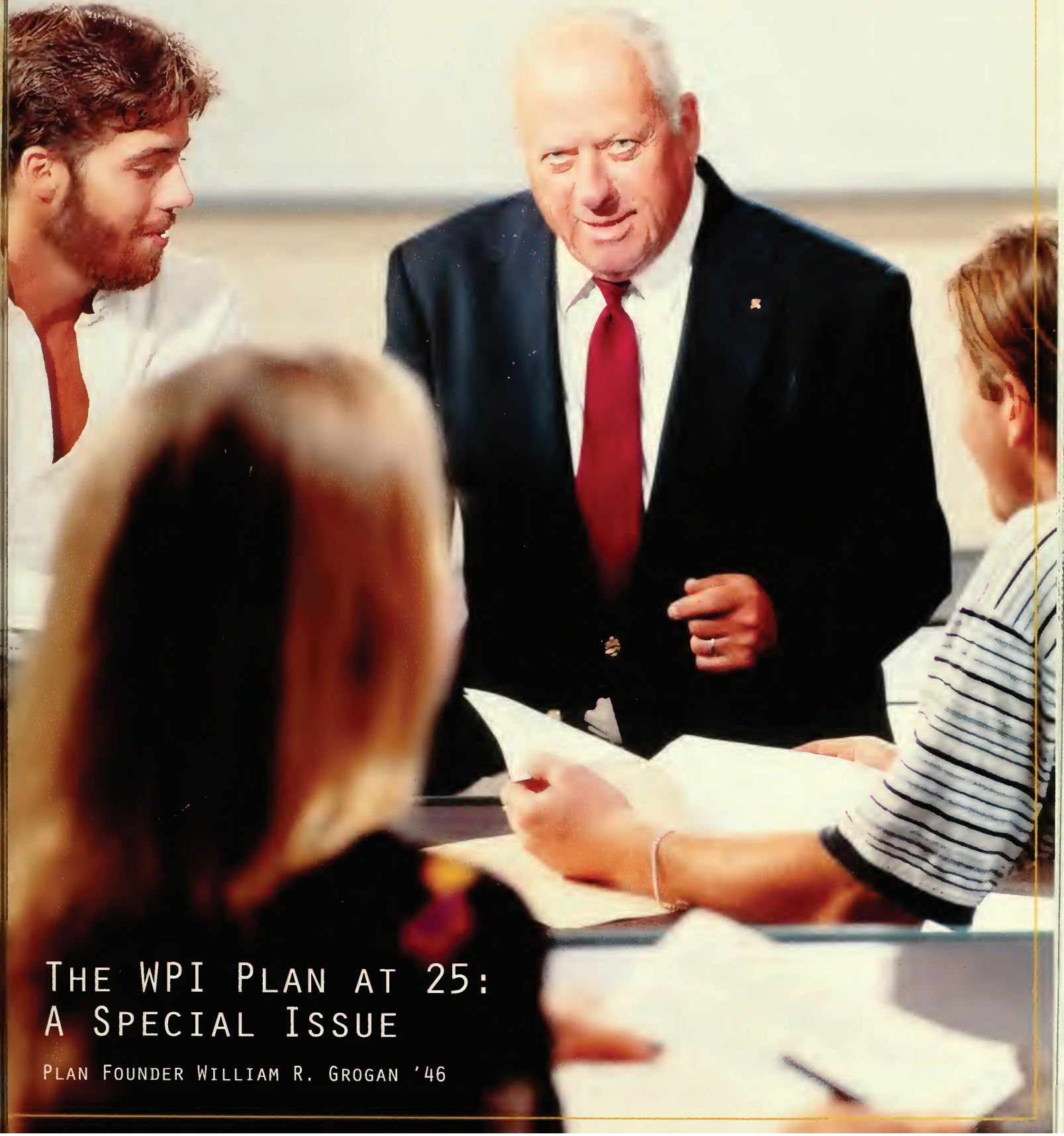


THE BIRTH OF THE PLAN ▼ HOW IT CHANGED TO LIVES ▼ THE NEXT 25 YEARS

# WPI JOURNAL

OCTOBER 1996



THE WPI PLAN AT 25:  
A SPECIAL ISSUE

PLAN FOUNDER WILLIAM R. GROGAN '46



# WPI JOURNAL

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It's been said that the proof is in the pudding. For the WPI Plan, the "pudding" is the stories of the lives and careers of the more than 12,000 men and women who have experienced it. Here are 10 of those stories.

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**On the cover: As a member of the faculty Planning Committee, William Grogan helped shape the WPI Plan; as the first dean of undergraduate studies, he oversaw its implementation and development for more than 20 years. Story on page 4. Photo by Patrick O'Connor. Opposite: Grogan talks with Sarah Wilcox '97 and Christopher Lengner '98, members of a student team that recently completed a project in Germany (advised by Grogan) that studied the drug approval process in that country. Photo by Patrick O'Connor. Back cover: The two towers of Boynton Hall and Washburn Shops have, since WPI's founding, symbolized the merger of theory and application that forms the core of the university's educational philosophy—a philosophy embodied today in the WPI Plan.**

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# Remembering WPI's Heroic Age

*"Writers are always selling somebody out."*

—Joan Didion, *Slouching Toward Bethlehem*, 1969

The cover story in this special issue of the *WPI Journal* is one I have been thinking about writing for some time. I'm grateful to the organizers of this year's celebration of the WPI Plan's 25th anniversary for giving me the impetus to finally tackle it.

The story of how the Plan came to be is intriguing for anyone who was not on campus (and even many who were) in the late 1960s, a time of incredible change at WPI. How was it that a small, traditional engineering college was able to turn itself around and become, virtually overnight, one of the most innovative and successful institutions of technological higher education in the country? What combination of circumstances and human capital made this seemingly impossible feat possible?

The drive to answer those questions for myself was behind my interest in writing this story. The answers proved well worth the time and energy the article entailed, as did the opportunity to spend some time talking to the remarkable men who drafted the Plan—the seven surviving members of the now famous Planning Committee originally appointed in 1968 by the late Harry P. Storke, WPI's 10th president.

The title of the article, "A Miracle at Worcester," makes reference to Catherine Drinker Bowen's 1966 book, *Miracle at Philadelphia*, which recounts the events of the Constitutional Convention of 1787. While it may seem a bit audacious to compare the Plan's creation to one of the most critical events in U.S. history, the analogy is apt. Like the writing of the Constitution, the drafting of the Plan—certainly the most important and pivotal episode in WPI's recent history—was accomplished in a climate of turmoil and change by a small group of dedicated, passionate, creative individuals—each with his own beliefs and biases. That group, the faculty Planning Committee, was determined to craft a sound, workable framework for the future, one that evolved from a set of clearly defined, well-reasoned principles and one that was designed to stand the test of time and the

inevitable resistance that greets any new idea. Indeed, looking back from a distance of a quarter century, the birth of the Plan seems nothing short of miraculous.

This spring, I was pleased to see that I am not the only writer who has found a parallel between the accomplishments of the



**Shapers of two Heroic ages: top, the signers of the Declaration of Independence; bottom, from left, Planning Committee members Bill Grogan, Charles Heventhal, Steve Weininger, Jack Boyd and Roy Seaberg.**

Planning Committee and the achievements of America's founding fathers. On April 23, WPI celebrated the birth and implementation of the Plan with Commemoration Day, an event that brought together many of the

dozens of individuals who worked to draft the Plan and turn it into a living, breathing program. As the day wound down, John Zeugner, professor of history, rose to make some concluding remarks.

"Another of our friends of '76 is gone, my dear Sir.... We too must go, and that ere long," Zeugner began, quoting Thomas Jefferson's letter to John Adams. "I believe we are under half a dozen at present; I mean the signers of the Declaration. Yourself, Gerry, Carroll and myself are all I know to be living. I am the only one South of the Potomac...."

Zeugner told of the correspondence between Jefferson and Adams that began in 1813, "three years after Jefferson left the presidency, having won it from Adams in 1800. So, two men who had made a revolution and a new republic, whose political campaigns against one another, for sheer vicious-

ness of personal attacks, make the campaigns of this century seem genteel by comparison, began again a secret letter correspondence that blossomed over the next 13 years into a remarkable ex-presidential colloquy.

"The exchange of letters lingered over characteristics of Indians, Christ's spirituality, British politics, proper ethics, old partisan accusations, grandchildren's vanity, and the certain knowledge that by explaining themselves to each other they were partici-

pating in some astounding coda to the Founding Generation. The letters are darted with Greek and Latin sentences and French exhortations. Their erudition stuns. Their thoughtfulness amazes. And throughout, there is a jocular consideration of imminent death, which occurred magically for both men on July 4, 1826, the 50th anniversary of the signing of the Declaration of Independence.

"In his last letter to Adams, in late March 1826, Jefferson wrote that his grandson Thomas Randolph would like to pay Adams a visit. 'I must ask for him permission to pay to you his personal respects. Like other young people, he wishes to be able, in the winter nights of old age, to recount to those around what he has heard and learnt of the Heroic age preceding his birth, and which of the Argonauts particularly he was in time to have seen. It was the lot of our early years to witness nothing but the dull monotony of colonial subservience, and of our riper ones to breast the labors and perils of working out of it. Theirs are the Halcyon calms succeeding the storm which our Argosy had so stoutly weathered. Gratify his ambition then by receiving his best bow, and my solicitude for your health by enabling him to bring me a favorable account of it. Mine is but indifferent, but not so my friendship and respect for you.'

"Twenty-five years out from the founding of the WPI Plan, it does seem, in the poor parallels the mind constructs, that the Planning Committee, the Implementation Committee, and the undoubted captain of the Plan Argosy, Bill Grogan, constitute, in fact, a kind of Heroic age," Zeugner concluded. "They did indeed triumph over a dull colonial educational subservience, did indeed breast the labors and perils of working out of its monotony and stasis. They did provide this institution more than a few Halcyon days (indeed, they saved and grew it). And though the Institute's health at the moment may be indifferent, to use Jefferson's terms, not so its deep friendship

and respect for them."

While the cover story focuses on the individuals who were most intimately associated with the Plan's creation—President Storke, President George Hazzard, Dean Cookie Price and the members of the Planning Committee—many, many other people played roles, both small and large, in the story of the birth of the Plan. They include the many faculty members who shared the Planning Committee's passion about education and its conviction that WPI could, and should, be a better and more innovative institution. They offered their ideas, their opinions, their time and their unwavering support as the process of shaping the Plan moved forward. Many went on to become officers and foot soldiers in the more than decade-long campaign known as Implementation, the monumental job of turning the educational program approved by the faculty in 1970 into a workable system. You will read more about that process in the second half of the cover story, to be published in early 1997.

In addition, many faculty members, students, administrators, trustees and alumni helped shape the Plan by taking part in two Planning Days in 1968 and 1969 and by serving on a multitude of subcommittees that helped the Planning Committee flesh out the details of the Plan. Their efforts on behalf of the university were invaluable, and they had the satisfaction of contributing to one of the most important community efforts in WPI's history.

The bottom line of all this is that no matter how careful a job of research a writer might do, or how diligent one might be about giving credit where it is deserved, there will always be those unwittingly and unintentionally left out of the story. To those many individuals, I apologize. I invite them to tell their stories and relate their memories of the Plan's birth on the Letters pages of future issues of the *Journal*.

MICHAEL W. DORSEY

## Thanks for the Van A Update

TO THE EDITOR:

I thank you for updating alumni on one of the most beloved men: John van Alstyne ("The Wizard of Asheville," Spring 1996). Dean van Alstyne is one of the reasons I stayed and succeeded at WPI. He is a man of such wisdom and kindness. From my first day of classes at WPI through the dreaded Competency Exam, Van A inspired me to succeed. He gave me confidence and faith in my abilities. It warms my heart to know that he is still giving his magic to students young and old.

KIMBERLY BERG KITCHENS '83  
RALEIGH, N.C.

## President Chose the Right Name

TO THE EDITOR:

I am responding to the letter in the Spring 1996 *WPI Journal* by Erling Lagerholm, which argued the need for a new name for the school. While I find it hard to accept the need for a new name, times do change and we must go forward. In doing so we must never lose sight of the fact that the names WPI, Worcester Polytechnic Institute and, informally, Worcester Tech have been well-known and highly respected in the community and the business world.

Though progress is unavoidable, a drastic change such as that suggested by Mr. Lagerholm would be unwise and also a great loss to those of us who love WPI. Fortunately, President Parrish and his cabinet chose the right name, WPI. I support their decision 100 percent, and hope we can still informally be known as "Worcester Tech." I am sure it will continue to garner the same respect it has always inspired in the past. Remember, our alma mater begins, "Dear Worcester Tech, our Worcester Tech." May it always be so.

GEORGE IDLIS '54  
CRANSTON, R.I.

**EDITOR'S NOTE:** *Earlier this summer, WPI President Edward Parrish and his cabinet, a group of senior administrators, decided that the university should emphasize its initials, WPI, instead of its full legal name in its publications, on its stationery and business cards, and in other forms of communication directed to the world beyond the campus. For a report on this decision, the reader is directed to the Summer 1996 issue of the WPI Wire.*

# A Miracle at Worcester



## PROLOGUE

*“Freedom’s just another word for nothing left to lose....”*

—Me and Bobby McGee, *Kris Kristofferson and Fred Foster, 1969*

**I**t was 1966, a time of turmoil and social upheaval. In the South, the struggle for racial equality raged. Across the Pacific in Southeast Asia, a bloody war dragged on, while back home demonstrators staged ever larger protest rallies, boycotts and moratoriums. Around the nation, a new generation was awakening to the realities of poverty, sexual inequality and environmental degradation. It was an age of transition, experimentation and excitement—a time when anything might be possible.

For Professor William Grogan '46, all of that seemed a million miles away. WPI, where he had earned his bachelor's and master's degrees in electrical engineering (the former under the U.S. Navy's wartime V-12 officer training program) and to which he had devoted the last two decades of his life, was stuck in neutral. While change swirled all around it, the Institute on Boynton Hill seemed firmly anchored to the past. Grogan had had enough. It was time to get out—to jump ship while the ship was still afloat. “I was a month away from leaving WPI and taking a post with the Navy Department in Washington,” he says. “From my perspective, WPI was dead in the water. There was simply no reason to stick around.”

Fortunately for Grogan and for WPI, his dissatisfaction was shared by a fellow military officer, retired Army Lieut. General Harry P. Storke. A 1926 West Point graduate, a veteran of World War II and the Korean War, and the recently retired commander of NATO's land forces in southern Europe, Storke had become WPI's 10th president in 1962. He quickly sensed the stagnation that had taken hold of the Institute and decided—for WPI's own good, and perhaps for its very survival—he had to try to shake it out of its decades-long slumber.

It would take nearly 10 years to bring that goal to fruition. In that time, “Worcester Tech” would be turned inside out, becoming an educational institution unlike any other in the country. The roles of students and faculty members would completely change, as a traditional, rigid engineering school became a model of flexibility and innovation, one that still serves as a beacon to other educators.

## THE STORY OF THE WPI PLAN, PART 1. BY MICHAEL W. DORSEY

MORE THAN 25 YEARS AGO, SOMETHING QUITE REMARKABLE HAPPENED ON BOYNTON HILL. WITH A SINGLE VOTE OF THE FACULTY, WPI BECAME A COMPLETELY DIFFERENT KIND OF INSTITUTION. THE CREATION OF THE WPI PLAN WAS THE SINGLE MOST IMPORTANT EVENT IN WPI'S RECENT HISTORY. THIS IS THE STORY OF HOW, IN THE WORDS OF THE PLAN'S FOUNDERS, A GOOD COLLEGE BECAME AN EXCELLENT ONE.

Before it was over, Harry Storke would retire and WPI would inaugurate its 11th president. Many longtime faculty members would depart—disgruntled or disheartened over what their beloved school had become. But Bill Grogan would remain. Tapped by Storke to begin the process of loosening up the curriculum, he would find a new reason to believe in his alma mater. He would go on to help create the spark that ignited a powder keg of change. And having turned WPI upside down, he would spend the better part of his academic career harnessing and channeling the force of that blast into a workable and effective educational program—a program that would become known as the WPI Plan.

*“What we’ve got here is a failure to communicate.”*

—From Cool Hand Luke, 1967

**A**s one looks back from the perspective of the 1990s, it is hard to imagine how different a place WPI was in the 1960s. For students, the college bore an uncomfortably close resemblance to the high schools they thought they had left behind. WPI seemed reluctant to believe that students could make decisions for themselves, so it gave them few to make. In a typical four-year curriculum, most undergraduates had only two electives. Class attendance was mandatory. Saturday mornings were spent in classes, or in drills for ROTC, which was required of all students. Women guests (there were not yet female students at WPI) were prohibited from residence hall rooms without supervision.

For the faculty, WPI was a warm and supportive community, a small college where everyone knew everyone else and everyone's problems. It was a place where the faculty harbored intense feelings of loyalty and concern for the school where many had earned their academic degrees. And though there was no tenure system, there was an unspoken guarantee of job security.



**In the few short years that marked the end of the '60s and the start of the '70s, WPI underwent an avalanche of change, culminating in the creation of the WPI Plan. The seeds of the Plan were sown by President Harry Storke (above); the remarkable program that grew from them was nurtured for two decades by Professor Bill Grogan (opposite).**

But WPI was also a place where the power over virtually everything—including the curriculum—resided in the hands of a very few senior administrators and department heads. There was no faculty governance system. The agenda for the (quite rare) faculty meetings was drawn up by the Executive Committee of the faculty—the heads of the academic departments—and consisted largely of announcements of decisions that had already been made behind closed doors.

It was within this structure that President Storke set out to create change. In late 1963, he outlined a 10-year plan for WPI that encompassed major campus improvements (including a new field house and a modern library) that he and the trustees believed were needed to move the college forward. The plan became the basis for the Centennial Fund, a \$15 million capital campaign that culminated in 1965, WPI's centennial year. "The next two years or three years will help shape Tech's destiny for many years," he said in a Nov. 2, 1963, address to alumni. "They will provide each of us an opportunity to participate in a program that will give to our heirs the kind of institution we inherited from our predecessors and to the generations of future students the kind of education needed for tomorrow's world."

He called on the department heads to help define that new kind of education, but they seemed resistant. That December, Storke and Dean Lawrence "Cookie" Price asked the department heads to join them for a retreat at a hotel in nearby Sturbridge to help draft a long-range educational plan to accompany the facilities plan Storke had

already developed. By one report, Storke became so frustrated by the department heads' lack of ideas that, early one morning, he summoned them from their rooms and dismissed them without breakfast.

***"There are going to be times when we can't wait for somebody. Now, you're either on the bus or off the bus."***

—Ken Kesey, 1968 (quoted by Tom Wolfe in *The Electric Kool-Aid Acid Test*)

**D**espite the reluctance of department heads to alter what they believed to be a perfectly workable academic program, Storke knew change was inevitable. He could not help but be aware that students were unhappy. Increasingly, they were voicing their displeasure in the pages of *Tech News*. Required courses, Saturday classes, mandatory ROTC, the lack of parietal hours in the dorms—all came under fire as students began to demand more freedom and more responsibility.

