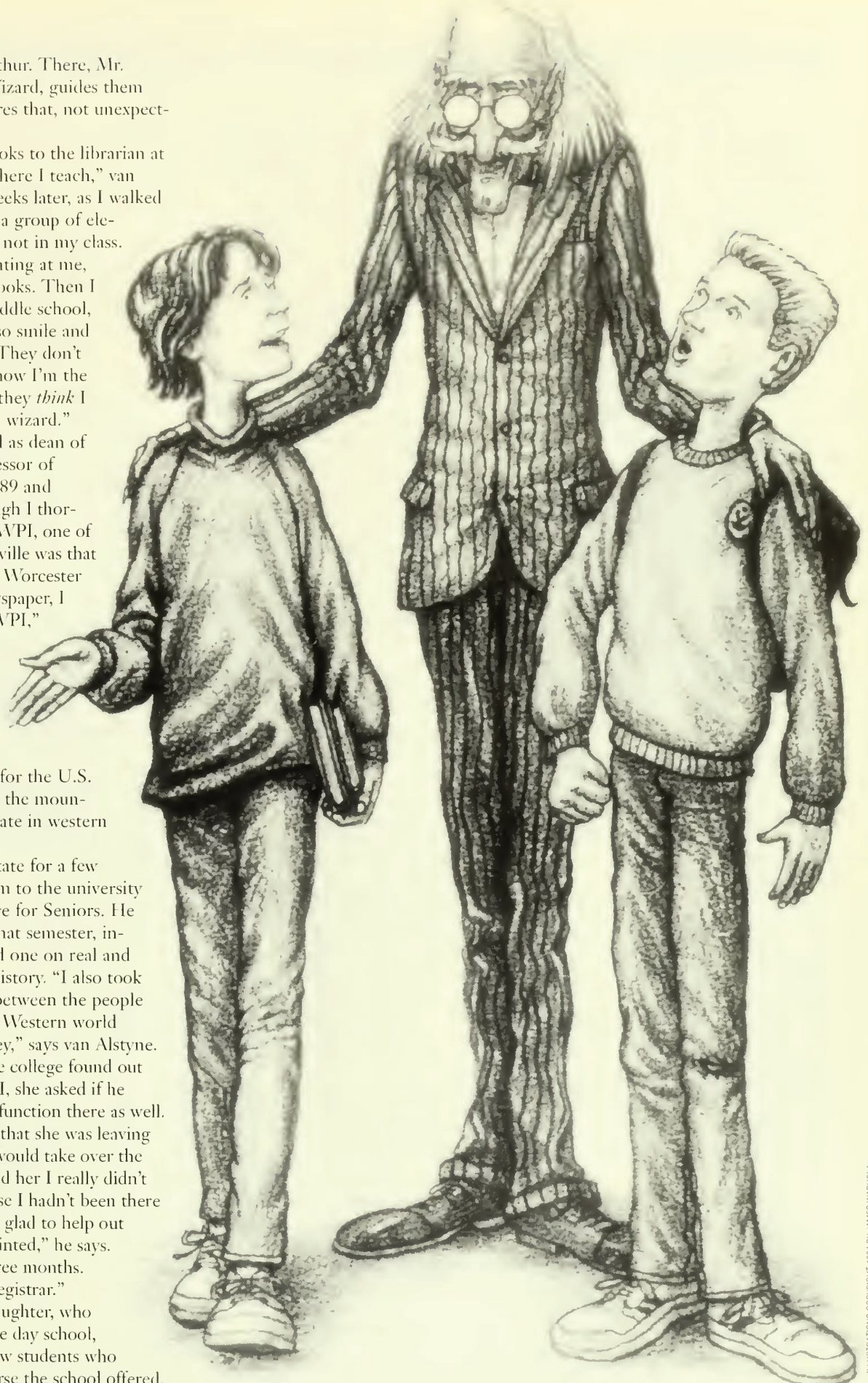
John van Alstyne retired as dean of academic advising and professor of mathematical sciences in 1989 and moved to Asheville. "Although I thoroughly enjoyed my years at WPI, one of the reasons I moved to Asheville was that it was far enough away from Worcester so when I picked up the newspaper, I wasn't going to read about WPI," he says. "If I were closer, I would read about it and miss not being a part of it."

