

OCTOBER / NOVEMBER 2001

UMaine Today

CREATIVITY AND ACHIEVEMENT AT THE UNIVERSITY OF MAINE

**Music of
the Holocaust**

**Shawn Walsh on
What Matters Most**

**'Ice Man' Seeks
Climate Clues**

\$4.00

From the President

FOR MORE THAN 130 YEARS, The University of Maine has been making a huge difference. As one of the nation's oldest land-grant universities, UMaine has significantly improved the lives of generations of Mainers through education, research, and public service outreach. UMaine graduates, UMaine inventions, and UMaine ideas have made an impact across the nation and around the world.

That's no exaggeration. And the reason we have been so successful goes right back to the legislation that founded us. The Morrill Act of 1862 is considered one of the most progres-

sive and successful legislative acts in American history. The Morrill Act's purpose was truly revolutionary: to make higher education accessible for the very first time to all qualified persons — regardless of their background and economic status — and to use the powerful new knowledge discovered by the faculty to benefit society.

The benefits have been many. New ideas, technologies, products, and public policies have resulted from the people and purpose of the nation's land-grant schools. So too have advances in education, health care, environmental protections and other conditions related to our quality of life. The impact of the Morrill Act, both in Maine and across the country, has shaped the nation — and the world, for that matter — far beyond what proponents Justin Morrill and Abraham Lincoln could ever have imagined.

Today, 75 land-grant institutions exist among the more than 4,000 colleges and universities in the U.S. As one of those 75 schools, UMaine continues to integrate learning, discovery, and public engagement to address Maine's most urgent needs, but now it does so in a 21st-century context.

This new publication, *UMaine Today*, is but one of our University's efforts to illustrate its continued importance — and its accountability — to Maine and its people. Each issue of the magazine will showcase the creativity, achievement, and broad contributions of our students, faculty, and staff. And because of their efforts — undertaken daily both on campus in Orono and throughout the state — they help Maine increase its attractiveness and future as a place to live, work, and raise a family.



Photo by Monty Rand

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Located in Orono, Maine, The University of Maine is the state's land-grant and sea-grant institution. UMaine serves its home state through its explicit statewide teaching, research, and public service outreach mission. Offering 90 four-year, 61 master's, and 24 doctoral degree programs, UMaine provides the most varied and advanced selection of programs available in Maine. The Carnegie Foundation for the Advancement of Teaching classifies UMaine as a Doctoral Research Extensive university, the highest classification.

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Children need high-quality friendships. One best friend can mean the difference between a happy childhood and one filled with loneliness.

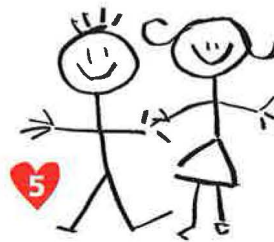


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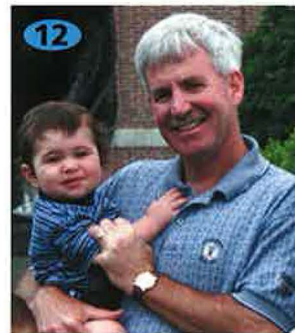
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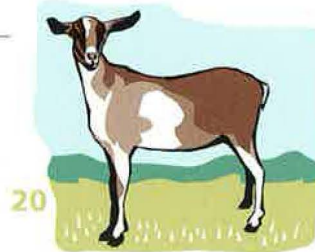
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Dana Humphrey's extensive research and consulting work with state transportation and environmental protection officials coast to coast has earned him a nickname — "Dr. Shred."