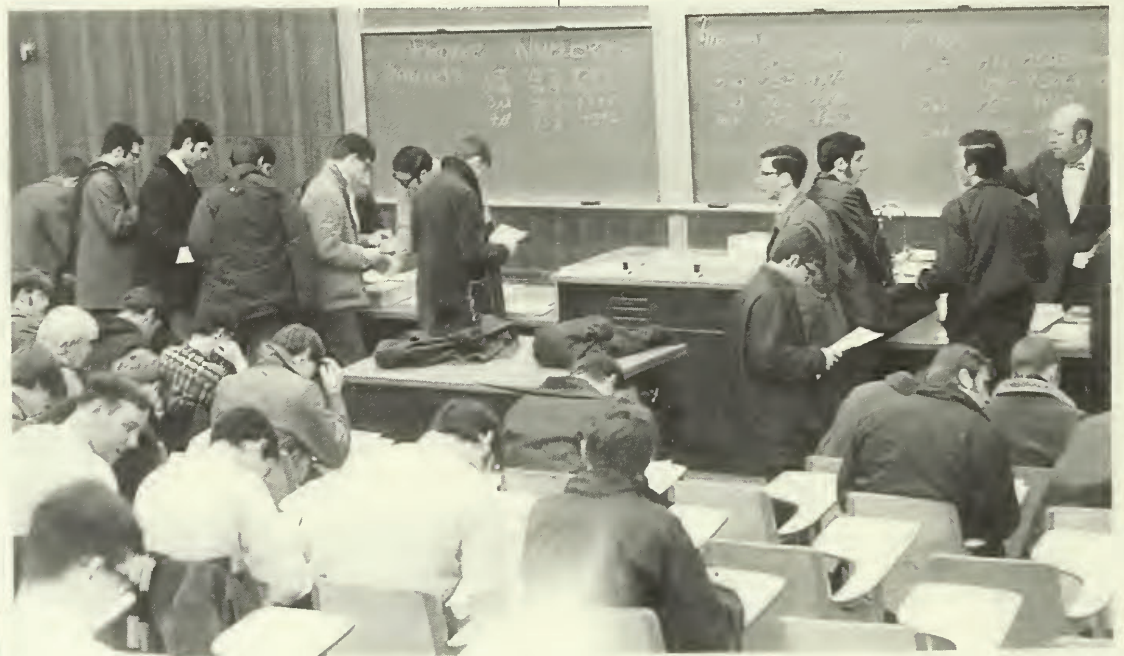
And among the faculty were a growing cadre of younger instructors (many with degrees from other institutions) who were eager to break out of the mold. In their own classes, they began to experiment. They included William Shipman, a professor of chemical engineering who came to WPI in 1958. Widely recognized for his award-winning, corporate-sponsored work on combustion and jet propulsion, he was among a small group of faculty then with an active research program. "WPI had many bright and eager students who were looking for something new and exciting to do," Shipman says. "I suggested what those 'somethings' might be, and they did the rest."

Shipman threw away the standard "cook-book" approach to teaching lab courses. Instead, he gave students open-ended problems to solve. "Rather than giving them an experiment on distil-



**SHIPMAN**

COMMENTS HE MADE AT A FACULTY MEETING IN 1968 LED PRESIDENT STORKE TO CREATE THE FACULTY PLANNING COMMITTEE AND APPOINT HIM CHAIR.





lation, for example, I asked them to find a way to extract iodine from kelp," he says. "If distillation was required, they would learn about distillation. How they accomplished the assignment was up to them. The enthusiasm in those labs was exciting."

In mechanical engineering, Jack Boyd, who arrived in 1966, was acutely aware of the failing of his own undergraduate education at Ohio State, which had filled him full of facts and equations but left him feeling uncertain about how to use them. He structured his courses at WPI around projects that helped students look beyond the equations to develop "functional literacy."

Over in electrical engineering, Grogan, who kept in touch with the corporate world by consulting for General Electric, Bell Labs and the Navy's Missile Systems Division, had been incorporating project work in his course in engineering economics. To add an element of realism to the course, he had students take on the role of professional consultants, completing small projects sponsored by corporations.

Grogan was one of a group of young faculty in electrical engineering who, starting in the late 1950s, met regularly—often on Friday afternoons in nearby Bigelow's Tavern—to talk about education and their (at least for WPI) radical notions about teaching and learning. In time, this group, which eventually included Owen Kennedy '44, Romeo Moruzzi, Harit Majmudar, Wilhelm Eggimann, Donald Eteson '48 and George Stanard '43, welcomed fellow travelers from other departments, including Boyd, Charles Heventhal, a professor of English who arrived in 1963, and Stephen Weininger, a chemistry professor who came on board in 1965.

Grogan also chaired a study committee in the Electrical Engineering Department that in the spring of 1966 presented a revised and somewhat liberated electrical engineering curriculum to the faculty Executive Committee. The report, which was approved, generated some discussion at a faculty meeting, something that had never happened before.

Despite this step forward, Grogan saw little prospect for campuswide change. But later that year Storke decided to appoint a faculty-based Curriculum Study Committee to accomplish what the department heads refused to do. Catching Grogan on the verge of resigning, Storke asked him to chair it.

*"You're either part of the solution or part of the problem."*

—Elbridge Cleaver, 1968

**S**torke asked each department head to submit a list of three department faculty, from which he would choose one member to be on the new committee. From the lists he received, Storke selected Leighton Well-

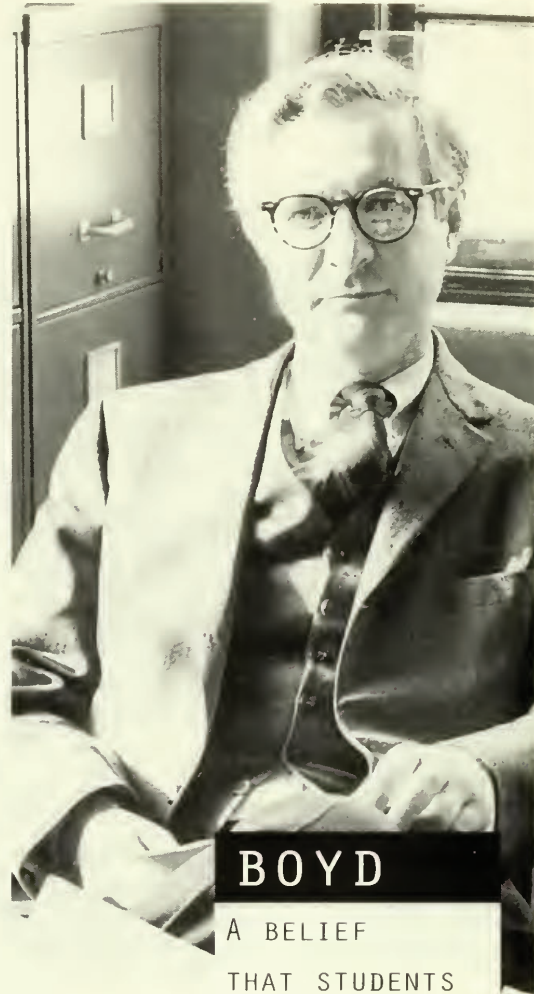
man, a 36-year veteran of the Mechanical Engineering Department, Imre Zwiebel, a recent addition to the Chemical Engineering Department, Jerald Weiss, professor of physics, William Hobey, a young professor of chemistry, Alan King, soccer coach and professor of physical education, James Hensel, a professor of English, Donald Johnson, a professor of history and modern languages who had been at WPI for 20 years, Robert Fitzgerald '53, a new professor of civil engineering, Nicholas Onorato, professor of economics, and John van Alstyne, who'd been teaching mathematics at WPI since 1961.

As chair, Grogan made regular reports to the department heads on the committee's ideas. "It was like running into a room full of feathers," he says. "They never got upset about our ideas, but they gave us no encouragement, either." The following February, the committee presented its initial recommendations to the Executive Committee, which reluctantly brought them to the faculty.

The committee wanted to revamp the freshman and sophomore curriculum by offering (unheard of) elective courses in the freshman year, making mathematics a degree program and introducing an optional minor program in English, history, and humanities and technology. They also recommended the establishment of a new Computer Science Department. The proposals were ultimately approved, but not before a hard-fought battle over whether to make freshman graphics optional.

"Six hours of drawing in India ink was required of every single student, no matter what his major," Grogan says. "The Mechanical Engineering Department, which employed a large cadre of drawing instructors and which clung to the belief that drawing was a basic requirement of engineering education, bitterly opposed eliminating this requirement. In the end, the recommendation passed by a margin of only four votes. After that vote, the olive was out of the neck of the bottle. If we could make that seemingly minor change in programming (but one with enormous philosophical implications), anything seemed possible. The stage was set for even greater change."

For one faculty member, the vote marked the end of a career. Leighton Wellman, a member of the "old guard" and the director of the drawing program, resigned from the committee. Not long after, in a move that echoed the departure of George Alden and Milton Higgins from WPI 80 years earlier over the creation of the "too scien-



**BOYD**

A BELIEF  
THAT STUDENTS  
SHOULD DEVELOP  
A "FUNCTIONAL  
LITERACY" MOVED  
HIM TO FAVOR A  
PROJECT-BASED  
PROGRAM.

## MORUZZI

HAVING HELPED LAUNCH THE FACULTY GOVERNANCE SYSTEM, HE WAS ELECTED TO THE PLANNING COMMITTEE IN ONE OF THE FACULTY'S FIRST MAJOR VOTES.



tific" electrical engineering program (see "An Electric Century," *WPI Journal*, Spring 1996), he resigned from the Institute.

*"The order is /Rapidly fadin' /And the first one now /Will later be last /For the times they are a-chaugin'."*

—Bob Dylan, 1963

As the end of the decade neared, change was in the air at WPI. In October 1967, the trustees approved parietal hours in the residence halls for upperclassmen. In short order, mandatory ROTC and Saturday classes were studied, debated and eliminated, as students became increasingly vocal about their unhappiness and as the war in Vietnam made mandatory military service an especially sore point. At their meeting in February 1968, the trustees decided to admit women undergraduates for the first time in WPI's history. And in April 1968, the faculty elected its first committee to study the issue of tenure. This committee of Young Turks—Heventhal, Moruzzi, Shipman, Weininger and, as chairman, mechanical engineering Professor Charles Feldman—developed a tenure and promotion system that the faculty and trustees approved that spring.

But as a new decade loomed, the undergraduate program was still in great need of improvement. WPI was finding it increasingly difficult to make a convincing argument that its quality was high enough to justify the difference between its tuition and the much lower prices charged by state universities, a fact that became clear to Bill Shipman one day that spring.

At the last faculty meeting of 1967-68, Storke asked for comments on WPI's long-range planning efforts. Shipman, van Alstyne, Zwiebel and William Roadstrum, professor of electrical engineering, rose to speak. Shipman's comments were particularly striking. "I was teaching a Sunday school class at the time," he says. "The mother of one of my students asked me if I could talk to him about which colleges he might consider. I thought to myself, 'Here I am at Worcester Tech, and I can't think of a reason why I would want to go here. What does this school have to offer that I couldn't get somewhere else for less money?'"

That June, Storke announced that he would retire the following spring. Perhaps hoping to finally realize his goal of reforming the curriculum before he departed, he began searching for the best way to get the job done, even if it meant going around the recalcitrant department heads.

That fall, Shipman wrote a memo to the Executive Committee suggesting, once again, that WPI needed to change to justify the tuition it charged students. Sometime after that, Storke sat down to lunch with Shipman in the Morgan Hall cafeteria and asked him if he had any thoughts on just what WPI could do. Shipman reminded the president about an article he'd written for the Spring 1966 issue of the *WPI Journal*, in which he'd offered a critical appraisal of the undergraduate program and some options for its future.

"It seems that the ultimate solution...will be found in a change from the set undergraduate curricula of former times to a program designed to teach the student to learn rather than to equip him to fill a specific job that may not exist five years after his graduation," the article said, in part.

Not long after that lunchtime discussion,

WPI's first two women undergraduates, Jayne Rossetti, left, and Lesley Small.



Storke telephoned Shipman's office. "I'm here," Storke said when Shipman answered, "and I want to be there. Are you going to be there?" He walked over and told Shipman he had decided to appoint a faculty planning committee and he wanted Shipman to serve on it. He said he wanted Roadstrum to serve, as well, but that Shipman was free to choose the rest of the members.

"I chose people I knew and people I thought were already thinking about education," Shipman says. In the end, invitations went out to van Alstyne, then acting head of the Mathematics Department, Heventhal, Boyd and Weinger, which gave the committee representation from the humanities, the sciences, mathematics and three major engineering disciplines. Roy Seaberg '56, who had become assistant secretary of the WPI Alumni Association in 1962, would later join the group as executive secretary.

In his formal charge to the committee, Storke asked it to prepare "a comprehensive proposal of feasible educational directions the Institute should take." He asked for the committee's first report by March 1, 1969. Learning of the committee, *Tech News* editor Joel Greene '69 called it "one more step in the quiet revolution now taking place within the traditional faculty-administration structure." Over the course of the following two years, the revolution was destined to get much louder.

***"We must dare to think 'unthinkable' thoughts. We must learn to explore all the options and possibilities that confront us in a complex and changing world. We must learn to welcome and not to fear the voices of dissent. We must dare to think about 'unthinkable things,' because when things become unthinkable, thinking stops and action becomes mindless."***

—James W. Fulbright, 1964

**T**he President's Planning Committee sat down to its first meeting that November in a conference room in Goddard Hall; its home base would later be changed to a Stratton Hall conference room, where a coffee pot would be kept perking for much of the next two years as the committee members—all but Shipman working without release time—put in long hours completing the committee's demanding work in addition to their own normal teaching and administrative loads. As its first item of business, the committee elected Shipman chairman. The vote was five to one, with only Shipman (who says he didn't see the need for a chairman) voting against himself. It would be the only vote the committee would ever take, as it completed the rest of its business by consensus. They then turned to matters of procedure—just how would they approach the rather open-ended assignment Storke had handed them?

A breakthrough occurred when it was suggested that the committee be completely open to any and all ideas, no matter how seemingly impractical or off-the-wall. If a committee member had something he thought should be considered, it would be discussed and evaluated from all sides.

This would become a guiding principle. They also decided early on that their first step should be to consider every seemingly practical future direction for WPI and to treat each one positively, a procedure that would help the Institute focus in on the direction it ultimately wanted to take. In short order it became apparent that the committee was thinking about a more fundamental evaluation of WPI's mission than Storke had had in mind.

Soon after the first meeting, the committee met with the president to talk about its desire to go beyond his charge. Weinger remembers that Shipman explained the committee's concern to Storke and asked for his thoughts. "My memory may be colored by romantic recollections," he says, "but I recall that he took no more than a minute to think about it and to say, 'Just go ahead and take this wherever it leads you.' It was exhilarating—and a little scary. In a sense, he'd placed the future of the college in our hands. If for nothing more than that decision, Storke deserves a place of honor in the history of WPI."

"We often think of the military officer as wanting to be in control," Heventhal says. "But the best military officers know that they have to have different options in front of them and that things are going to change. I think Storke sensed that that was what WPI needed."

The process of exploring those options encouraged each member of the committee to present and defend his own views on the ideal approach to education. Van Alstyne hoped for a program with far more flexibility than the traditional system.

Heventhal wanted to make the humanities a far more vital—and integrated—part of the undergraduate experience. Boyd, interested in a system that encouraged students to learn on their own, wanted to broaden the use of projects in the academic program, a concept that had been championed a year earlier by Charles Feldman in an article he wrote for the *Journal* entitled "Wither Worcester Tech?"

"One of the things that attracted me to WPI was that it had a long history of hands-on stuff," Boyd says. "But that had largely disappeared by the 1960s. Just after I arrived, some students broke into the machine shop—to use the machines! The Mechanical Engineering Department responded by changing the locks."



**HEVENTHAL**

HE CHAMPIONED THE ELEVATION OF THE HUMANITIES IN WPI'S CURRICULUM, AND LATER HELPED CREATE THE SUFFICIENCY.

Shipman's interest was in inverting the traditional American model of higher education. "We were doing things backwards," he says. "We'd have a lecture for 100 students. Then we'd have a recitation where students would do problems based on what they were supposed to have learned in the lecture. Finally, they would do a lab experiment to see that what they learned in the lecture and recitation was pretty close to being right. But that's not how people learn. We learn by making observations, correlating facts, and arriving at generalizations. That's how students have to operate when they go to work, but that's not what we were teaching them to do."

Shipman suggested a better model might be the traditional tutorial system used at Cambridge and Oxford universities in England. Weininger, who had taught at the University of Durham in northern England, had also come to admire the British system. The hallmark of the system is a one-on-one relationship between the student and a faculty tutor—essentially a guide who helps the student in his or her educational journey. In their first few years, students are free to explore ideas and academic disciplines in an intellectually charged atmosphere without the pressure of grades. The emphasis, Shipman says, is producing students who are "educated," meaning able to cope with change, able to learn on their own, able to recognize their capabilities and limitations, able to be sensitive to the needs of other people, and able to be motivated by a purpose greater than themselves.

The Cambridge/Oxford model was one of 12 options for WPI the committee outlined in its first report, "The Future of Two Towers," in March 1969. "There were some options we didn't particularly like," van Alstyne says, "yet we felt it necessary to present each one in the most favorable way possible."

The other options were

- to become a high-quality graduate school in engineering and science.
- to educate engineers and scientists to become leaders in society.
- to become a research-oriented graduate center in engineering and science.
- to become a middle college, a place for graduates of the growing two-year college system to

continue their education.

- to become a high-level trade school and prepare students to become technologists.
- to specialize in educating the underprivileged.
- to become a university geared to the needs and quirks of nascent inventors and entrepreneurs.
- to become a general university, an option best achieved through a union with Clark University.
- to become part of the state university system.
- to maintain the status quo.
- a combination of any of the above.

Each of these options would be carefully presented in the first report or its follow-up, "The Future of Two Towers, Part II," which appeared that June. Initial descriptions of the options, along with an analysis of the current state of the Institute, were written by individual committee members. As chair, Shipman handed out the writing assignments.

"Bill is one of the great gentlemen I've known," Weininger says, "but he is also something of a taskmaster. He'd hand out these assignments and ask us to have them done by the next meeting—which sometimes was the next day. We were all carrying our full teaching loads and keeping up with many other responsibilities. I'd just signed a contract to write a textbook and my first child had been born the previous year. My wife, Jennifer, was working full time, as well, so keeping up with the committee work—in reality, a second full-time job—was difficult. Some nights the only way I could get my assignments done was to dictate them to Jennifer while I sat in the bathtub."

Pride of authorship was not a quality most committee members clung to for long. As the drafts came in, the committee reviewed them, van Alstyne says. "Reviewed is not the word to use. We found ourselves haggling over each word, not out of animosity, but out of a desire to say it just right. The result was a series of proposals written by the committee as a whole. I can go through the reports and find parts of sentences we each wrote. As a consequence, the reports were consistent and no one could find a section that would be recognized as the pet idea of any one of us."

Before the first report was released, Shipman decided to give Storke a preview. "We typed the report on mimeograph masters," Shipman says, "and I took it to Storke to read. I was advised to do it that way so he wouldn't change anything, and he didn't. He was a little upset because there were some things in there he didn't like. He told me what they were and why he didn't like them. Finally, he looked at me and said, 'Print it!' As a matter of fact, he told me, 'Job well done,' after the report came out."

Some time later, Shipman was in front of Gordon Library when Storke drove up beside him and asked him to get in. "I told you, 'Well done,'" Shipman recalls him saying. "I should have said, 'Damn well done!'" Adds Shipman,



WEININGER

HE SERVED ON THE PLANNING COMMITTEE FOR A YEAR WHILE ALSO WORKING TO COMPLETE A TEXTBOOK AND EARN TENURE.

"The next time the committee heard from him was after the final plan was submitted. He wrote us a letter in which he said it was as fine a plan as he could have imagined. Storke's hope all along had been to make WPI worthy of being in the private sector. That's why we have a private sector—to innovate."

*"You can't always get what you want / But if you try sometimes / You just might find / You get what you need."*

—Mick Jagger and Keith Richards, 1969

**A**fter the publication of the first report, an all-campus Planning Day was held to get input from the entire community on the 12 options. Several trustees, most of the faculty and many students came and met in small groups to voice their opinions and, in some cases, vent their frustrations and express their elation that a tidal wave of change seemed to have been set in motion. To assure that everyone could attend, Storke declared that all classes would be canceled for the day, something no one could recall ever having happened at WPI.

The committee continued to get input from the community through an ambitious series of meetings with faculty, administrators and students. In the process, committee members had dinner in every campus housing unit, including the fraternity houses. Their objective, Shipman says, was to be sure that anyone with a point to make or an idea to contribute would have a chance to voice it, and that in the end, no matter what form the committee's final recommendation might take, everyone would feel as if he had had a part in shaping it.

For Heventhal, this exhaustive procedure might be the greatest legacy of the Planning Committee. "When you read our reports, you will see that what we were really talking about was a process," he says. "This was just as important as creating an ideal vision for WPI. The process of planning was something WPI needed in a time of crisis. The community needed a way of looking at itself and at the possibilities for what it might become, and it needed to know that it had the power to bring about change."