"I had visited Asheville twice before and I liked the area. And my daughter was then working for the U.S. Forestry service here. I love the mountains and the moderate climate in western North Carolina, too."

After he'd been in the state for a few weeks, his daughter took him to the university to find out about the College for Seniors. He signed up for four courses that semester, including one on ceramics and one on real and mythical figures in British history. "I also took a course on the difficulties between the people of the Muslim faith and the Western world taught by a man from Turkey," says van Alstyne.

When the director of the college found out he'd done scheduling at WPI, she asked if he would like to help with that function there as well. That spring, she announced that she was leaving and asked van Alstyne if he would take over the running of the college. "I told her I really didn't think I should do that because I hadn't been there long enough, but I would be glad to help out until someone else was appointed," he says. "So I was acting head for three months. Since then I have been the registrar."

In 1989, van Alstyne's daughter, who was then teaching at a private day school, told her father she knew a few students who had finished every math course the school offered.



(Continued on page 30)

THE WIZARD OF ASHEVILLE

(Continued from page 29)

"She wondered if I could teach them a step up," he says. "So I started in with only two students and taught them what would have been Calculus III and Diffy Qs (differential equations) at WPI. They later took the university exam. One of them, at the age of 17, earned the highest grade of all the students who took that exam."

Van Alstyne then began teaching younger students, working through a program called MATHCOUNTS, a national initiative sponsored by several engineering societies. He coached a team of students who went on to win the Western North Carolina MATHCOUNTS championship. "I started by teaching them beginning algebra and went right through to matrix theory, linear algebra, and topics like that. The year after I worked with them, they took the SATs as high school freshmen and all scored over 1200. They were disappointed because they had to be sophomores before they could compete for the National Merit Scholarships."

In time, he starting tutoring students, mostly disadvantaged youngsters, in the public high schools, as well as students from the university. "I ended up with about 30 students a year in 10 to 12 different courses, from beginning algebra on up. At Asheville High, I was given a room during the regular school day so I could teach rather than just tutor students. The university students would meet with me after hours in the office that comes with the job of registrar for the College for Seniors."

When he's not been engaged in teaching mathematics, van Alstyne has devised a few courses for the college. They include "'Tis a Puzzlement," a look at various number systems that "helps the seniors who might never have had much math get some idea where math has come from. I also taught a course on oral history because I had gained some experience with this while serving as an advisor at WPI's London and Washington, D.C., project centers."

Though he endeavored to get away from Worcester and the university he served for 28 years, van Alstyne says he does miss the campus community. "I really enjoy college people and would miss not having an academic affiliation," he says. "If there was not a university here in Asheville for me to become a part of, I'd have found it very difficult. But here I've gotten to know a lot of the undergraduates. Since my name is unfamiliar to them, I tell them to just call me "van A." That's what I've been called by students for many years. Even the new chancellor calls me van A."

Van Alstyne enjoys taking long walks near his home in Asheville and taking in the lush scenery. "I do miss the changing fall colors. There are very few maples down here, so what we get are shades of browns, tans and yellows, but none of those marvelous scarlets or golds I remember from New England. The first year I was here, I went up onto the Blue Ridge Parkway thinking, 'Oh, good. I can go for miles amidst the beautiful fall colors.' I went for miles, but I never saw any of the colors I knew from up north."

While the fall colors may disappoint, van Alstyne says the region abounds in wildlife—he's even spied a bear near his house—which he enjoys seeing on hikes and mountain climbs with his daughter and young grandson. "He has reached the stage where he loves words," van Alstyne says. "He likes words that rhyme, so I have to figure out stories with words that use the same sound in different ways. I tell him about the fox that locks his sox with the clocks in a box, for example. He thinks that's just great."

Van A has also become involved with the local music scene. "Here in Asheville, we have a pretty good symphony orchestra. I've been going to that since I came here. Then we have an Asheville Community Concert Series; I got put on the board of that for a while. I'm a member of a local chamber music group, and they wanted me to serve on their board, but I suggested that they give someone else a chance.