As the spring ended, the committee completed its second report. Then it did something quite remarkable—it disbanded. From the beginning, many committee members had been uncomfortable with the idea of a presidentially appointed committee creating a plan that would depend on faculty support for its success. In addition, the motivation for reform had come largely from the faculty, and the committee worried that as presidential appointees, their allegiances might seem suspect. Now, as the time came to move from a process to a final plan, these concerns grew especially acute, and the committee demanded to be reconstituted as a faculty-elected body.

Hearing the news, "Storke was horrified," van Alstyne says. "Armies are not run in a democratic manner." But he notes that the faculty was also becoming concerned over the dramatic—perhaps radical—course the committee seemed to be charting. As a result, few ran for election to the committee's six slots. Weininger, the demands of completing his textbook and of preparing his tenure file weighing heavily on his mind, chose not to serve again. When the votes were tallied, Shipman, van Alstyne, Heventhal and Boyd were re-elected, but Roadstrum was not. In a bit of poetic justice, the last two slots would be filled by two electrical engineering professors: Grogan, who had chaired the curriculum committee that had ignited the drive toward change, and Moruzzi, a member of the tenure committee that had unleashed the faculty governance system. Seaberg would remain executive secretary until that September, when his appointment as assistant director of admissions required that he step down.

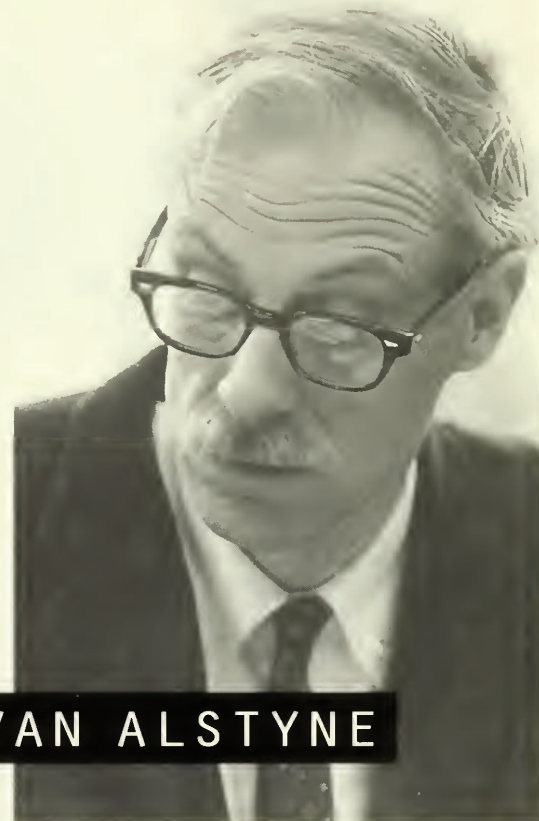
*"That's one small step for a man, one giant leap for mankind."*

—Neil Armstrong, July 20, 1969

**T**hat summer, while Protestants and Catholics fought in Belfast, children starved in Biafra, young men died in the jungles of Vietnam, the "Chicago Eight" were tried in Judge Hoffman's courtroom, and Richard Nixon settled into the Oval Office, the faculty-elected Planning Committee sat down around the conference table in Stratton Hall and honed their ideas and proposals into "The Future of Two Towers, Part III: A Model," which contained the essence of what would later come to be called the WPI Plan. But lurking within its pages was what one committee member would later call "a poison pill."

In the report, the committee outlined an approach that united elements of several of the 12 options, with a heavy emphasis on the Oxford-Cambridge model. It devised a program in which the requirements for graduation were based on a student's ability to learn, and not on his or her ability to accumulate facts through courses. It included a liberal dose of project and independent study work to "provide realistic and intimate learning situations for both student and faculty."

Students would receive their degrees if they successfully completed advanced-level work on two projects (the committee strongly urged that at least one project be completed off campus), a



**VAN ALSTYNE**

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two-year residency requirement, a comprehensive examination in a particular area of study, and two sufficiency exams in disciplines other than the area of the comprehensive exam. The model also stressed the importance of a culturally vital and intellectually stimulating community to the success of such a program. The committee summarized the philosophy of the model in the following goal statement, a version of which was adopted by vote of the faculty in December 1969:

"The WPI graduate of the future must have an understanding of a sector of science and technology and a mature understanding of himself and the needs of the people around him. While

an undergraduate, he must demonstrate that he can learn and translate his learning into worthwhile action. He must learn to teach himself those things that are needed to make his actions socially significant. A WPI education should develop a strong degree of self-confidence, an eagerness to contribute to the community beyond oneself, and an intellectual restlessness, a spur to continual learning."

As the summer wore on, Shipman felt comfortable that the committee had accomplished its objective and should commit it to paper. The other committee members, however, thought they

needed more time to sort out a slew of picky details that had to be resolved before the Plan could be declared functional. They arranged for a brief stay that July at the Fitzwilliam Inn just over the border in New Hampshire to complete their work. "I've often thought we should put a plaque up at that inn," Grogan says. "That's where we really hammered out the Plan."

On July 19, as Apollo 11 astronauts Neil Armstrong and Buzz Aldrin prepared to make their historic descent to the moon's surface, Dean Price and George Hazzard, who had just taken office as WPI's 11th president, arrived to hear about the emerging plan.

(By many reports, it was the work of the Planning Committee that turned the tide with Hazzard. A St. Lawrence University graduate with a Ph.D. in experimental physics and physical chemistry from Cornell, with experience in academia and industry, Hazzard had been involved in a

national movement to reform physics teaching. Initially, he had been unimpressed with WPI. But after a meeting with the Planning Committee, he realized that the Institute had an opportunity to transform itself from an unexceptional college into a uniquely different one.

"That meeting took place in the Gordon Library Seminar Room," van Alstyne says. "Ironically, it was the same room where the Executive Committee had met to submit their long-range plans and where they had sat in shock when Storke told them he'd appointed the Planning Committee.")

After dinner, everyone retired to the living room of the inn for the presentation. The president and academic dean seemed enthusiastic; in fact, both men would become strong advocates for the Plan and critical forces to assure its passage and success. "Before he became dean, Cookie Price had taught for many years in the Mechanical Engineering Department. He was a member of the old guard," Weininger says. "But he was an open-minded person who was willing to entertain the idea of change—even radical change. And because he enjoyed pretty much universal respect in the Institute, and because he was an insider with unassailable credentials, he was able to head off what could have been a lot of factional splitting and some pretty nasty infighting over the Plan. His moral authority kept the place together." Echoes Boyd, "It took an enormous act of faith for him to put the weight of his reputation behind this. I really respected him for that."

Keeping things together was much on the minds of committee members that fall when "Two Towers III" was released. The more the committee had thought about their model, which differed fundamentally from WPI's existing program, the more they realized that it could not be carried out successfully by the same organizational structure that had maintained that program far beyond its useful life. In the report, they outlined a new structure that placed the day-to-day operation of the academic program in the hands of a dean of program operations (much like the position of dean of undergraduate studies that was later established) and a dean of academic resources (much like the current position of provost), both of whom would report to the academic vice president.

But the truly explosive proposal—the one that shocked the faculty as they returned that September from the summer hiatus—was to abolish the academic departments and replace them with three academic divisions made up of functionally related study groups. The idea was to blast away the rigid, stifling departmental structure and promote faculty interaction across disciplines. To illustrate the concept, the committee included a detailed, fold-out organizational chart. "That almost killed the whole process," Grogan says. "It was an idea that was just too far ahead of its time."



## ROADSTRUM

HAND-PICKED BY PRESIDENT STORKE, HE WAS THE ONLY MEMBER OF THE ORIGINAL PLANNING COMMITTEE NOT ELECTED BY THE FACULTY TO ITS SECOND INCARNATION.

*"To dream the impossible dream, to reach the unreachable star."*

*Joe Davion, from Man of La Mancha, 1969*

**F**ollowing closely on the heels of the third report was a second all-campus Planning Day. The committee also called for the establishment of nine subcommittees, made up of 74 faculty members and 90 students, to explore various aspects of the proposed model. With considerable input from the community, the committee spent the better part of a year hammering out "The Future of Two Towers, Part IV: A Plan." The suggested reorganization of the college was dropped, but the model academic program was fleshed out into a dramatically different, but highly functional plan—one that encapsulated the philosophy of education the committee had been refining.

The degree requirements were formalized into a Major Qualifying Project (MQP)—a significant design or research experience in the student's major field; a second project, later dubbed the Interactive Qualifying Project (IQP), which encouraged students to understand how technology affects society—for better or worse; the Comprehensive Exam (later renamed the Competency Exam to identify more clearly its real intent); and the Sufficiency.

The Sufficiency was the culmination of the committee's deep-seated desire to transform the



## SEABERG

AS EXECUTIVE SECRETARY TO THE PLANNING COMMITTEE, HE RECORDED—AND CONTRIBUTED TO—MANY IMPASSIONED DISCUSSIONS ABOUT EDUCATION AND WPI'S FUTURE.

The Sufficiency greatly elevated the role of the humanities in the undergraduate curriculum (in fact, the humanities component of the Plan was to be given the same academic "weight" as the MQP and IQP combined). No longer could students of engineering and science regard the humanities courses as meaningless credits to be acquired.

Consistent with the idea of giving students responsibility for their own learning, students chose a theme, explored it through five related humanities and arts courses, and then synthesized what they learned in a final project that could take the form of anything from a research paper to a play to a musical performance.

The committee also proposed a new academic calendar made up of four seven-week terms. The terms were designed to be conducive to project work, but were also meant to be short enough to force the faculty to break out of their traditional approach to teaching. There would be an "intersession" during the winter break, an opportunity for community members to teach brief courses on any

topic that interested them or in which they had some expertise. (The first year, 440 mini-courses were offered. For the six years of its existence, Intersession would be one of the liveliest and most exciting elements of the young Plan.) Finally, there was a grading system with just three grades—Acceptable, Acceptable with Distinction, and No Record (there was no failing grade, as the committee believed failure should be seen as an opportunity to learn and grow, and not a stigma permanently attached to one's transcript). The grading system represented a compromise between those, like



**The advocacy of Dean "Cookie" Price, left, and newly inaugurated president George Hazzard proved crucial to the Plan's passage and success.**

role of the humanities in a WPI education. "When I arrived, the humanities program was quite limited and the department was really a service department," Heventhal says. "Occasionally we'd have a student who would have done well at any liberal arts college, who enjoyed the humanities courses so much that he was ready to transfer to another college. I felt as though these cases were really failures for WPI, because there was a potential to define a humanities and arts program that would accompany these technical people in their careers, and not merely stamp out English majors."

Boyd, who preferred that there be no grades at all, and those, like Grogan, who feared the lack of a more traditional system would be problematic for students going on to graduate school.

"Two Towers IV," the last in the series, was published in April 1970. Unlike the previous three volumes, which had been bound with maroon covers, this one was wrapped in green. "We called it the 'Go Volume,'" Heventhal says. The publication kicked off an extraordinary series of 13 faculty meetings—one every week—to discuss and amend the final report, section by section. The meetings were boisterous, volatile and con-

Wilmer Kranich to give the Plan a better sense of structure).

"It was difficult for the committee to listen to some of the criticism and there were times when we felt a bit discouraged," van Alstyne says. "But there were positive moments, too. I remember one meeting not long before the final vote when a senior member of the faculty, Professor Dick Cobb of the Math Department, rose to speak. I could see the smiles on the faces of the traditionalists, but those smiles quickly faded. Cobb, in his own well-reasoned way, supported the Plan as the best way for WPI to improve its standing and educational opportunities."

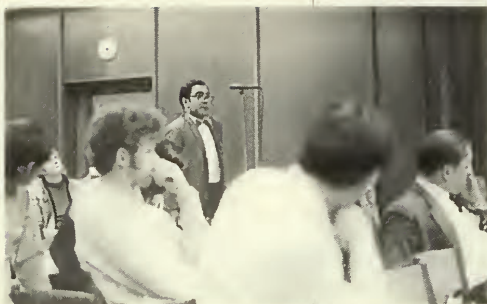
At another critical point, when a faculty member asked pointedly, "Who would hire a graduate of a program like this?" Howard Freeman '40, a WPI graduate, a recently elected member of the WPI Board of Trustees, and the founder and chairman of Jamesbury Corporation, a successful Worcester manufacturer of valves, ended the discussion by responding in a calm, quiet voice, "I would."

On May 29, 1970, the time came for a vote. The committee had asked that there be one all-or-nothing, up-or-down decision, to avoid the piecemeal recasting of their vision. While their reading of the faculty told them that the odds were in their favor, the tension was still high as the faculty filled out their written ballots. When the counting was done, Professor James Hensel, the secretary of the faculty, announced the tally: 92 in favor, 46 opposed and 3 abstaining. After the vote, the victors retired to Putnam and Thurston's restaurant for a real blow-out, a celebration party few will ever forget.

Some of those who voted against the Plan left WPI in the weeks and months that followed, unable or unwilling to go along with this fundamental shift in the Institute's course. Some stayed and resisted the changes—some for decades. Some stayed and did their best to adapt—a number of them became some of the Plan's greatest boosters, and others became some of its most adept practitioners. In the end, nobody was left unchanged by the educational earthquake called the WPI Plan.

But when the shaking stopped, WPI was still there, strengthened from the experience, and in many ways a better institution than it had ever been. The earthquake completed the crumbling of the Institute's top-down organization, leaving in its place a faculty in awe of its newfound power. "At the end of that period, we really had a faculty," Boyd says. "They trusted each other and they were terribly interested in faculty governance, which was new to them. They saw the power of it and the need for it. I don't suppose you can maintain that forever, but it was nice to be in on it when it happened."

"The outpouring of energy and creativity on the part of the entire faculty during the early



**Debate over the proposed WPI Plan took place in formal meetings, including 13 faculty meetings, and in informal settings like the Goat's Head Pub, above.**

tentious. Strong feelings were voiced as the future of the Institute—and the very foundation of education—were debated in eloquent and passionate fashion. Remarkably, the discussion managed to stay focused on the issues, and rarely strayed into nastiness or personal attacks. "Voices were raised and tempers flared, but mutual respect was never breached," Boyd says. "Lifelong friendships were forged in that heat."

In between meetings, the discussion continued all over campus, especially at the daily 10 a.m. coffee hour in Salisbury Laboratories, a longtime ritual that provided a means of campus communication unrivaled by even today's wired campus, and at the Goat's Head Pub in the basement of Sanford Riley Hall, a popular place for faculty members, administrators and students to gather and socialize on Friday evenings. Two critical changes were made in the Plan: the inclusion of a physical education requirement and the stipulation that students achieve 12 units of credit before taking the Competency Exam (an amendment offered by Chemical Engineering Professor



years of the Plan's implementation was incredible," Grogan says. "The dedication of the faculty to the Plan was just remarkable."

## EPILOGUE

**I**n the 25 years since the WPI Plan made its dramatic entrance, many have wondered how a small band of faculty members, working against the clock and with no resources other than their own ideas and dedication, were able to make it happen. In part, it was WPI—its heritage of innovation; its loyal, dedicated faculty, passionately concerned about education; its small, cohesive and supportive community; and its financial situation, which while not dire was certainly troubling—that made the Plan possible. It may well be true, as Seaberg believes, that it could not have happened at another institution, and, in fact, could not happen at WPI today.

But much of the credit must go to the Planning Committee itself, an extraordinarily well-matched and forward-looking group of individuals. "We were a group of strong personalities, all a bit eccentric in our own ways," Boyd says, "but there were no hidden agendas, no competition for power—in a short time, we gained complete trust in one another, and I never knew why. We felt we had a mission, and in the process of fulfilling it we became more than the sum of our parts. It was the kind of committee activity you dream of, but which I never knew before and have never known since."

"We all cared very much about teaching, about our students and about education in general," van Alstyne says. "We were college faculty first, and department faculty second, and we had friends in all the departments. What's more, everything we proposed we felt was something that could and should be done, and having all of us, with our different backgrounds and interests, find agreement gave us impetus to continue to the end."

After the Plan was approved, the members of the committee moved on to other challenges. Roy Seaberg went on to become director of special admissions, helping expand WPI's reputation around the world. He retired this year and was honored at Reunion for his service and devotion to WPI.

Boyd, Heventhal, Moruzzi, Roadstrum, van Alstyne and Weininger returned to their lives as teachers and scholars, earning distinction as both. Romeo Moruzzi served as secretary of the faculty from 1983 until 1985, when he retired. He died in 1993. Bill Roadstrum, who retired in 1980, died in 1994.

John van Alstyne became dean of academic advising in 1971 and spent more than a decade and a half making a profound difference in the lives of hundreds of WPI students. He retired in 1987 and lives in North Carolina.

Charles Heventhal became head of the English Department and spent several years building a humanities program and organization equal to the ideal of the Sufficiency—one that could provide students the exposure to the humanities and arts, and the writing skills, that the Plan demanded. He retired in 1990 and lives in Vermont.

Jack Boyd, who retired in 1994, divides his time between Worcester and Maine. He became one of the Plan's most passionate advocates and watchdogs, at once applying its principles to his work as a teacher and project advisor and criticizing the changes that gradually seemed to steer the Plan away from those principles.

Steve Weininger continues today as professor of chemistry. In recent years he has become actively involved as an advisor in WPI's Global Perspective Program, through which students can complete their WPI Plan projects at sites around the world.

Bill Shipman became dean of graduate studies. One of his first tasks was to head a committee that set out to revitalize the graduate program—to create, in essence, a WPI Plan for graduate students. In the end, though, the Institute, perhaps still reeling from the dramatic change it had just undergone, was unprepared to implement its suggestions. By the time the committee's report was released, Shipman had already decided to resign to join the Cabot Corporation, where he continued his groundbreaking work in combustion. He now lives in Maine, not far from the cottage where Boyd spends his summers.

Even before the Plan vote was taken, President Hazzard asked Bill Grogan to become the first dean of undergraduate studies. In the process, he became WPI's first dean who had never been a department head. The man who David Reisman, the eminent Harvard professor of social science who served on the NSF visiting committee that evaluated the Plan, called "the Harry Truman of higher education," spent the better part of two decades managing the gargantuan task of implementing and developing the Plan, and protecting it from internal and external forces that constantly threatened it. Grogan retired in 1990. Since then, as dean emeritus, he has remained actively involved in many WPI projects (most recently, he led the committee that orchestrated the Plan's 25th anniversary celebration).

Some years back, while in Vermont to begin a trip out West, Shipman stopped for an overnight visit with Heventhal. "Well," Shipman said as he shook the hand of his old colleague and fellow revolutionary, "a couple of years ago, we turned the place upside down." "Yes," Heventhal replied. "And some of it stuck!"