"Then I go over to Warren Wilson College, which it not very far away. They have a summer music festival much like the Marlborough Festival in Vermont. I help them when I can. I've also been asked to join a couple of clubs, but for that I guess they'll have to wait until I 'retire'."

Perry is senior writer for WPI's development newsletter; Quest.

For John van Alstyne

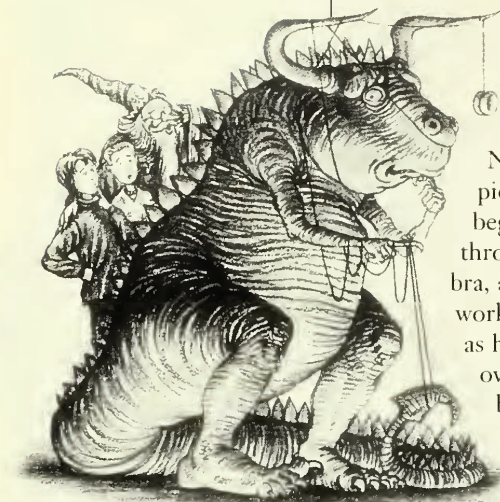
"... and gladly teach."

FROM THE WUZ-ARD, *OR*

THE OVER-THE-HILL WIZARD

Love


The dedication to van Alstyne in *The Wizards and the Monster* and beneath it van A's own whimsical dedication to a friend.



"The year after I worked with them, they took the SATs as high school freshmen and all scored over 1200. They were disappointed because they had to be sophomores before they could compete for the National Merit Scholarships."

DEDICATION TEXT COPYRIGHT 1994 BY BILL BRITANN

It's Time to Give WPI a New Name

TO THE EDITOR:

This was the last straw! It's really time to retire (bury, excise, consign to history) the name Worcester Polytechnic Institute.

Recently I had the occasion to call WPI. Not having the number on hand, I called directory assistance and was given the number 799-1945. Although it didn't sound familiar, I dialed it. The answering voice said something in garbled diction that included the words "Worcester" and "Institute" and something like "Tech." I asked, "Is this Worcester Polytechnic Institute?" The voice replied that it was Worcester Technical Institute. I asked if this confusion happened often, and the answer was, "All the time."

For those who don't know (and I suspect few people outside Worcester do), Worcester Technical Institute is a trade school located only a few blocks from WPI. To add to the confusion, they have just as much a right to the name "Worcester Tech" as WPI does.

Another incident that stuck in my craw happened a few years back. As I drove past Worcester Industrial Technical Institute (as Worcester Technical Institute was known at the time) with a friend, he asked if this is where I went to school. I assured him it was not, but again, one can see how confusion reigns.

Add to this the fact that, at times, Worcester becomes Worchester or Wooster, Polytechnic becomes Polytechnical or Technical, with only Institute remaining unscathed. All this confusion can easily be rectified by the logical process of a name change. The only question, then, is what name?

Name changes for colleges are not unusual. For instance, Trinity University became Duke University, Case Institute of Technology became Case Western Reserve University, Carnegie Institute of Technology became Carnegie Mellon University, Alabama Polytechnic Institute became Auburn University, and so on.

Given that the Alden family and the George I. Alden Trust have been major benefactors to WPI over the years, how simple and clear and beautiful and unconfusing it would be to rename the school Alden University. The only confusion then might be with John and Priscilla of Mayflower Pilgrim fame.

If Worcester County Free Institute of Industrial Science can become Worcester Polytechnic Institute, then Worcester Polytechnical Institute (oops!) can become Alden University.

ERLING LAGERHOLM '44
CARMEL, CALIF.

Proud of Sacco's Achievement

TO THE EDITOR:

Congratulations to Professor Sacco ("Coming Home," Winter 1996) and the entire WPI community. As I sit on a plane traveling my 25,000th air mile for 1996, I realize how much we take air travel for granted, and how little we appreciate the accomplishments of our space program. Professor Sacco became the 326th person to venture into space—such a small number considering the human population, yet quite an achievement for the human race. I have often thought of being one of the lucky few to venture into space, and through Professor Sacco, we—especially the WPI community—are able to experience a little of what he must have felt.