**EDITOR'S NOTE:** *In Part 2 of this article, to be published in March 1997, we will look at what has become of the Plan during the past 25 years.*

# A Gateway to Adulthood

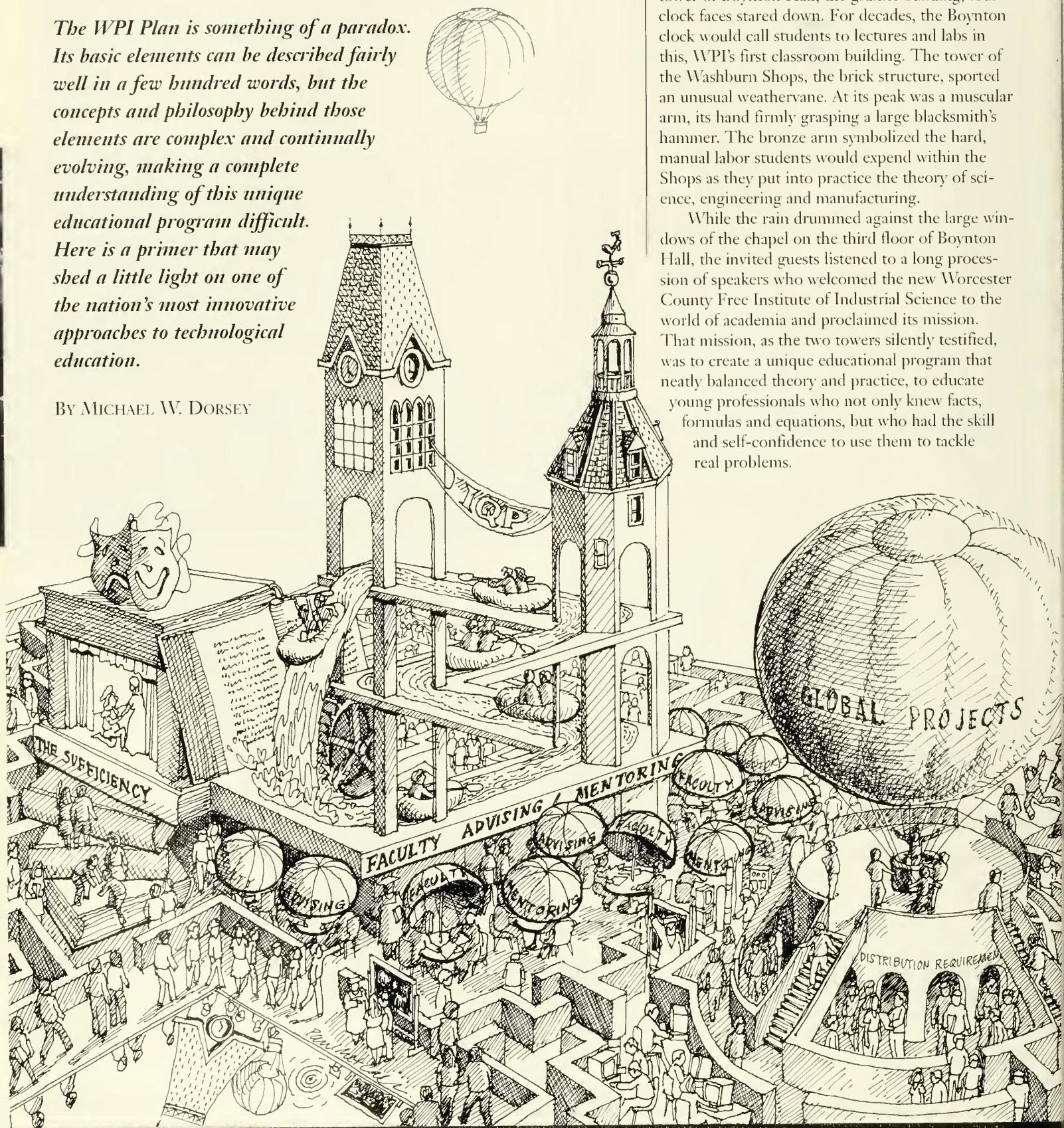
*The WPI Plan is something of a paradox. Its basic elements can be described fairly well in a few hundred words, but the concepts and philosophy behind those elements are complex and continually evolving, making a complete understanding of this unique educational program difficult. Here is a primer that may shed a little light on one of the nation's most innovative approaches to technological education.*

BY MICHAEL W. DORSEY

On a rainy November morning in 1868, a group of Worcester citizens and educational leaders from around the region trudged through muddy streets and climbed a steep, nearly treeless hill. Rising before them, side by side, were the gleaming facades of two brand new buildings. One was sheathed in rough-hewn granite, the other neatly encased in rows of bright red bricks.

Above each building rose a tower. From the tower of Boynton Hall, the granite building, four clock faces stared down. For decades, the Boynton clock would call students to lectures and labs in this, WPI's first classroom building. The tower of the Washburn Shops, the brick structure, sported an unusual weathervane. At its peak was a muscular arm, its hand firmly grasping a large blacksmith's hammer. The bronze arm symbolized the hard, manual labor students would expend within the Shops as they put into practice the theory of science, engineering and manufacturing.

While the rain drummed against the large windows of the chapel on the third floor of Boynton Hall, the invited guests listened to a long procession of speakers who welcomed the new Worcester County Free Institute of Industrial Science to the world of academia and proclaimed its mission. That mission, as the two towers silently testified, was to create a unique educational program that neatly balanced theory and practice, to educate young professionals who not only knew facts, formulas and equations, but who had the skill and self-confidence to use them to tackle real problems.



Just over a century later, WPI once again broke with the ranks of technological educators and fashioned a new program unlike any that had come before. Like its predecessor, the WPI Plan gave students the opportunity to hone their personal and professional skills through practical application. But there is more to the Plan than the marriage of learning and practice. The Plan is built upon a well-reasoned philosophical foundation—a distinct set of beliefs about the role of faculty members and students in the process of learning.

The Plan was created at a college quite different from the larger, more diverse technological university that WPI has become in the last quarter century. WPI in the mid- to late 1960s was a more rigid and conventional institution, a school where the emphasis was on passing a largely pre-determined sequence of courses, and in the process, it was believed, gaining the knowledge one needed to be a competent technological professional. This is the model still followed by the majority of technological institutions in this country.

The members of the faculty Planning Committee that created the Plan believed that this model, while it had provided a solid education to many generations of WPI students, was not the best way to prepare young people for the challenges of their careers and lives. They believed that higher education, at its core, should be a gateway to adulthood, a period during which men and women can gain the emotional, social and intellectual maturity they need to succeed in life. Attaining maturity requires taking on responsibility and making decisions—even failing, from time to time.

In fact, the Plan places a great deal of the responsibility for their education on the shoulders of students. In stark contrast to the largely prescribed curricula of the 1960s, the Plan gives students the freedom to structure their own academic programs, with considerable guidance from their advisors.

There are no required courses, and undergraduate courses have no prerequisites—only recommended background courses. Students must fulfill a set of distribution requirements in their major field. These are designed to assure that students do, indeed, acquire an “excellent grasp of fundamental concepts in

their principal area of study,” as the university’s Goal Statement asserts. About a decade ago, distribution requirements replaced the “live or die” Competency Exam as the method of verifying that students had learned what they needed to know to enter their chosen profession.

The Planning Committee also believed that in its ideal form, education is a process of learning how to learn, and that a WPI education should instill in students “an intellectual restlessness that spurs him or her to continued learning.” They recognized that traditional technological programs—including WPI’s—placed too much emphasis on memorizing facts and equations and passing tests, and too little on learning how to acquire and synthesize knowledge and apply it to real problems. They decided to develop a new spin on the century-old Two Towers model.

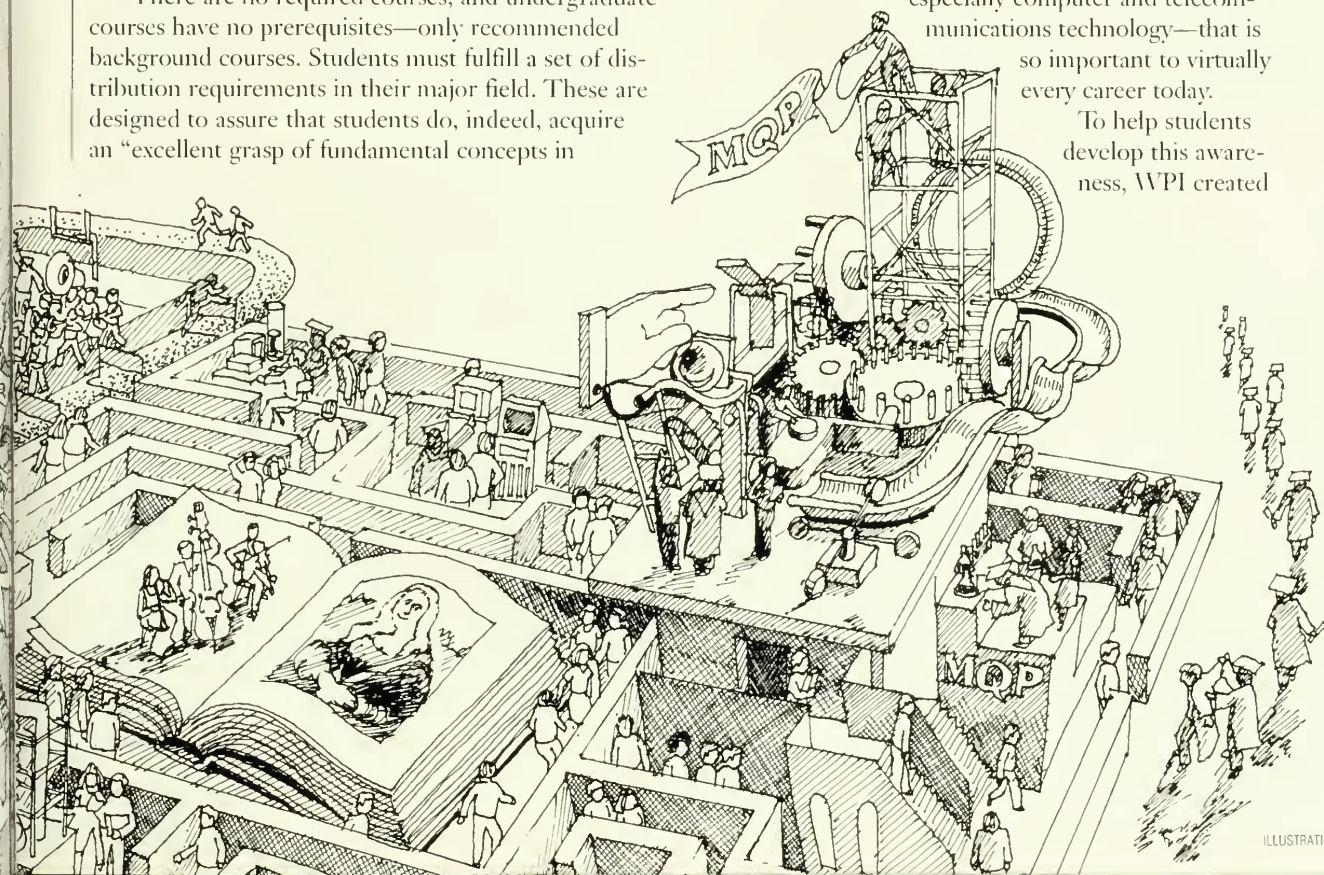
Under the Plan, students take courses and independent studies and engage in self-directed learning to acquire needed skills and knowledge. But this learning is not an end in and of itself. It is also preparation for the Plan’s primary degree requirements—the “practice” side of the Plan. Students apply the knowledge and competence they gain through their academic work by completing three major projects, each having been designed to address a set of skills, qualities and abilities the Planning Committee believed technological professionals should acquire during their WPI careers.

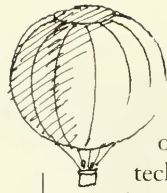
To begin with, the committee believed, WPI graduates should be aware of the world of knowledge beyond their own areas of study. If they are preparing for careers in science and technology, they should appreciate how the study of history, philosophy, art or music enriches one’s professional and personal lives. Likewise, students pursuing degrees in the liberal arts should appreciate how scientists and engineers approach their work and be familiar with the technology—

especially computer and telecommunications technology—that is so important to virtually every career today.

To help students develop this awareness, WPI created

*The Planning Committee believed that in its ideal form, education is a process of learning how to learn.*





*The IQP has been widely recognized as the most creative and effective innovation in technological education in the last quarter century.*

the Sufficiency. The name of this project derives from the idea that students need a depth of exposure to either a humanistic or technical field sufficient to produce more than a cursory appreciation. The project requires students to take five thematically related courses and then to complete an original work of scholarship that somehow derives from the content of those courses. The works students have completed include research papers, lengthy essays written in another language, original plays, short stories, novels, musical compositions and musical performances.

The framers of the Plan also believed that technological professionals should understand that they do not work in a vacuum; that their work affects society, and that society, in turn, affects the kinds of work they do—or need to do. More and more, engineers and scientists must deal with social and political issues as part of their careers and lives, and must develop partnerships with professionals in nontechnical fields to successfully carry out their assignments.

This belief led to the creation of the Interactive Qualifying Project (IQP). Put simply, the IQP requires students to complete original research and scholarship on a topic that lies on the boundaries of science, technology and society.

Read the abstracts of a hundred of these projects, and you might be hard pressed to find a common theme among them. To fulfill the IQP requirement, students have studied the problems of garbage collection in a large slum in Bangkok, looked at the potential for using biogas as an energy source in Botswana, made numerous studies of the American patent system for the U.S. Patent Office, developed innovative curricular materials and courses for pre-college classrooms, researched and built exhibits for major New England museums, studied health care management issues at hospitals in San Francisco, and developed technology to help disabled persons in London lead more productive and rewarding lives.

The IQP has been widely recognized as the most creative and effective innovation in technological education in the last quarter century. While other elements of the Plan have been duplicated to some extent at other colleges and universities, nothing quite like the IQP yet exists beyond the boundaries of the WPI campus.

In addition to completing the Sufficiency and IQP, WPI students must tackle the Major Qualifying Project (MQP). The MQP was created in response to a number of convictions about what a professional should be capable of. First and foremost, he or she should be able to size up a problem, develop a solution to it, and then implement that solution competently and professionally. That's why MQPs, by and large, are professional-level design or research projects that give students

hands-on exposure to the kinds of work assignments they will really do after graduation.

Professionals today also need to be able to work in teams and to communicate well in writing and orally. Most MQPs are completed by student teams, giving team members a true appreciation for the challenges and rewards of cooperating with other professionals to get important work done under a deadline. MQPs must be thoroughly documented in a written report. In addition, virtually all MQP teams make an oral presentation to their advisors and sponsors.

In recent years, WPI has added an exciting new dimension to the Plan by building a growing infrastructure for student project work away from campus. In the process, the university has taken the lead in globalizing technological higher education. In fact, WPI students currently account for more than 15 percent of all U.S. engineering students studying abroad. WPI's Global Perspective Program has grown from the conviction that to be successful in business, engineering and science in our increasingly interdependent world, engineers and scientists must understand other cultures and be able to work with—and compete against—people from all nations and backgrounds.

WPI's comprehensive program is aimed at giving all undergraduates a global perspective. To this end, the university maintains an extensive network of project centers and programs around the world. Working in teams under the supervision of faculty advisors, students spend seven weeks at an international project center conducting professional-level projects proposed by off-campus sponsors. Students can complete any of the three required WPI projects—the Sufficiency, the IQP and the MQP—overseas or off campus within the U.S. Through academic exchange programs with technical universities in several nations, students can spend as long as a year taking courses and continuing their study of such languages as French, German, Russian and Spanish.

“While some of the early features of the Plan reflected the times in which they were developed, the basic educational processes are timeless,” says William R. Grogan '46, dean of undergraduate studies emeritus. “Placing responsibility for learning in the hands of the students—including responsibility for making their own course decisions and selecting their own qualifying projects—and requiring accountability for achieving professional outcomes through project activities combine to produce an outstanding educational experience.

“We enter the next 25 years with a vast array of new teaching technologies, a rapidly broadening spectrum of student interests, and an explosion of new career challenges. As we do so the WPI Plan will evolve and grow, but remain the best format yet developed in technological-based education to achieve that elusive but essential goal of learning how to learn.”

# Ten Lives Changed



**The best way to understand what makes the WPI Plan unique and uniquely effective is to talk to the men and women whose lives it has touched.**

BY RAY BERT '93, ALAN EARLES, BONNIE GELBWASSER,  
JOAN KILLOUGH-MILLER, ROGER N. PERRY JR. '45 AND RUTH TRASK

ILLUSTRATIONS BY FABIO DEPONTE, WHITE PICKETS STUDIO

Since the WPI Plan was first implemented in the early 1970s, hundreds of thousands of words have been written about the workings and benefits of this groundbreaking undergraduate program. The lion's share of those words have focused on the Plan's outcome-oriented approach. In other words, while most programs of technological higher education ask, "What should students learn?" the Plan asks instead, "What should technological professionals be? What skills, abilities and qualities should they take with them as they begin their careers and lives?"

The answers to those questions are many. Encapsulated within the Plan is the notion that students should be able to work in and lead teams; to size up problems and solve them in a logical and efficient manner; to gather the knowledge they need to do their jobs and to communicate what they have learned and what they have accomplished in a clear and professional manner. By the time they receive their diplomas, WPI students should have come to understand the profound relationship between the work they do and the society in which they live. They should appreciate the positive and negative consequences of science and technology and come to understand that those effects are often intertwined in complex ways. And, they should see that there are diverse and exciting worlds of scholarship beyond their own field of study and appreciate how those worlds can enrich their lives.

During the Plan's first quarter century, more than 12,000 young men and women have earned their bachelor of science degrees at WPI, studying under this student-centered, project-driven, outcome-oriented program. Their stories provide a compelling and often poignant confirmation of all those many words. Here are 10 of those tales. To avoid repetition, we have not provided definitions of the components of the WPI Plan within each story. For definitions of the Sufficiency, Interactive Qualifying Project (IQP) and Major Qualifying Project (MQP), please refer to "A Gateway to Adulthood," starting on page 16.



# Barbara Bain Gatison '74

BY RAY BERT '93

Barbara Gatison tackles questions in much the same way she tackles problems—directly, intelligently and with enough energy to knock you backwards if you happen to be standing too close, or worse, getting in the way. “You can’t ever get a simple answer to a question from me,” she’s the first to admit. In fact, she makes mincemeat of them, as she has been doing to all manner of problems and obstacles throughout her career.

Gatison is currently president of SNET America in North Haven, Conn., the interstate long-distance subsidiary of Southern New England Telecommunications. She’s also president of SNET Wireline Communications, a product development house. She’s reached this lofty perch after 22 promotion-studded years with the company, where she began as a systems analyst in 1974 after receiving her bachelor of science degree in biology.

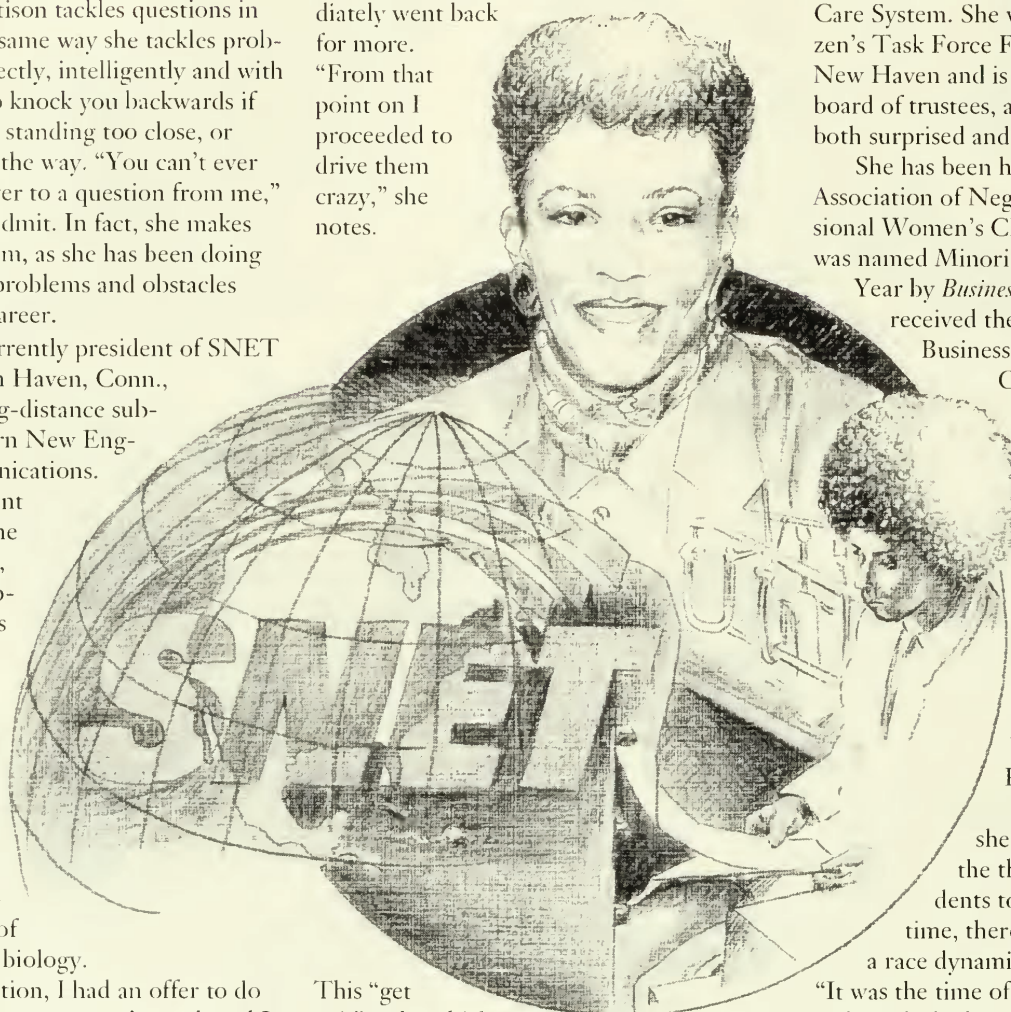
“After graduation, I had an offer to do research, but the money wasn’t much and I had a lot of debts,” she recalls. “So I took the job with SNET, telling myself that I’d give it two years and then get back to biological research. Well, after two years I was promoted, so I gave it another two years, and then I was promoted again....”