Professor Sacco laments that he may never get to experience space travel again. I have a similar feeling about my WPI experience—never being able to return to its wonderful student life again. However, with each success the members of our community achieve, the closer I feel to those memories, and the prouder (and more boastful) I become of our fine institution.

DAVID J. RUBINSTEIN '82
NEWTON HIGHLANDS, MASS.

Joe Gale Made a Lasting Impression

TO THE EDITOR:

I especially liked the article about Joe Gale in the Winter 1996 issue ("Hey, Joe!"). I graduated in 1958 in mechanical engineering, and I remember Joe teaching me how to weld. Some people make a lasting impression, regardless of their position.

I hope there is a way to recognize Joe—perhaps by naming the shop for him, as the article suggested. If I remember him almost 40 years later, than I am sure many others do, as well. In my opinion, his impact is as important to the school as that of a wealthy donor—if not more so.

HOWARD B. PRITZ '58
COLUMBUS, OHIO

Stealing the Goat Was a Serious Act

TO THE EDITOR:

I enjoyed the Winter *WPI Journal*, save one article. The author of the article on the Goat's Head rivalry ("The Case of the Purloined Goat's Head") heralded members of the Class of 1996 for "reviving the tradition," but I am not so sure they deserve that praise.

While the author was careful to detail the exact steps the students took to obtain the goats, no mention was made of the fact that these students committed some pretty serious acts in doing so.

I'm dismayed that a handful of students can commit such acts on the WPI campus and be heralded as reviving a tradition, especially in the name of an entire class. As a member of the Class of 1996, I'd like to point out that these students had no right to claim their actions were on my behalf, or that of any other members of the class. To my knowledge, these individuals made no attempt to involve any other members of the class in their scheme.

While I'm glad to see the spirit of competition alive and well on the WPI campus, I think certain members of the senior class could have gotten the new rivalry off on the right foot by waiting for the competition to officially begin and stealing the goat by the rules of the game.

AMY L. PLACK '96
WORCESTER, MASS.

It Was Alpha Phi Omega

TO THE EDITOR:

I would like to offer a clarification to the article "The Case of the Purloined Goat's Head" (Winter 1996). The article noted that the new goat was used to help raise money when Alpha Tau Omega fraternity auctioned off a chance to touch the bronze animal.

Actually, it was Alpha Phi Omega, a philanthropic organization, which held the "Slave Auction" at which the Goat was to be auctioned. Also, it was the Class of 1997 that put the Goat up for auction, not APO itself.

Unfortunately, everyone had left by the time the Goat went up for auction; it didn't help raise any money for charity. But it was fun anyway!

DAVE KOELLE '97
NORTH BRANFORD, CONN.

Big Character Has Big Plans

BY JOAN KILLOUGH-MILLER

Guns, wedding gowns and cold beer might seem an unlikely combination, but they coalesce in the title of the debut CD by Big Character, a Boston-area rock band that lists six WPI alumni among its personnel. Lead vocalists Brian Chu and Noel Christopher, both 1992 graduates, play keyboards and guitar, respectively. Their management team,

Snarling Frog, is a collaboration of four WPI grads: Steve Coscarella '92, Mike Cronin '91, George Kalavantis '92 and Ed Minasian '93.

The title of the CD comes from a sign the band's drummer spotted in front of a General store in Maine. "It summed up the past year for us," explains Chu. "One band member got married, and Noel was held at gunpoint during an armed robbery." And the beer? "It's just typical cold beer." The band's name was inspired by a book Chu read about student protesters in Tianamen Square. Some of the stu-

dents wrote their words of protest on posters using small characters.

Others, who wanted their messages to stand out, wrote them in big characters. For its logo, the band chose the Chinese character that forms part of the word for revolution or change.

Engineers by day, they rock out at night in Boston clubs like The Attic, Phoenix and Mama Kin, the Lansdowne Street club owned by members of Aerosmith. Their all-original songs can be heard on radio stations WFNX and WBCN, as well as stations at Emerson College, Boston College and Brandeis University. Worcester-area fans got a chance to hear them live in April when they played Sir Morgan's Cove on Green Street.