What she discovered was that, as much as biology fascinated her, her main passion was not specific to a field but to the pursuit of solutions—to taking on challenges and succeeding. She established herself as a master problem solver on her first day with SNET. Her supervisor assigned her the task of developing a new badge security system, a project he said was expected to take six months.

“I had no notion of how things were supposed to be done in business,” she laughs, “so I just started calling people,

introducing myself, setting up meetings that same day. I wasn’t going to wait around for more direction.” Dragging her notes home that evening, she typed up a report and created the badge background by photographing a colorful handmade blanket (so it couldn’t be duplicated). Gatison completed the six-month project in one day and immediately went back

for more. “From that point on I proceeded to drive them crazy,” she notes.



This “get at it” style, which she attributes in large measure to her education at WPI, combined with a preternatural energy level, pushed Gatison relentlessly up the corporate ladder at SNET. “I have a very high need for learning,” she says, and then adds with a laugh, “If I can’t constantly be on the growth side of the learning curve, I am one evil pain in the ass.”

To a large degree, Gatison’s career has reflected the Plan philosophies of independence and the ability to think and solve problems in original ways. She nurtures those qualities in her subordinates, insisting that they not become pigeonholed, rewarding their willingness to learn, and giving them the power and encouragement to find solutions in their own ways. She also preaches to her staff about the need for a

healthy balance between work and home life, and strives for that balance in her own life. Her “downtime” is split between her husband, Lenward, and eight-year-old son, Lenward II, and her many volunteer efforts.

Over the years, the latter have included serving on the boards of the New Haven (Conn.) YWCA and Saint Raphael’s Health-Care System. She was co-chair of the Citizen’s Task Force Fighting Drug Abuse in New Haven and is a member of WPI’s board of trustees, an honor that, she says, both surprised and delighted her.

She has been honored by the National Association of Negro Business and Professional Women’s Clubs, and earlier this year was named Minority Businessperson of the Year by *Business New Haven*. In 1992 she received the Milestone Award for

Business from the South Central Connecticut Chapter of the National Coalition of 100 Black Women Inc., and the following year received the Business Leadership Award from the Chi Omicron Chapter of Omega Psi Phi Fraternity Inc. In 1984 she became the initial recipient of WPI’s Ichabod Washburn Young Alumni Award for Professional Achievement.

In the early 1970s, she was a member of only the third class of WPI students to include women. “At the time, there was both a gender and a race dynamic for me,” she recalls.

“It was the time of the Black Panthers and such, and I had my fun being a radical, but I always remembered that my main focus was getting an education.”

Her rebellious nature almost kept her from choosing the Plan over the traditional WPI curriculum, but she says she has never regretted the decision. Certain parts of her Plan experience stand out in her memory. “My MQP required a fair amount of electron microscopy, and my project team had to learn on the fly,” she says. “We got a lot of positive reinforcement as we learned these new skills, mostly due to the one-on-one interaction with the faculty that WPI provides. The MQP research work sets up a structure that is nonstructured. It teaches you that the boundaries of what’s required to do a task are not predetermined. That’s an important lesson.”

# Glen Yee '74

BY BONNIE GELBWASSER

The impact of the WPI Plan has extended far beyond the classroom for Hong Kong businessman Glen Yee. As one of the first students to enroll under the Plan, which was optional during its first few years, Yee learned discipline and important lessons about dealing with uncertainty and taking risks—tools he used to move into uncharted territory in his life and career.

Yee was born in China and emigrated with his family to Cleveland, Ohio, where he attended high school. "I was stronger in math and the sciences because I had not entirely grown up in the United States and my English was not up to speed," he says. "I was interested in a small engineering school and was accepted by Rensselaer and Rose-Hulman. But I was struck by WPI. It was smaller than Rensselaer and I was always interested in New England. I thought it might be an exciting place to spend a few years."

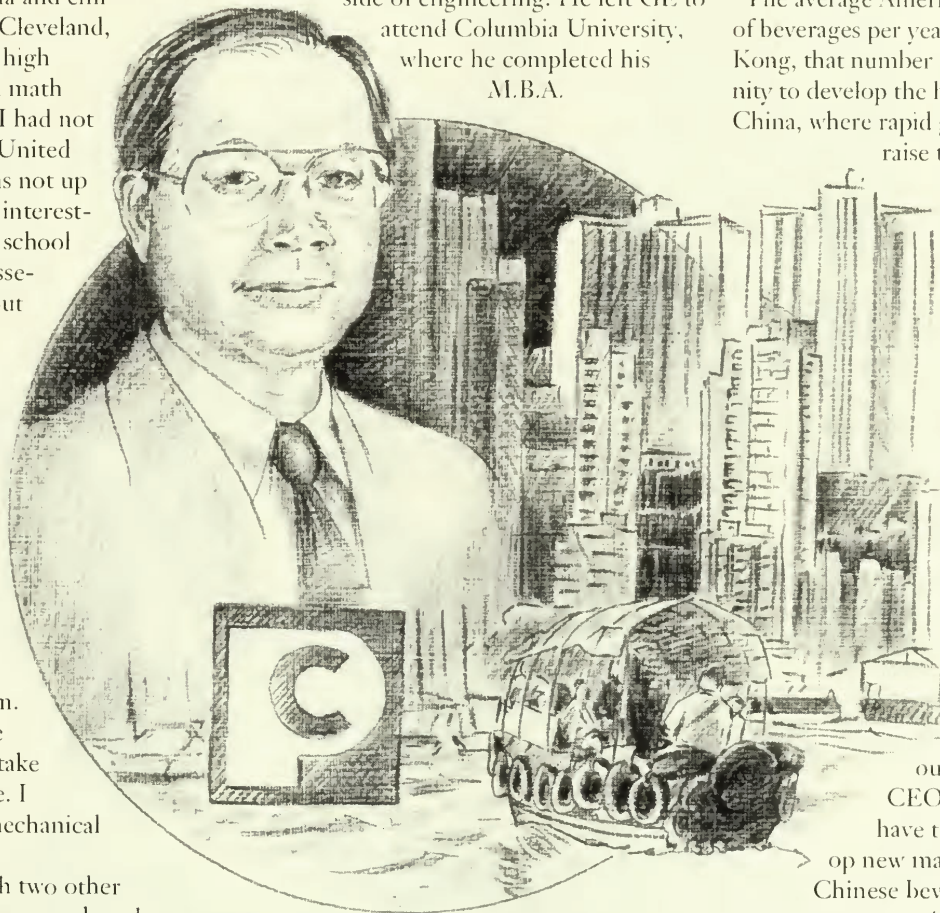
Yee says he was attracted to the flexibility of the Plan, which seemed a welcome contrast to the rigidity of WPI's traditional program. "I knew that if I chose the Plan I would not have to take every required ME course. I wasn't even sure I liked mechanical engineering."

For his IQP, Yee, with two other students, worked with the research and development staff of American Optical to determine how best to fit lenses into eyeglass frames. "Our objective was to design a measuring method that could be digitized for computer input," he says. "We did devise a fairly scientific way of measuring how the many three-dimensional curves in the lenses fit into frames."

His MQP focused on fiberglass-reinforced materials. "There were few publications and less than a handful of books on the topic," he recalls. "WPI had a machine shop and we got help to do some of the molds. We tried to quantitatively analyze the physi-

cal performance of different materials and orientations of the fiber-reinforcing material and their possible applications. The boundaries of these projects were often not clear. They served as lessons in dealing with uncertainty. We also learned to work with other people and to push each other to achieve the desired results. The Plan gives you the chance to develop people skills early on."

After he completed his bachelor's degree in mechanical engineering, Yee joined GE's Technical Marketing Program and completed four assignments in four locations. Toward the end of this period, he became interested in the business and commercial side of engineering. He left GE to attend Columbia University, where he completed his M.B.A.



In 1976 he married the former Amy Lee, a Hong Kong student he met during his senior year while she was attending Simmons College in Boston. In 1977 he joined Continental Can Co. in Stamford, Conn., as a corporate finance analyst in international finance at the company's headquarters. He remained in the U.S. for approximately two years until the company opened an Asian Pacific Office in Hong Kong.

"I was fortunate enough to be promoted to regional finance manager," he says. "I was happy to return to Hong Kong, where I had relatives and where Amy's family was." The

Yees now have two sons, Nicholas, 17, and Curtis, 15, who attend boarding schools in Connecticut.

"In Hong Kong, I was responsible for financial evaluations of various joint ventures and acquisitions in the region," he says. "By 1984, Continental Can successfully established several operations and I was appointed commercial director for Continental Can Hong Kong Ltd. In 1986 I was promoted to deputy managing director, responsible for business development in China; three years later I was named managing director."

In 1992 Yee left Continental Can to form his own start-up company, Pacific Can Co. "The average American consumes 400 cans of beverages per year," he says. "In Hong Kong, that number is 130. I saw an opportunity to develop the beverage can market in China, where rapid growth was certain to

raise the current annual consumption rate of four cans per person. We specialize in aluminum soda cans. There are four major beverage companies in China: Coca Cola, Pepsi Cola, Jianlibao, a famous Chinese orange soda, and the internationally known Tsingtao Beer. Several other local companies are all trying to develop a position in China.

"In 1993, Continental Can Europe Inc. invested in Pacific Can and became our strategic partner. As CEO of my own company, I have the opportunity to develop new markets and grow with the Chinese beverage market. This

more entrepreneurial position is a natural extension of my professional career. Today, Pacific Can operates five joint-venture plants and is one of the four multinationally linked major can manufacturers in China."

Yee says the skills he gained through the Plan have helped him build his successful career in Hong Kong. "The Plan required that I think outside of the box' quite often," he says. "Because of that, I feel I'm better equipped to deal with flexibility, uncertainty and nebulosity. My project experience made me comfortable with uncertainty and gave me courage to take up challenges. That has helped me a great deal since graduation."

## Jon Anderson '75

BY ROGER N. PERRY JR. '45

When I entered WPI in 1971, I already knew I wanted to become a lawyer," says Jon Anderson of Montpelier, Vt. Now a partner in one of the 10 largest law firms in the state, Anderson was in the first class of freshmen to study under the WPI Plan.

Anderson says it was the Plan and his interest in studying engineering that drew him to WPI. "I interviewed several lawyers who said that every engineer they'd ever known who'd gone on to law school was a darned good lawyer. My parents also liked the idea of my having an engineering background, and my brother graduated in the Class of 1968. My dad, a guidance counselor, had heard about some interesting curriculum changes WPI was making. We came for a visit and I liked what I saw.

"I don't think I would have gone to—or stayed at—WPI but for the Plan. It was the way I wanted to learn. As time has gone by, I realize that I learn differently from other people. I learn by immersing myself in something, not really understanding it very well at first. Then I put it all together. The Plan seemed tailor-made for me."

Anderson majored in chemical engineering and used his projects to develop his knowledge of the law. "I did my IQP on the Watergate hearings, watching just about every hour of the proceedings on television," he says. "It was great for a future lawyer to see government trying to regulate a technical issue, in this case the wiretapping law, and then hearing people talk about why they thought their personal ethics entitled them to step outside the law."

He explored the relationship between U.S. and Russian foreign policy for his Sufficiency. "I'll always remember my advisor, Professor John Zeugner, saying, 'With your grades, people will understand that you know what you are doing as far as science goes. We need to do something that tells people you understand history and the humanities.'"

As a result of that discussion, Anderson

published a paper, "Royall Tyler's Reaction to Slavery in the South," in *Vermont History*. He informed every law school to which he'd applied about the publication. He says he likes to think the article played a role in his acceptance to Yale Law School, his first choice. While a law student, he published a note in the *Columbia Journal of Environmental Law* on the 1976 ruling by Department of Transportation Secretary William Coleman to allow the Concorde to land in the United States despite concerns about potential harmful effects on the ozone layer. He says he used his engineering background to evaluate the scientific data that had supported that decision. "Without my WPI education, I would have had no way of understanding all this," he says.

After law school, Anderson was accepted as a law clerk by a highly respected federal judge in Wilmington, Del. "During my two years as his clerk," he says, "the judge decided several particularly noteworthy cases involving chemical compounds, including the patent for crystallized polypropylene. Needless to say, this challenged my WPI background."

After that experience, he joined a Vermont law firm that wanted him to do public utility work. This later led to a position

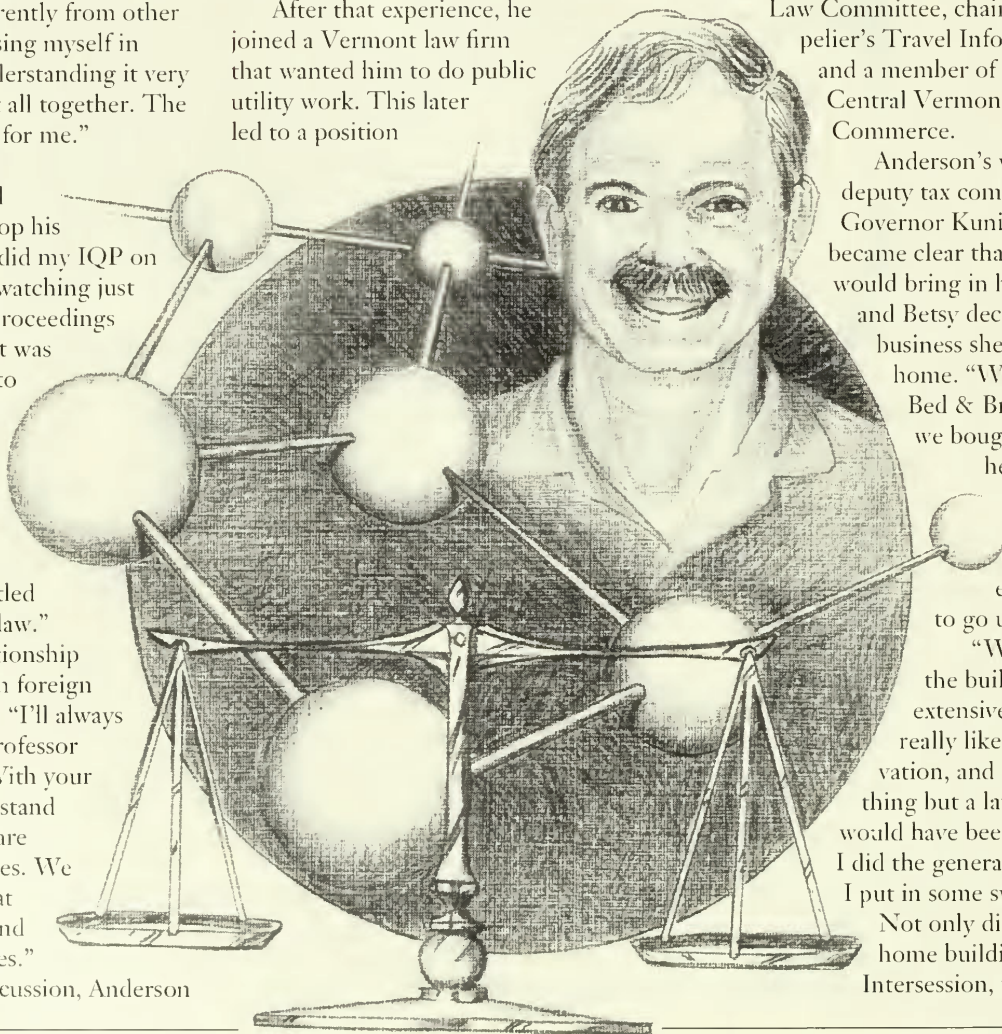
with the Vermont Public Service Department, where he represented rate payers in public hearings. "In 1985, Mike Burak, a former colleague at the PSB, invited me to join him," he says. "Initially, we were affiliated with a firm in Boston, but in 1990 we separated from them and recapitalized, forming Burak and Anderson. We now have nine lawyers. That may not seem large by big city standards, but in Vermont that's a large firm." Anderson specializes in environmental law.

"Starting a firm and building a practice from scratch is not something you learn in law school," he says. "I had to read a lot about the business of law, especially marketing, and approach it just as I did projects back at WPI."

Anderson has played a role in the political life of Vermont. He served as interim legal counsel to Governor Madeleine Kunin and for eight years was an elected alderman in Montpelier. He also served, by gubernatorial appointment, as the chairman of Vermont's Blue Ribbon Task Force on Hazardous Waste. Today he is chairman of the Vermont Bar Association's Environmental Law Committee, chairman of Montpelier's Travel Information Council, and a member of the board of the Central Vermont Chamber of Commerce.

Anderson's wife, Betsy, was deputy tax commissioner under Governor Kunin. When it became clear that a new governor would bring in his own staff, he and Betsy decided to create a business she could run from home. "We started Betsy's Bed & Breakfast in a house we bought in Montpelier," he says. "We opened with three rooms and we now have eight, with space to go up to 10 or 12."

"When we first saw the building, it needed extensive renovation. I really like historic preservation, and if I'd been anything but a lawyer, I probably would have been an architect. I did the general contracting and I put in some sweat equity, too. Not only did I learn about home building in WPI's first Intersession, when I took





Professor Ray Hagglund's short course, but opening the B&B was really another project. Once again, WPI's project-based education taught me how to learn."

## Virginia Giordano FitzPatrick '75

BY RUTH TRASK

The WPI Plan gave me the confidence to stand up for what I believe and to not be afraid to take risks," says Virginia Giordano FitzPatrick, president of CALC/Canterbury Corp., a personal computer training company headquartered in Morristown, N.J. "This extended to my disagreeing with my peers and defending my position whenever I believed my ideas were the way to go. Somehow, this tactic worked, especially when I made suggestions that had merit."

Evidently most of FitzPatrick's suggestions had merit. She is now holding the reins of a company that serves more than 3,000 clients from six locations in New York City and northern New Jersey, making it the largest PC trainer in the Manhattan metro area.

How did she become a "guru" of PC training? FitzPatrick attributes much of her success to what she learned through the WPI Plan. She was first drawn to the Plan because of its technical nature and its emphasis on projects. Working on projects forced her to develop the organizational and analytical skills that became the building blocks of her career.

For FitzPatrick, the road to the president's chair has been an around-the-world odyssey. She is married to John FitzPatrick '75, a civil engineer who owns and operates his own business, General Business Services, in Morris Plains. They both worked briefly

for Procter & Gamble as young graduates. "John then spent 10 years at Exxon in project management, and his career took us from New Jersey to England to Colombia and

the presidency of the company. Along the way, she has held nearly every position at CALC.

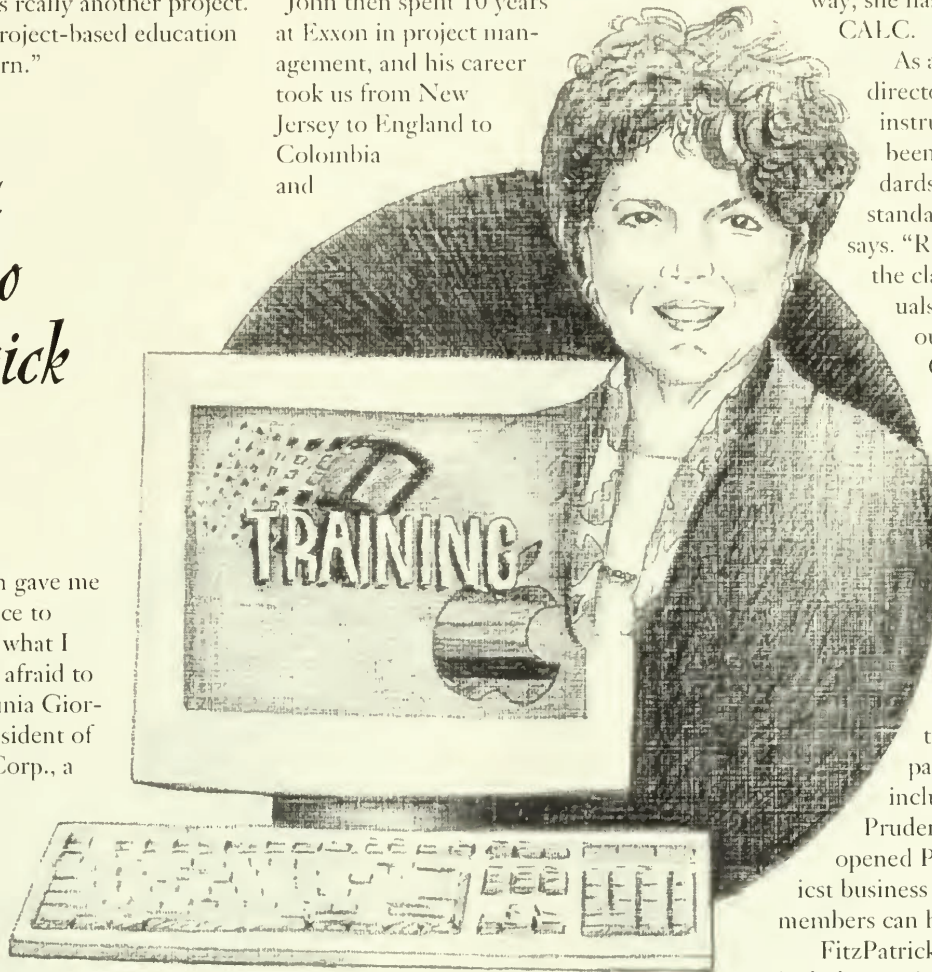
As an instructor and later as director of training, she developed instructional methods that have been adopted as industry standards. "One of my goals was to standardize training materials," she says. "Regardless of the software or the class, I wanted all training manuals to have the same style, layout and structure. Today, all CALC's training manuals adhere to my original courseware specifications."

In 1994, CALC was purchased by Canterbury Corporate Services, which develops a wide range of business-oriented training programs; FitzPatrick was named president of the CALC/Canterbury division. Since then she has concentrated on enhancing the company's service to its clients, which include AT&T, Sandoz and Prudential. For example, CALC has opened PC training centers in the busiest business sections of Manhattan so staff members can have easy access to courses.

FitzPatrick says her goals for CALC include opening additional training centers and expanding into distance learning and other leading-edge training techniques. "Within five years, I'd like to see CALC fully involved in alternative learning methods and offering additional services and training in all areas of business learning."

FitzPatrick says she calls on her WPI education often as she manages the company. "Sometimes it's rough getting points across to my colleagues and employees who do not have engineering backgrounds and project experience," she says. "They don't see things that someone with technical knowledge sees. To help them think things through, I often give members of my staff projects to carry out, not unlike the projects I did at WPI."

FitzPatrick says her WPI education prepared her well for the business world. She says she also benefited from the university's lopsided male-female ratio. Being in a decided minority "wasn't necessarily a bad thing," she says. "When I started my career, I often found myself in a similar minority. I received little respect or appreciation as a career woman, especially outside of the New



back again," she says. "Our daughter Cara, 16, was born in the U.S.; our son, Joey, 15, was born in England; and we adopted our daughter Linda, 10, while we were in Colombia."

Virginia and John enrolled at WPI just after the Plan had been introduced. In those inaugural years, students were allowed to choose whether or not they wanted to study under the university's still experimental undergraduate program. John chose WPI's conventional, pre-Plan curriculum. "He's a traditionalist and I'm more the free-wheeling type," she says. "We were fortunate that WPI offered each of us a curriculum so well tailored to our needs."

In the midst of her world travels, FitzPatrick spent nine years as a systems representative for Control Data Corp. She completed research and development work in computer-aided design that was used by the company worldwide. Back in New Jersey, she joined Computer Applications Learning Center (now CALC/Canterbury) in 1987 as one of the company's first part-time instructors; in less than a decade she would rise to

York-New Jersey area. Male colleagues usually didn't take me seriously until they learned I held a degree from WPI. WPI has a good reputation in the business world. That reputation has helped me throughout my career."

FitzPatrick says her husband's non-Plan education has helped him advance to head his own company. "We've been through two 10-year plans," she says. "For the first 10 years, John's career was primary and I followed him. For the second 10 years, John was the flexible one and I developed my career at CALC. We just celebrated our 20th wedding anniversary—the next 10 years we plan to share!"

## Steven W. Harvey '75

BY ALAN EARLES

Once I'd been at WPI for a short time I realized I didn't want to be a narrowly focused technologist," says Steven W. Harvey. Fortunately, the flexibility of the Plan and its emphasis on individual choice—the reasons Harvey chose WPI—let him chart his own course.

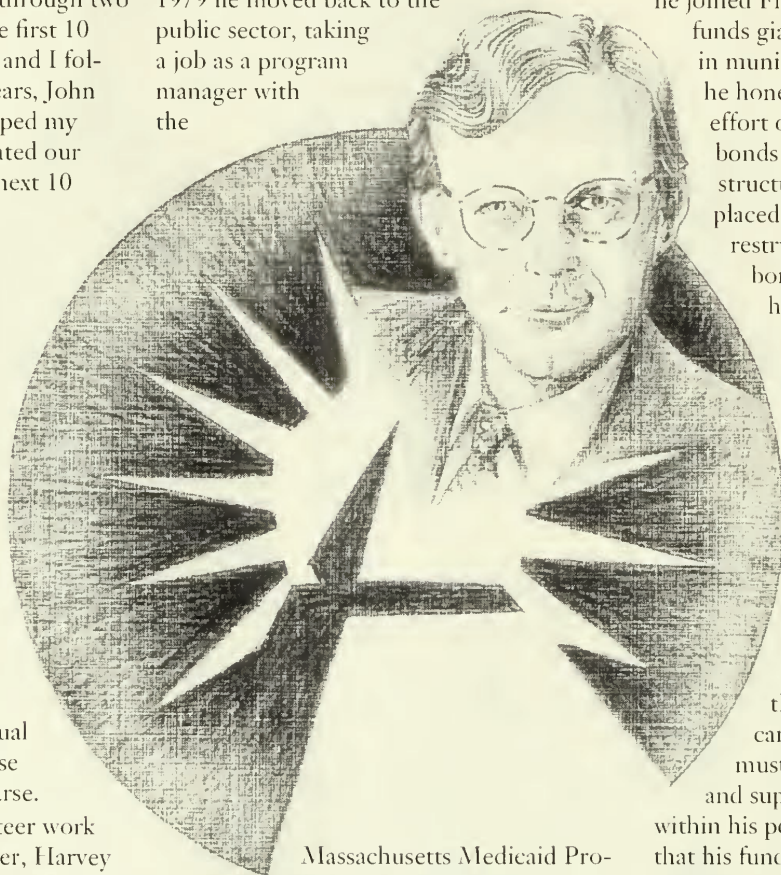
While doing paid and volunteer work with inner city youth as a teenager, Harvey became interested in city planning. Working within the urban planning program in WPI's Civil Engineering Department, he developed his own major in humanities and technology. For his Interactive Qualifying Project, he completed an internship at the Central Transportation Planning Staff, an arm of Greater Boston's Metropolitan Area Planning Council.

"That experience focused my interest on the process by which cities operate," he says. It also showed him another element of the reality of reshaping a city: "Underneath it all there was often a complicated financial issue," he says. "That was brand new to me."

After graduation, Harvey took "an immediate left turn, landing a job at Rounder Records in Cambridge, Mass. At the recording industry start-up, he found ways to apply his WPI education. As a small, closely held company, Rounder was up against stiff competition. At the time, its distribution arm was helping to support the

fledgling recording operations, but its geographic reach was limited. "It was purely domestic when I started," he says. "As distribution manager, I built international distribution, picked up some record labels, and increased sales."

But the positive experiences he'd had with the Plan kept tugging at him, so in 1979 he moved back to the public sector, taking a job as a program manager with the



Massachusetts Medicaid Program. "If I was going to make a career in government," he says, "I knew I would need training, but first I wanted to find out if it was really right for me." In short order, he was implementing one of the first managed-care programs in the nation for low-income families and setting up two demonstration projects based in neighborhood health centers.

"I saw—even more clearly—how crucial the financial side is in any public project," he says. It also became clear how few individuals in the public sector were equipped to understand and manage complex financial issues. Harvey decided to become one of them, enrolling in an M.B.A. program at the Wharton School of the University of Pennsylvania.

While there, he had the opportunity to consult for Philadelphia's director of finance. "I helped put together bond issues and bond deals—my first exposure to the municipal bond market," he says. The expe-

rience was an eye-opener—here was a challenging area, poorly understood by many in government, yet crucial to both day-to-day operations and long-term programs.

In 1983, Harvey joined Standard & Poor's Corp. as a municipal ratings officer. Three years later he moved over to the investment side of municipal finance when he joined Fidelity Investments, a mutual funds giant with extensive involvement in municipal instruments. For six years, he honed his skills, leading the research effort on all the tax-exempt health care bonds in Fidelity's funds. He also structured \$95 million in directly placed health care securities and restructured a \$12 million hospital bond holding and a \$31 million hotel financing.

In 1993, he graduated to portfolio manager at Fidelity. Today he manages five municipal bond portfolios totaling \$1.9 billion, including the \$1.1 billion Massachusetts Tax-Free Bond Fund. Like other fund managers, he is captain of his own ship on a sea that can often turn rough. Keeping his eye on the pulse of global financial markets and on the grassroots political forces that can upend funding programs, he must devise investment strategies and supervise active trading tactics within his portfolio. He notes with pride that his funds have bested 80 percent of his competitors' during his tenure.

His funds hold bonds that finance some of the country's largest construction projects, including the cleanup of Boston harbor and that city's "Big Dig." Harvey says, "Having an understanding of the engineering complexity of these mammoth projects helps me identify the best investment ideas."

But the real edge he gained from his WPI education comes from "having a technical background combined with a humanistic perspective." As a portfolio manager, Harvey must design and present marketing campaigns for brokers and retail clients. He is also called upon often to address a wide variety of groups involved in the bond market. "The attention I received at WPI from the humanities faculty sharpened my writing and communication skills tremendously. It has served me well throughout my career."

The thinking skills he gained as a WPI student also inform Harvey's day-to-day activities. He says the Plan gave him a tool-

kit for tackling virtually every challenge he has faced in the working world. "I have the ability to quickly break down every problem I face into its component parts," he says.

And as if that were not enough to make him think often of his alma mater, his current job provides him with a daily reminder of the Plan. "When I look out my office window, I can see the building where I did most of my IQP work."

## Eric Hahn '80

BY RAY BERT '93

If you asked him, Eric Hahn would probably tell you he's a "propeller-head," that he's been one ever since he was a kid goofing around with his first computer, and that in one way or another, he'll always be one.

He'd say it for two reasons. First, he is fully aware of his status in today's society as a 'computer geek', one of those people who make their living roving the world of code and networks as if they own the place (which they pretty much do). Second, he'd say it because he is the most self-effacing former CEO you're likely to meet. The guy who once described himself as "on the nerdy end of nerd," is now, at age 36, senior vice president of enterprise technologies at Netscape Communications Corp., one of the hottest, brightest stars in the computer industry.

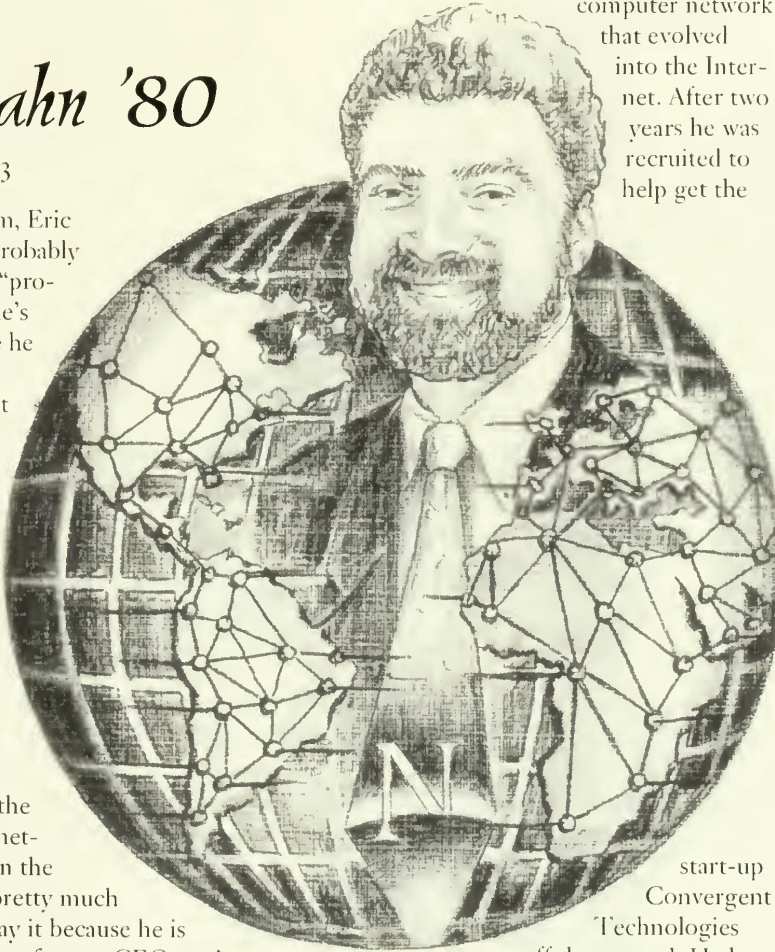
The WPI Plan was designed for people like Hahn—people who grab the system and wring out every last drop of potential, experience and insight it offers. "The Plan and I were very compatible," Hahn says. "The fact that it was less structured, with a project focus, worked well for me."

Much of what he learned through the Plan has been borne out by his experience or has influenced his own approach to the workplace. "I've never gone to the office Monday, Wednesday and Friday afternoon

with 200 people and been lectured to," he says. "The Plan's student/advisor model is a much closer representation of the workplace, and the project focus is much more like the reality of business."

When Hahn graduated from WPI in 1980, he took a job with Bolt, Beranek and Newman (BBN), a computer services company based in Cambridge, Mass. There he helped develop ARPANET, the nationwide

computer network that evolved into the Internet. After two years he was recruited to help get the



start-up Convergent Technologies off the ground. He became vice president and general manager of the server products division before departing in 1990 for cc:Mail, where he was vice president of engineering and, later, general manager.

Hahn's crowning achievement was the founding of Collabra Software Inc. in 1993. With Hahn as president and CEO, Collabra quickly became a major player in the burgeoning "groupware" market. Collabra Share™, introduced in March 1994, captured numerous awards, ranging from Groupware '94 Best of Show to *PC Magazine's* Editor's Choice to *PC Week's* Analyst's Choice. The product led to Collabra's selection that year as one of "25 Cool Companies" by *Fortune* magazine. Hahn, himself, was honored last fall by WPI, which pre-

sented him with its Ichabod Washburn Young Alumni Award for Professional Achievement. Collabra Software Inc. was acquired by Netscape in 1995.

Hahn made the most of his time at WPI. Finding the WPI computer system difficult to use, he wrote *How to Survive the PDP-10*, which "was required reading for freshmen until a new computer system was installed," he says. He co-authored one Major Qualifying Project in his first year and did a second, solo MQP for his degree requirement later on. He accomplished all of that in just two and a half years on campus.

"At WPI, you're much more successful if you can manage yourself—if you have a certain amount of self-directedness," he says. "That translates particularly well to the software industry, where you have to be able to lay out and organize your thinking without a lot of guidance and direct supervision."

Hahn has made leaps and bounds in his career, grabbing for new challenges whenever he felt a need to grow or change. And yet with all of his success, he remains a propeller-head whose eyes light up with the seemingly limitless possibilities of the technology. "I just love computers," he says. "They're the world's best blank sheet of paper."

Through hard work and his love of the field, Hahn has attained good measures of wealth and fame, yet he doesn't have to feign the ambivalence he projects about that aspect of his life. "I feel like I've done all the 'formal' career things that I want to do," he says. "Now I'm at a place in my life and my career where I want to optimize for the things that bring me real joy: working with technology and really bright people and spending more time with my family." (Hahn and his wife, Elaine, have two sons: Evan, four, and Jeremy, born this summer.)

What does Hahn think about the environment that today's graduates entering the computer industry face? "I really feel for the kids in school now," he says, "because the market is changing so quickly that no school can really keep up. So the important thing for students is to become well-rounded thinkers, which is obviously one of the core tenets of the Plan."

"What I appreciate most about my experience at WPI was that I got the chance to be an individual. My education was, to a large degree, designed by me, and I was responsible for it. I never felt like just some student ID number marching through a process to get to a finish line. There were bumps along the way and things that I did that were weird compared to most people's

experience, but that's part of what made my education my own, and I value that a lot. The Plan took a chance to let people be different and that's special—you don't get that everywhere."

## Elizabeth Mendez '86

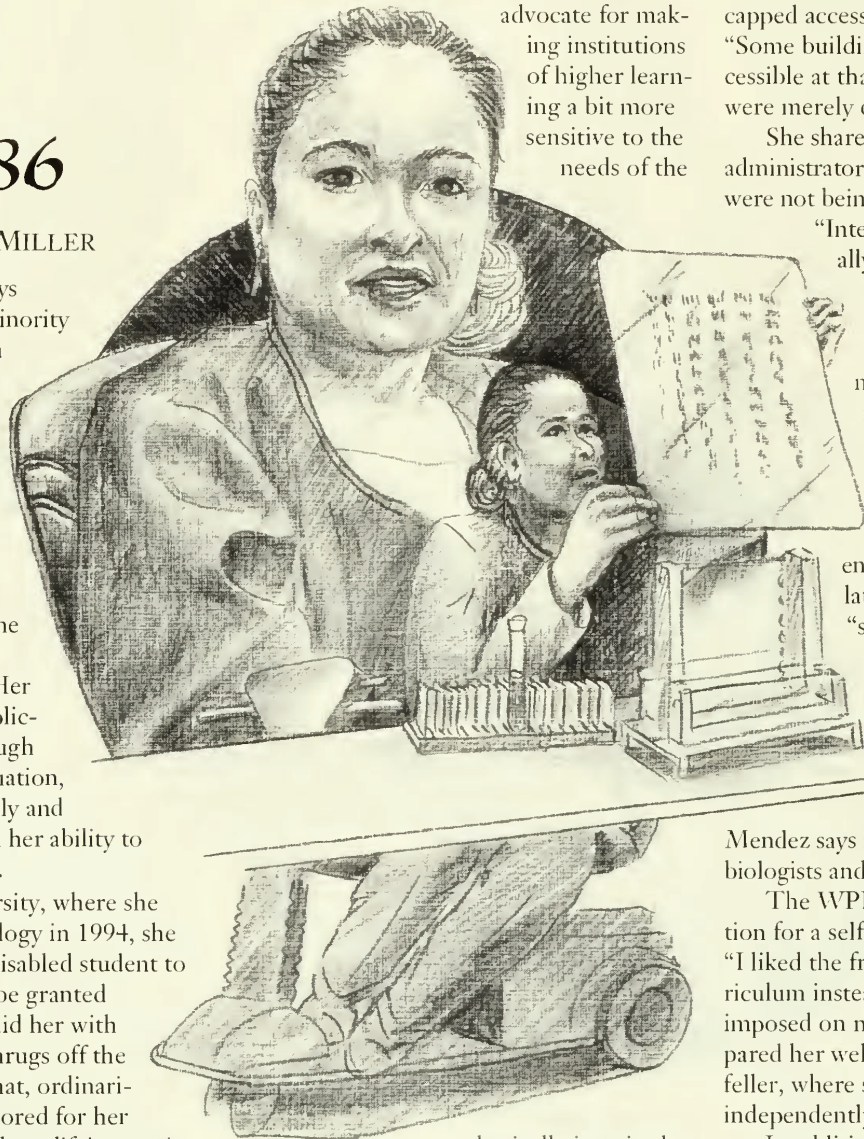
BY JOAN KILLOUGH-MILLER

I'm a triple threat," says Liz Mendez of her minority status as a Hispanic, a person with a physical disability, and a woman in the upper echelons of scientific research. Mendez is a postdoctoral fellow in the Department of Embryology at the Carnegie Institution of Washington, located on the campus of Johns Hopkins University in Baltimore. Her current interest is RNA splicing and processing. Although she can joke about her situation, she takes her work seriously and lets nothing interfere with her ability to do it without impediment.