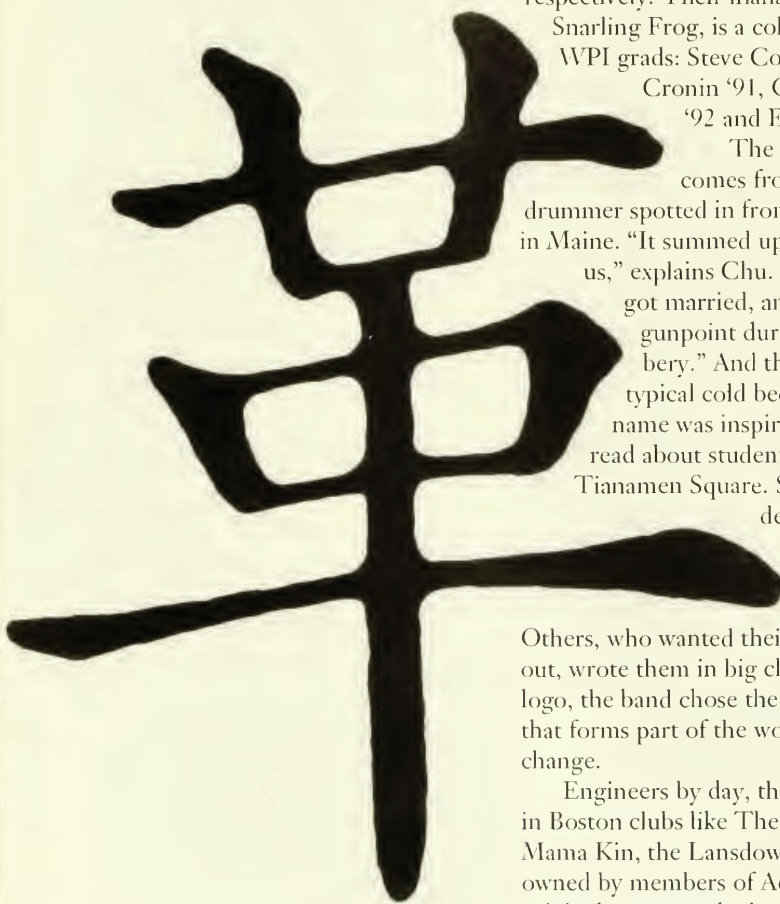
The band also hosts an annual cruise around Boston Harbor. Last year's cruise attracted 300 fans; when they sail again on July 13, Noel's parents, Jody and Assistant Professor of Mathematics Peter Christopher, are bound to be on board. "It's every father's

dream, isn't it?" remarks Christopher of his son's career in rock and roll. "Actually, I find the music quite listenable, although I have to pay attention to make out the words." A devoted fan, he attends many gigs. "I have the opportunity to go places I wouldn't ordinarily go." Brian's brother, George Chu '95 (who, like Brian, was an All-American wrestler at WPI), is also a big fan.

Mama Kin's monthly magazine described Big Character as "Grassroots sound with strong emotional lyrics, as well as a heavy edge...." The five-member band, which also includes a lead guitarist, a bassist and a drummer, describes its music as progressive pop alternative rock, "or anything you might decide to call it." Their influences include Nirvana, Blue Hole, Midnight Oil and other alternative bands that evolved from the punk music style of the 1980s. Chu and Christopher harmonize on lead vocals and write lyrics, which are mostly personal and introspective.

"This was a natural for me; I've been doing music all my life," says Chu, a business analyst for Harvard Community Health Plan. A quiet, determined individual, he is the founder and the driving force behind Big Character. At WPI, Chu played keyboards at campus parties, rousing his Phi Kappa Theta brothers to sing along on Billy Joel's "Piano Man" and other favorites. Christopher, his neighbor in the fraternity house, would occasionally join in on guitar. The more gregarious of the two, Christopher was a classical string player who found he couldn't abide life without music. An award-winning viola player at Shrewsbury (Mass.) High School, he was president of the orchestra and an All-State, All-District musician who sometimes picked up a cello or bass to fill in for absent band members.