At Rockefeller University, where she earned a Ph.D. in cell biology in 1994, she made history as the first disabled student to graduate, and the first to be granted funds for a technician to aid her with her scientific work. She shrugs off the distinction and explains that, ordinarily, a laboratory can be tailored for her use by lowering tables and modifying equipment so she can reach it from her wheelchair. In this case, some equipment could not be adapted, so an assistant was needed. "They understood the need for this," she says. "They were extremely accommodating and supportive."

Born with spina bifida—a neural tube birth defect—Mendez was an early advocate for handicapped rights. In San Juan, where she attended high school, she belonged to the Spina Bifida Association of Puerto Rico, and was once the island's Miss Wheelchair. "It gave me an opportunity to put forth to the general population that not all handicapped people are older or lethargic; many are active and able to contribute, if given the chance."

Today she lives out that message, sometimes giving lectures for the National Science Foundation on her experiences as a physically challenged person in the scientific community. "Because of my background, I have become a vocal advocate for making institutions of higher learning a bit more sensitive to the needs of the



physically impaired. There aren't many women who proceed down this path, and Hispanics are also severely underrepresented."

Mendez also sought to widen the path for ethnic minorities in the sciences by implementing a summer program at Rockefeller University that brought promising minority high school students into the lab as interns. Mendez is proud of her role in the program. Although she had a natural facility for science and knew early on that she wanted to study biology, she says she had no one to emulate.

She was one of the first handicapped students to attend WPI, at a time when there were few Hispanics and women were still relative newcomers. Rather than making

an issue of her differences or using them as an excuse, Mendez made her uniqueness an integral part of her academic program. For her Sufficiency project, she translated a classmate's original play from English into Spanish. For her IQP, she studied handicapped accessibility at four local colleges. "Some buildings at WPI were totally inaccessible at that time," she recalls. "Others were merely difficult."

She shared her findings with college administrators. When she felt her concerns were not being taken seriously, she took the "Interactive" part of her IQP literally, having able-bodied administrators take to wheelchairs to navigate their own campuses.

Mendez did her MQP in molecular biology, conducting research on the transport of small nuclear ribonucleic protein complexes (snRNPs) across the nuclear membranes of cells. The process ensures that introns (nontranslatable portions of RNA) are "spliced" from the coded sequence. If this does not occur, certain proteins produced by the cell are defective or absent. Although a link to a specific disease has not yet been established,

Mendez says it is still a hot topic among cell biologists and remains a pet interest of hers.

The WPI Plan provided an ideal education for a self-directed person like Mendez. "I liked the freedom to plan my own curriculum instead of having a set of courses imposed on me." She says that freedom prepared her well for graduate study at Rockefeller, where students are expected to work independently.

In addition to preparing her academically, Mendez says WPI provided good preparation for facing life as a triple minority. "I was fortunate to find many helpful, supportive people, including members of the administration and professors who were very giving of their talent, time and knowledge. I found no hesitation when I asked for a ramp or other accommodation.

"But because I was treated in such a nondiscriminatory way while I was at WPI, it made me a bit naive. When I moved on, I didn't expect to encounter problems. Still, my experience at WPI gave me the confidence to say, 'This isn't right,' when the issue of my disability or my being Hispanic was raised as a concern. I found I could

stand up on my own and say, 'Wait a minute, if this wasn't an issue for these folks, why should it be an issue for you?'"

## Stacey J. Cotton '90

BY JOAN KILLOUGH-MILLER

Fresh out of high school, Stacey Cotton dreamed of becoming an astronaut and designing the spaceships of the future. A strong student who enjoyed mathematics and science, she was steered toward engineering, although she knew little of the field. She chose WPI for its top-notch reputation and its small size.

The young woman from Norton, Mass., daughter of a nurse and a plumber, didn't know much about how one set out to become an astronaut. At WPI she found people who could point her in the right direction. She joined the Air Force ROTC and selected aeronautical engineering as her major; she excelled in aerospace science courses, maintaining an A average in her major. Her academic performance and outstanding leadership qualities won her membership in three honor societies, numerous awards, and a ranking as one of the top five Air Force ROTC cadets in the country.

After four years at WPI, Cotton was well on the way to fulfilling her dreams. She graduated with the gold bars of a second lieutenant on her sleeve, and tuition for graduate school in her pocket from an impressive number of military and athletic scholarships. She earned a master's degree in aeronautical and astronautical engineering at Stanford University, working with a team that published research looking toward a joint U.S.-U.S.S.R. mission to Mars.

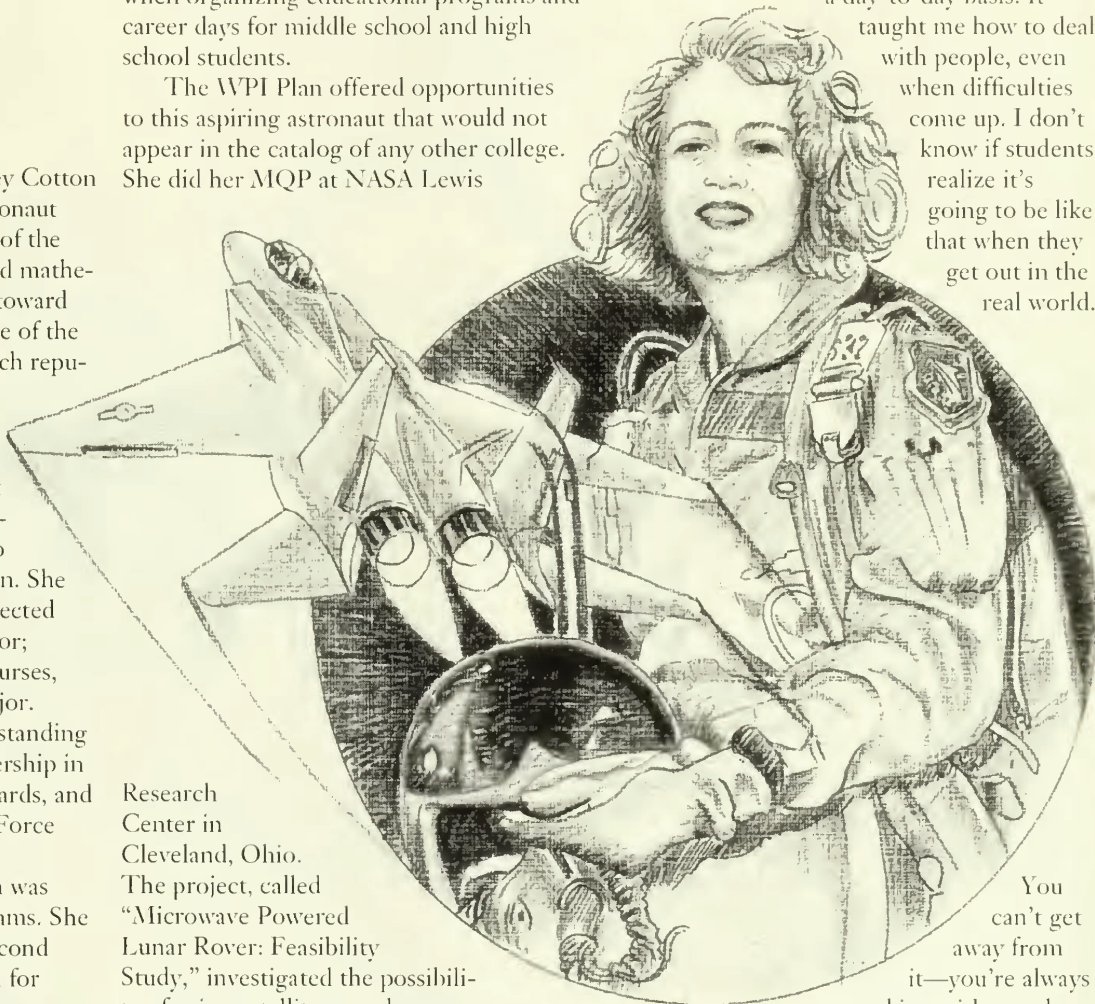
During a summer internship at the USAF Test Pilot School at Edwards Air Force Base, Cotton got "totally hooked" on flying. She applied for pilot training, then worked for two years at Rome Laboratory in upstate New York. She made captain in 1994 and earned her pilot's wings in 1995. To her delight, she was assigned to fly the F-15C, a single-seat fighter considered superior to anything in the sky. Stacey Cotton was flying high, on her way to becoming the third woman in the country to go into F-15C training.

Last year a medical problem grounded the young pilot and sidetracked her hopes of going into orbit. But Cotton's career has taken a new direction. As a public affairs officer, she reaches out to America's youth and inspires them to careers in aeronautics and the military. She is most in her element when organizing educational programs and career days for middle school and high school students.

The WPI Plan offered opportunities to this aspiring astronaut that would not appear in the catalog of any other college. She did her MQP at NASA Lewis

tations before the president and board of directors. "It builds your confidence and lets you know you're going to be ready when you get out of college. I think that's really important.

"The IQP was the first time I worked with a small group on such a big project on a day-to-day basis. It taught me how to deal with people, even when difficulties come up. I don't know if students realize it's going to be like that when they get out in the real world.



Research Center in Cleveland, Ohio.

The project, called "Microwave Powered Lunar Rover: Feasibility Study," investigated the possibility of using satellites to relay power to a remote module to explore the surface of the moon.

Her IQP gave her the opportunity to go abroad for the first time in her life. Working at the London headquarters of Ferranti International, an electronics and computer firm, her team explored the feasibility of establishing local work sites where employees could work by computer and avoid driving in London's horrendous rush-hour traffic. Cotton says the project was a terrific confidence builder.

"When you're 20 years old, going overseas, working in a major corporation right beside the president, executing his project... that was cool." The project called for an array of interpersonal skills—from the poise to conduct door-to-door and telephone surveys, to the self-assurance to make presen-

You can't get away from it—you're always working with people, no matter what job you're in. I use those skills everyday as an officer."

The WPI curriculum puts a lot of responsibility on its students, but Cotton says those challenges helped her develop self-reliance. "WPI treats you like an adult. The responsibility for the project rests on the student, not the professor. My professors were always there for guidance and help. But the professor doesn't just sit you down and tell you what to do. You have to come up with your own ideas, and work out your own game plan."

Perhaps the best learning experiences come about when things don't go as expected. When progress on a project runs into a brick wall, says Cotton, it's up to the student to find a way around it. "I think the WPI Plan has a unique way of teaching you how

to problem-solve and think in a logical way. You learn how to stop for a second, analyze the problem, come up with Plan B, and go for it."

So when a medical problem threw a roadblock in Cotton's career path, she was able to chart a new course. Although she is aware that the Air Force is strict about the physical condition of its pilots, she hopes to fly again. But if that is not possible, she wants to stay in public affairs. Accepting that reality was one of the hardest things she's had to deal with.

"Dreams die hard," she says. "But there are other dreams. It's just a matter of latching on to a new one."

## Jason S. Anderson '95

BY ALAN EARLES

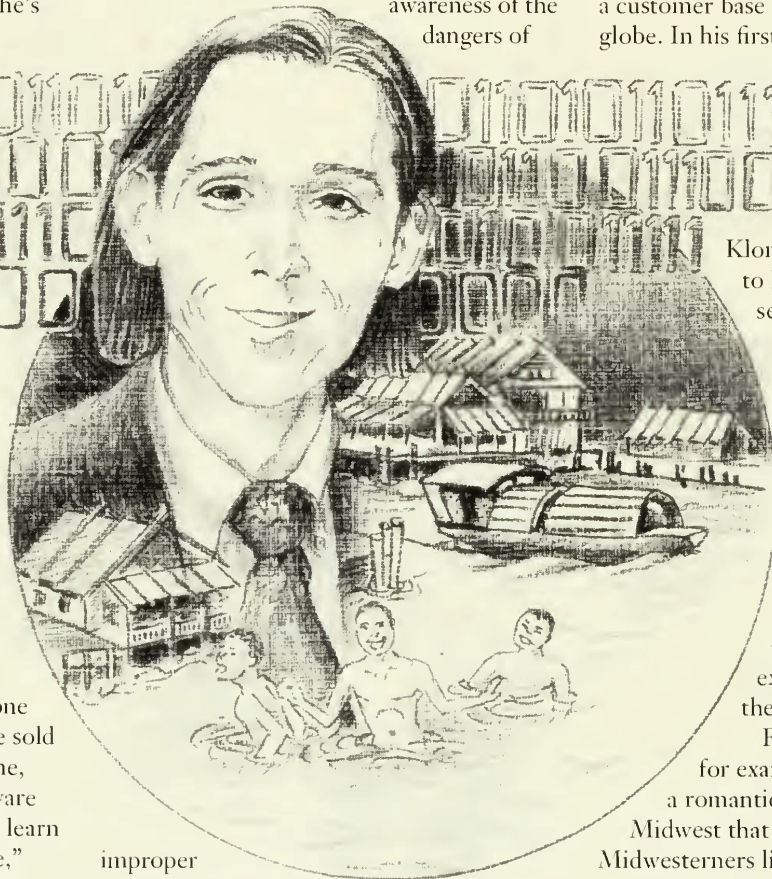
**H**ailing from Harry Truman's hometown of Independence, Mo., Jason Anderson began mastering grown-up technology at an early age. It wasn't long after he learned to read that he taught himself to write programs in BASIC on the Timex/Sinclair 1000, one of the earliest personal computers. He sold his first program, a space strategy game, when he was 12, and later wrote software for his school district to help students learn mathematics. "Some of it is still in use," he says.

Anderson, the valedictorian for his high school class, says the chance to roll up his sleeves and tackle real-world engineering challenges were part of what attracted him to WPI. But it was the opportunity to pursue an Interactive Qualifying Project (IQP) beyond WPI's campus that truly sold him on the WPI Plan. In fact, his IQP would take him a long way from the world he knew—half a world away, to the slums of Klong Toey, a section of Bangkok. Along with Sandra Davis '95, he spent seven weeks seeking solutions to the trash and pollution problems that degrade the quality of life for Bangkok's most impoverished residents.

Because trash collection in Klong Toey is so infrequent and trash collectors themselves so poorly paid, wastes tend to accumulate quickly and remain for long periods.

Indeed, the wheelbarrow-based collection system rarely manages to cover the entire area more than a few times a year. As a consequence, trash and refuse often block canals and drainage systems, contaminating water sources and providing a home for rats, cockroaches and other vermin.

Anderson and Davis put their analytical skills to work seeking ways to improve existing trash collection patterns, and started a community education program to raise awareness of the dangers of



improper garbage and trash disposal. Finally, the two offered suggestions for low-cost steps to improve sanitation, such as acquiring more trash barrels and fencing off disposal areas.

"Spending time in the slums was truly an eye-opening experience," he says. "Traveling to Bangkok to complete a project gave me a new perspective on the world. It let me spread my wings and forced me to adapt to and embrace another culture."

Today, Anderson puts the skills he learned in Bangkok to use in the fast-paced world of software development. Employed since graduation at Vivid Technologies Inc. in Woburn, Mass., a pioneer in advanced airport security systems, he has been part of the staff responsible for improvements to existing products and for the high-level design of new products.

Vivid's main product is an X-ray system with a high-performance, parallel-processing computer capable of analyzing 1,500 items of luggage an hour. Anderson says the computer's processing power and the software he helps develop give the system the power to accurately identify a wide range of bombs, explosives and other types of contraband.

Formed in the aftermath of the 1988 bombing of Pan Am Flight 103 over Lockerbie, Scotland, Vivid has developed a customer base that spans much of the globe. In his first year with the firm, Anderson's duties have often taken him overseas on short-deadline projects involving image-processing problems. After his experiences in Klong Toey, he says, adjusting to life in Rome or Brussels seems easy.

In just over a year with Vivid Technologies, Anderson has already served as the key designer for a product launched this summer and has signed his first patent application. But this success isn't due simply to technical savvy. He says he also draws on the diverse experiences he had under the Plan.

For his Sufficiency project, for example, he wrote a play—a romantic comedy about life in the Midwest that made clear that not all Midwesterners live on farms. "I was trying to demonstrate that you shouldn't assume anything about people; that you should try to be tolerant of differing opinions and cultures," he says. The experience helped him see that the humanities is an important pillar of the engineering profession and taught him to communicate his ideas effectively.

In his time away from the office, he has developed his own company, Andersoft Distributed Enterprises, that serves as a consulting group for a variety of software design and development projects, including screen savers, World Wide Web page layouts, network utilities, and product pricing and forecasting applications. The company's flagship product, PriceADE, set for release this fall, provides small businesses with the tools necessary to accurately set prices for their products and services based upon production expenses and desired profit margins.

But Anderson says even the launch of his own software firm is merely a step in a bigger process—one that began back in Independence with that T/S 1000 computer. “My long-term thinking,” he says, “is that I’ll probably return to school in another year or so to work on an M.B.A. or perhaps a doctorate in computer science.” For now, though, Anderson is keeping busy with a career going very much according to Plan.

## Antonio J. Delgado '96

BY BONNIE GELBWASSER

Antonio José Delgado Parra came full circle when he returned to Venezuela this summer to begin his career as a development engineer with Shell Oil Co. in Maracaibo. The second oldest of four children of a cab driver and a secretary, Tony Delgado grew up in Maracay, a city of about 2.5 million people located about 50 miles southwest of Caracas.

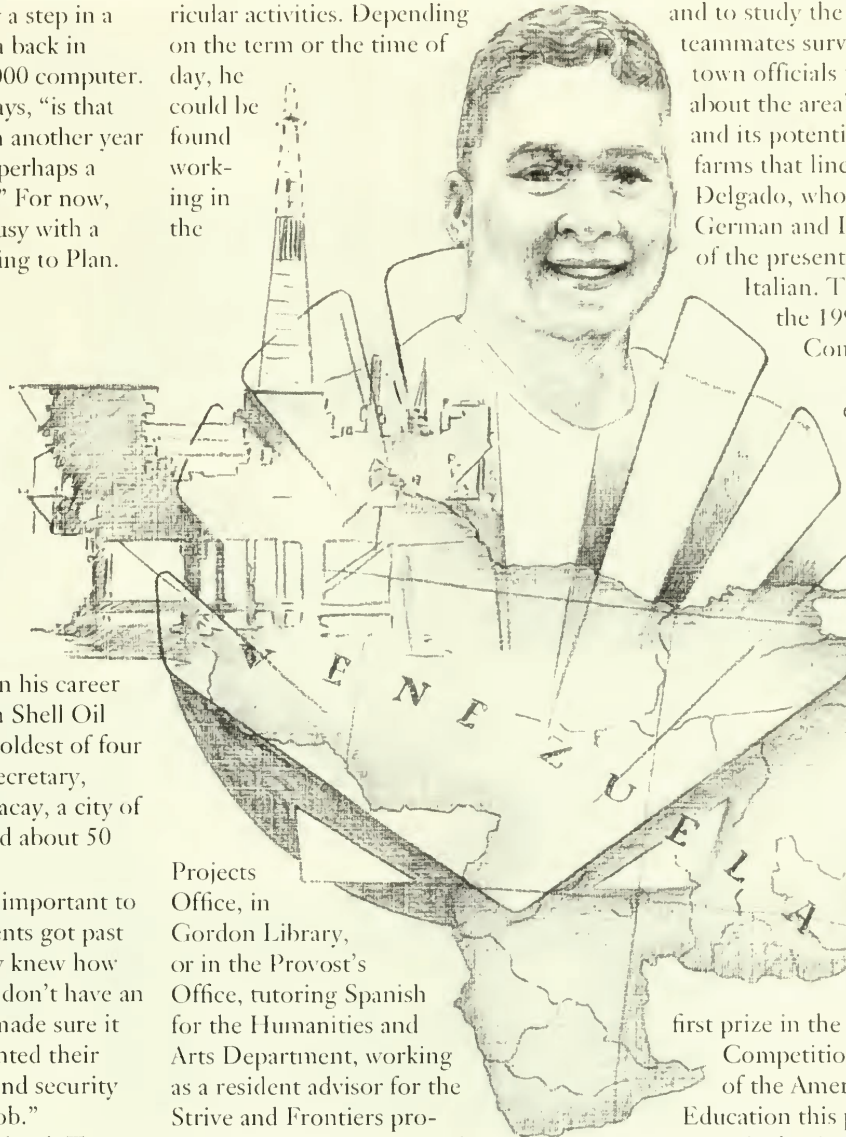
Education has always been important to his family. “Neither of my parents got past high school,” he says, “but they knew how hard life is out there when you don’t have an advanced education, and they made sure it did not happen to us. They wanted their children to enjoy the comfort and security of a well-paying, professional job.”

In his senior year of high school, Tony was among 3,500 students selected by Fundayacucho, a Venezuelan institution funded by the government, to compete for scholarships to colleges and universities throughout the world. The program requires recipients to work in Venezuela for two years after they graduate from college. Delgado was one of only 250 to receive the scholarship.

In September 1991, he left home to spend a year learning English at the Colorado School of Mines. The people at Fundayacucho and LASPAU (the Latin American Scholars Program at American Universities), which administers the scholarships, suggested WPI because of its project program. “I wanted an interactive program,” he says. “One that would give me a lot of experience in the workplace as well as the classroom.”

Energetic, enthusiastic and curious about everything, he quickly immersed him-

self in his courses, in work, and in extracurricular activities. Depending on the term or the time of day, he could be found working in the



Projects Office, in Gordon Library, or in the Provost's Office, tutoring Spanish for the Humanities and Arts Department, working as a resident advisor for the Strive and Frontiers programs, or serving as a member or an officer in the Hispanic Students Association and the Society of Hispanic Professional Engineers (he was HPE president during his senior year). During his four years on campus, he also managed to take part in two award-winning projects in two countries at opposite ends of the globe and to add two new languages to his repertoire.

“After I started working in the Projects Office,” he says, “I saw all these people going out of the country to do projects and I thought, ‘This is something I would like to do.’” Through the Global Perspective Program, he was able to do his Interactive Qualifying Project (IQP) in Innichen, on the border between Italy and Austria, and his Major Qualifying Project (MQP) at the University of Puerto Rico in Mayaguez.

In the summer of 1994, six students in two teams traveled to San Candido, on the Italian side of Innichen, to examine the fea-

sibility of establishing a WPI project center and to study the impact of tourism. The teammates surveyed farmers, tourists and town officials to find out how they felt about the area’s growing tourist industry and its potential impact on 26 mountain farms that line the slope above the town. Delgado, who had taken courses in German and Italian at WPI, gave his part of the presentation to town officials in Italian. The project was a finalist in the 1994 President’s IQP Awards Competition.

One year later, he traveled to Puerto Rico to do one of the first MQPs completed at the University of Puerto Rico, Mayaguez. As part of a four-person team, he undertook a bench-scale study of the bioremediation of petroleum-contaminated sand. The project focused on bioaugmentation and biostimulation as a way of enhancing the removal of total petroleum hydrocarbons. The project, sponsored by BFI, won first prize in the Student Technical Papers Competition of the Northeast Region of the American Society of Engineering Education this past spring.

As he begins his career back home, Delgado says he is excited to be returning to his family and friends and is ready for the challenges of being one of the first employees hired by a company anxious to make its mark on Venezuela’s economy. “Venezuela is one of the world’s largest oil producers and exporters,” he says. “The country’s oil industry was nationalized in 1975, but in recent years the government has begun offering concessions to encourage companies to establish businesses there.”

Shell responded and is recruiting many new people to work in Venezuela on the company’s new zero-spill platform in Maracaibo Lake. “More than anything else,” he says, “WPI taught me how to solve problems and get results. I learned how to be a professional, to not only analyze a problem from an engineering perspective, but see the social implications and the environmental impact of technology. I am ready to start my new job.”

# 2020 Foresight

**EDITOR'S NOTE:** Last year, the WPI community received a challenge from the committee planning a campus celebration of the 25th anniversary of the WPI Plan: in a scholarly essay, describe the state of the university 25 years into the future. Several individuals peered into their crystal balls and wrote brief abstracts about what they saw. The committee invited five of these authors to expand their visions into full-length papers, which were presented to the community in a panel discussion on April 23, 1996. The papers can be found on WPI's Web site, <http://www.wpi.edu>. Select "Information" from the home page, then click on "Events," then "Major Events & Celebrations," and finally, the Plan's silver anniversary page. The following article provides an overview of the invited papers.

**S**ome 25 years ago, realizing that the time for change had come, some forward-looking sculptors chiseled the last vestiges of Victorian educational trappings from the WPI curriculum and molded it into the WPI Plan (see story, page 4). The Plan turned the curriculum upside down, and in the process, greatly enhanced the reputation and stature of the university.

Before they could create the Plan, the faculty Planning Committee had to take careful stock of where WPI and the world stood in the late 1960s and peer into the future to determine what kind of institution WPI should become to best meet the needs of students and society in the decades to come. Before crystallizing their ideas into the Plan, they drafted 12 quite different visions of WPI's future.

As the university celebrated the 25th anniversary of the Plan, it seemed an apt time to peer ahead, once again, to see what the next 25 years might bring. In five remarkable papers, the winners of an open

What will WPI be like 25 years hence? Will it provide a higher quality of campus life for its students? Will it use modern technology to build "virtual worlds" to help students learn? Will it make sensitivity to the environment an integral part of its curriculum? Will it be a downsized, but better and better-known institution? Will it steer aspiring engineers toward a professional master's degree? Here are five very different visions of WPI's future.

BY RUTH TRASK

competition held in conjunction with the campus observance of the Plan's silver anniversary offered quite diverse forecasts for the coming quarter century. Like the framers of the Plan, they have evaluated WPI's current strengths and weaknesses, and formulated plans to help the university continue to flourish in an increasingly turbulent world.

The authors are Diran Apelian, Howmet Professor of Mechanical Engineering, director of the Metal Processing Institute, and former provost and vice president for academic affairs; James K. Doyle, assistant professor of social science and policy studies; Colleen J. Fox '97, an electrical engineering major; Roger S. Gottlieb, professor of philosophy

and Paris Fletcher Distinguished Professor of the Humanities and Arts; and John F. Zeugner, professor of history and director of WPI's Asian project programs.

**I**n her paper, Colleen Fox says the university needs to shore up its learning environment so students today and 25 years from today can make the most of their WPI education. "The college community has always played an important role in a student's ability to learn," she says. "As a student and residential hall assistant, I have seen how a comfortable, learning-based environment can foster productive students who are satisfied with their lives academically and personally. I have also seen how the wrong environment, including overcrowded dorms and thoughtless neighbors, can lead to dissatisfaction."

Since community living is most highly focused in residence halls, the architecture of these buildings is of paramount importance, she notes. "A well-designed dormitory can add much to a stu-

dent's academic and social growth," notes Fox, who says she believes that refurbished residence halls can attract more students, a larger percentage of whom will elect to live on campus. The result will be a tighter-knit, more family-like community.

But WPI needs more than a face-lift, she says. "It needs the campus center promised long ago in the WPI Plan and which is only now being funded. When prospective students tour our campus after visiting other colleges, they immediately notice the absence of a social center. The lack of a center does not improve our image or help draw new students."

Although students, faculty members and guests will eventually socialize in a beautiful new campus center, Fox suggests that a more immediate way for WPI to build a sense of community would be to bring back



*"When prospective students tour our campus...they immediately notice the absence of a social center. The lack of a center does not improve our image or help draw new students."*

Colleen Fox



the Goat's Head Pub. "Years ago," she says, "the Pub was a popular place for faculty and students to unwind together while discovering the pleasures and excitement of good conversation."

Fox says WPI should not underestimate the educational value of the kinds of interactions faculty members and students could enjoy at a campus center or a pub. If nothing else, she says, students and their mentors would get to know and understand each other better. "It would be hard for prospective students to overlook that kind of unity."

James Doyle, in his paper, notes that WPI may be on the verge of losing its uniqueness in the technical education community, as other universities move to adopt changes not unlike those WPI pioneered 25 years ago. Even the Interactive Qualifying Project, perhaps the most innovative element of the WPI Plan, is being looked at as a model of what other techno-

logical universities should strive to accomplish in the new millennium.

As its competitors move to implement project-based curricula, Doyle says WPI must blaze a new trail to assure the continuation of its leadership role in higher education. That new trail, he says, might take the university to some "virtual worlds," a term Doyle uses to describe computer-simulated learning environments. To succeed in the 21st century, he says, WPI must provide students not only with the best technological education possible, but with the best in educational technology.

The idea of learning through virtual worlds borrows from the theory and technology of computerized simulations that are used today to train people to run such complex machines as nuclear power plants and jumbo jets. Simulators, he notes, enable operators to experience and learn from situations that may be too dangerous or costly to reproduce in real life.

Doyle says there are manifold advantages to learning through simulations. They include the ability to present students with controllable, easily completed experiments that can be reversed, if necessary, making it easier for students to learn from their mistakes. Virtual experiments can also be interrupted, eliminating the time pressure that can degrade real-life decision making. And virtual worlds can collect years of simulated experience that can be easily retrieved.

"System dynamics software provides a universal language for representing systems in domains ranging from science to technology to social problems to economics to environmental science, making it particularly well-suited for WPI's interdisciplinary and interactive studies," he says.

Doyle says virtual worlds have the power to significantly improve undergraduate education, which is still dominated by the passive classroom lecture. He says a better method of teaching lies in the combination of virtual world simulations with two emerging educational practices: cooperative learning and learner-directed learning. In cooperative learning, students work together in small groups to solve problems. In learner-directed



James Doyle

*"System dynamics software provides a universal language for representing systems in domains ranging from science to technology to social problems to economics to environmental science, making it particularly well-suited for WPI's interdisciplinary and interactive studies."*

learning, students share responsibility with the instructor for the pace and direction of the educational process. The use of computer simulations enhances both processes, he says.

If WPI does not take current and future environmental challenges seriously, it should not claim the right to represent itself as a legitimate site for the training and evaluation of young professionals, Roger Gottlieb writes in his paper. "How can WPI be worthy of flourishing if it does not recognize its moral responsibility to our civilization and our species and also integrate its programs into the industrial and govern-

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2020 FORESIGHT (Continued)

mental structures which are the ultimate sources of its support?" he asks.

Gottlieb says the world is in environmental peril. Among the crises it faces are the destruction of its rain forests, the shrinking of the ozone layer, the threat of global warming brought on by use of fossil fuels, the polluting of air, land and water by toxic wastes, and the decimating of animal species due to the elimination of their natural habitats. Also looming are the "dismal prospect" of engineered life forms and the "potentially catastrophic" creation of insufficiently tested organisms through genetic engineering.

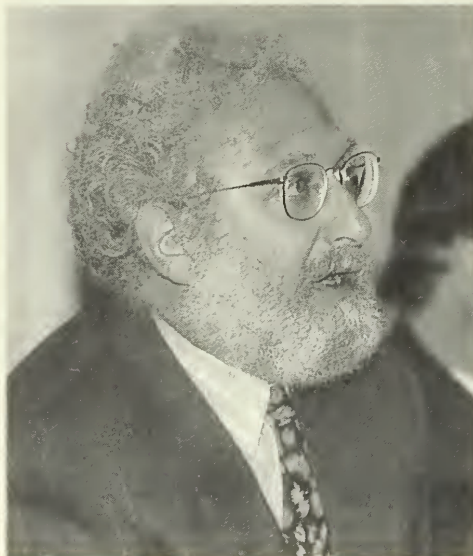
Many of these environmental problems have come about, Gottlieb claims, because people tried to make the world "better." For example, he says, engineered miracle seeds, chemical fertilizers and pesticides were introduced in Third World countries to vastly increase agricultural output. The result has been poisoned soil, destabilization of water usage, and the loss of crops. In short, when the engineers tried to fix things, they chose to dismiss the traditional practices of local peoples and turned instead to "expert scientific advice."

In the light of this scientific and moral dilemma, WPI must make some fundamental changes in its curriculum, Gottlieb notes. First, it should publicly acknowledge the severity of the environmental crisis. Second, it should provide its students a context in which they will be less likely to unemotionally skip over news stories about environmental problems, believing that such problems have easy, technological answers. Gottlieb says he tries to accomplish both objectives in his course titled "Philosophy and the Environment." Sometimes the results can be quite profound. Noted one of his students, "I'm not sure I can go on with what I'm supposed to do in this life. If I start to cry, I might never stop."

If a WPI education is to measure up to the challenges of a world threatened by environmental destruction, students must be taught to think of engineering problems in their full complexity, Gottlieb says. Awareness of the moral consequences of technological developments—as well as of their inevitable ties to forms of political and eco-

*"How can WPI be worthy of flourishing if it does not recognize its moral responsibility to our civilization and our species and also integrate its programs into the industrial and governmental structures which are the ultimate sources of its support?"*

Roger Gottlieb



nomic organizations—must be considered essential for a professionally competent engineer, scientist or manager. "The abstract education that forgets the social conditions in which environmental problems arise is simply not adequate for the tasks before us," he concludes.

**I**n industry, "downsizing" has become a frightening word for employees. "But if it's done right," John Zeugner says, "it can bring long-term benefits not only to industry, but to colleges seeking to redefine themselves in an ever-changing world."

Zeugner says WPI will very likely cease to exist in a society in which income distribution is increasingly skewed, with more and more wealth being controlled by fewer and fewer people, and where job security—espe-

cially at the entry engineering level—has become a thing of the past.

Acknowledging, however, that the celebration of the WPI Plan's 25th anniversary would not support a paper detailing the demise of the institution, Zeugner instead speculates that to survive WPI will have to steer away from its traditional role of educating students at the bachelor's level for entry-level jobs and redefine its mission to encompass a more exclusive set of functions. These might include an educational program tailored to graduate study in five particular fields—new materials engineering; social analysis of safety; cognitive science and artificial intelligence; technology, management and entrepreneurship; and bio/chemical/medical engineering—all within the dominant focus of ever increasing ecological concerns.

Before this grand design can be implemented, however, he says WPI will automatically undergo declining enrollments, in part due to the shrinking pool of students who come from families that can afford an education at a private university. After a year or two of this natural downsizing, WPI should step in and voluntarily and aggressively "downrightsizing" the student body, Zeugner says. "By that time, downsizing by choice will seem proper, brilliant and necessary, and it will be happening anyway."

Ultimately, "downrightsizing" should enhance the quality of incoming students and permit more generous forms of financial aid, he says. He envisions that WPI will make available to all students an expense-free fourth year through a revolving loan program that can be repaid after graduation at a low interest rate or waived entirely should a student qualify for entry into WPI's master's programs. These programs would be available to them after their third year at WPI because by then the university will have added required fifth and sixth terms each year. "Enrolling students would, therefore, have a powerful incentive to go on for their master's degree after personal expenditures for only three years of prior education," he says.

Despite the drop in enrollments and the initial worry by the faculty about decreased opportunities for tenure, Zeugner says he believes the college, given its recast graduate programs, would be able to survive the changes intact. "The angst downrightsizing

will cause among faculty members will be alleviated somewhat by the possibility of Satellite Center 'pasturing' of faculty unwilling to take retirement," Zeugner says.

With appropriate downsizing, by the year 2020 WPI will have shrunk to a manageable undergraduate population of about 1,400, he predicts. All students will be going to school nearly full time, studying under the guidance of world-class scholars hired by the college, and looking forward to graduating with their master's degrees within four years.

In the next century, following thoughtful downsizing and upgrading of the curriculum, WPI will savor a reputation and stability and prominence well beyond anything it has ever known, Zeugner believes. "The time to start downrightizing is not tomorrow, not next year, but today."



John Zeugner

*"By that time, downsizing by choice will seem proper, brilliant and necessary.... The angst downrightizing will cause among faculty members will be alleviated somewhat by the possibility of Satellite Center 'pasturing' of faculty unwilling to take retirement."*

One way for WPI to compete and to expand its leadership role in engineering education in the future is to offer a professional master's degree program," notes Diran Apelian. "As we examine the professions, including engineering, law and medicine, we find that with the exception of engineering, all have a professional terminal degree." For most undergraduates interested in careers in engineering, the professional master's would supplant the bachelor of science as that terminal degree, Apelian says.

Since World War II, the U.S. has been transformed from a defense-oriented to a commercial/industrial economy, a transition viewed with concern by the members of one of WPI's industrial consortia, the Aluminum Casting Research Laboratory, Apelian says. The consensus of the aluminum casting industry, he notes, is that to keep in tune with a changing world, WPI's curriculum should include exposure to organizational behavior, finance and management, and global issues, and should provide students opportunities to engage in industrial internships.

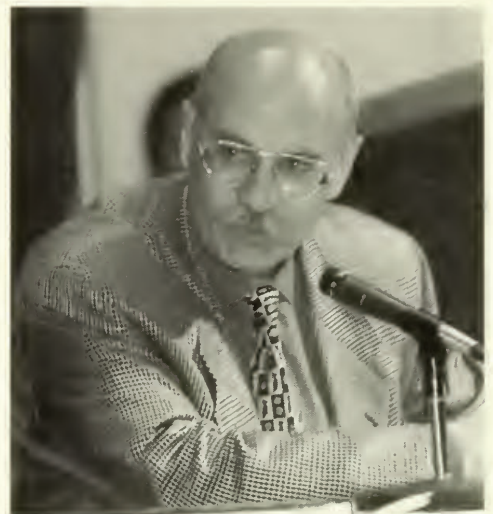
"It is expected that our graduates will assume leadership posts in industry, so it is imperative that they have a knowledge of the workings of organizations and the world of commerce," Apelian says. "I am not suggesting that our engineering graduate students should also be M.B.A.s. However, rather than viewing these two disciplines as separate cultures, we should look at them as points along a continuum."

To bridge the gap that often exists between higher education and industry, Apelian proposes that WPI institute a five-year professional master's intended as a terminal degree, not necessarily as the first step toward a research-oriented Ph.D. Besides taking the basic courses in their discipline, students in this master's program would be required to take courses with a focus in processing or design, skills eagerly sought by industry. To gain depth as engineers, students would also be encouraged to take courses in departments beyond their home department.

A major requirement of the professional master's degree would be a design project encompassing a full academic year. While tackling this complex, real-world project, students would take part in industrial clinics—programs where high-level practitioners would pass on their knowledge to students and their faculty advisors.

*"Our graduates will assume leadership posts in industry, so it is imperative that they have a knowledge of the workings of organizations and the world of commerce."*

Diran Apelian



Though he champions the professional master's as the terminal degree for engineers, Apelian says WPI should continue to offer its four-year accredited bachelor's degree programs in engineering for students who may want to pursue a Ph.D. or who plan to use their engineering degree as a stepping stone to other professions, for example law and medicine. He says the bachelor's curriculum should be revamped to allow time for exposure to subjects like management, manufacturing, and technology and society. "Such a B.S. degree has the possibility of developing into the liberal arts degree of the 21st century," Apelian says.

Apelian predicts that as the professional master's becomes more widely adopted, and as acceptance grows for the notion that entry to the professional practice of engineering begins with the receipt of a master's degree, engineering will enjoy increased prestige in the eyes of the public. And anything that enhances the engineering profession bodes well for the future of WPI, he says.



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