"When I got to college I thought it was time to put that away," he says. "I figured I should either get serious and get into an orchestra, or get out." After his freshman year, Christopher says he was going crazy without an instrument, so he "borrowed" Chu's guitar and started teaching himself to play. "I figured, if it's a string instrument, how hard can it be? Actually, it was easier



"If only one-tenth of one percent of the world likes your music and you're playing it really well, then you're a success." —Brian Chu '92

than I thought. I didn't give Brian's guitar back for a year. He probably never missed it."

Christopher eventually bought his own guitar and started taking lessons. After graduation, he was hired by a local manufacturing company, but soon lost his job as part of a major layoff. He currently manages the Boston Billiards nightclub in Worcester while he seeks to pick up his engineering career again. Chu continued to compose,

sing and play—solo and with cover bands—after receiving his diploma.

He made enough money to equip a modest home recording studio and cut a five-song demo tape. Listening to the tape in the spring of 1993, Christopher was struck by his friend's growing maturity as a performer and songwriter. In particular, he was touched by Chu's composition "Think of Me," a song the band performs often these days. "I saw Brian moving in a direction where I could fit in," he says.

When Christopher found out that Chu was advertising for musicians in the *Boston Phoenix*, he forced his way into the newly forming band.

"I harassed him so bad," says Christopher. "I bothered that guy for weeks. I wouldn't take no for an answer. I played for him. I sang for him. I tried to convince him that I could do it, and that he needed me." Chu finally agreed to accept Christopher on a trial basis.

"Two or three months later, we had jelled completely as a band," Christopher says. "It was clear that it was the right decision for both of us. We were on the same page." Their four fellow alums, who had backed Chu in his solo endeavors, incorporated as Snarling Frog and threw themselves into promoting the band. With a demo cassette and a lot of legwork, they waged a per-

sistent campaign for club dates and radio airtime.

"We put it together like a project plan," says George Kalavantis, "and split up the duties." Mike Cronin audits expenses, income and revenues from promotional hats and T-shirts. Steve Coscarella works on booking gigs, along with Ed Minasian, who also writes the band's newsletter, *Big News*. Coscarella handles the band's e-mail

"Having a management team is a luxury," Christopher continues. "Most bands have to call around, book their own gigs. Snarling Frog does the business end; we just have to make suggestions about where to play, how to grow."

The band's progress is carefully monitored and discussed at biweekly meetings. Although it is clearly a team effort, Christopher credits Big Character's success to

Chu's vision, know-how and perseverance. "He's a machine," he says. "The other night he came in with a 30-page printout on what the band has accomplished so far, with charts, graphs and a cost analysis of where we've played, what the pay was, and where we should be playing the most to maximize profits. I guarantee you, no other band in Boston has somebody doing this. That's certainly our WPI education at work!"

Chu, the realist, says the band's journey has been intense, but fun. His advice to aspiring rock stars is to persevere, and don't get offended at the inevitable criticism. "There's lots of different tastes out there," he says. "If only one-tenth of one percent of the world likes your music and you're playing it really well, then you're a success. You need a strong belief in yourself and your music."

Big Character is at work on a second CD and would like to expand beyond the Boston area, possibly playing colleges on the East Coast. Christopher says he would give up his job and go on the road "in a heartbeat." Chu's dream is a record deal with a major label, and a chance to work full time in music for at least a few years. "This is his thing," says Christopher of Chu. "No matter where his career and his life take him, he will always be doing music."



PHOTO BY ANTHONY

From left, Noel Christopher, Brian Chu, John Amaral, Seamus Tierny, Dan Goodwin, aka Big Character.

account (bigchara@usa1.com) and homepage on the World Wide Web (<http://www1.usa1.com/~bigchara/>). Kalavantis and Coscarella manage the database of more than 600 fans, which is used for mailings and marketing analysis.

Is your average rock band this methodical, this technologically evolved? "Most Boston bands last six months—a year if they're lucky," says Christopher. "Many can't even get together \$500 to make a demo tape to take around to clubs." Although Web pages are not uncommon for bands, Christopher claims that WPI graduates have a technological edge. "We were logged on when others didn't even know the Web existed."



LABORATORY