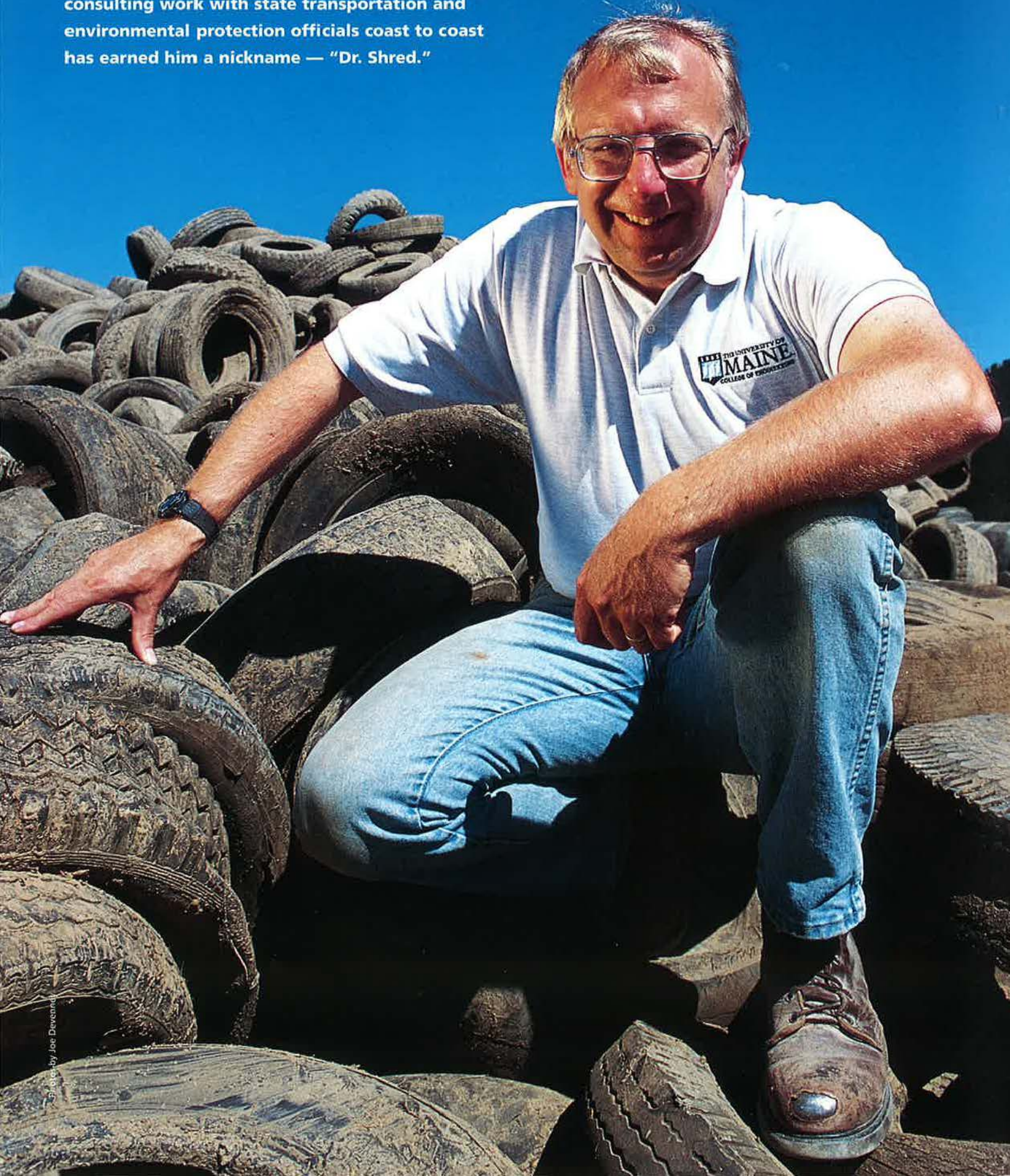


Photo by Joe Devenne

On the Road Again

UMaine Researcher Finds Valuable Uses for Old Tires

DANA HUMPHREY LIKES IT when the chips are down. It means that one more stockpile of old tires is no longer an eyesore or taking up space in a landfill.

Humphrey is the nation's leading expert on the use of tire chips in civil engineering projects. For the past decade, The University of Maine professor has studied the uses of shredded tires as a durable alternative to conventional materials — such as soil and gravel — in the construction of roads, drainage areas and retaining walls.

Humphrey's extensive research and consulting work with state transportation and environmental protection officials coast to coast has earned him a nickname — "Dr. Shred."

"Civil engineering is not just to discover something new but to put what is discovered into practice," says Humphrey. "My technology is about solving engineering and environmental problems by reusing tires and saving money."

Each year in this country, more than 270 million used tires are discarded, according to the Scrap Tire Management Council of the Rubber Manufacturers Association based in Washington, D.C. Approximately 84 percent of all scrap tires come from passenger cars.

In Maine, the state Department of Environmental Protection estimates that there were 30 million old tires in abandoned stockpiles in the woods when Humphrey began his research 11 years ago. After this year's tire shred construction projects, only one pile with greater than 1 million tires will remain.

"Maine had more stockpiled tires per person than any other state. Today, with the Maine Department of Transportation (MDOT), Maine Turnpike Authority, Maine Department of Environmental Protection (MDEP), and UMaine working together, the state is headed toward cleaning up all its stockpiles," Humphrey says.



"Maine had more stockpiled tires per person than any other state. Today, with the Maine Department of Transportation, Maine Turnpike Authority, Maine Department of Environmental Protection, and UMaine working together, the state is headed toward cleaning up all its stockpiles."

Dana Humphrey

In 1990, MDOT funded UMaine's first laboratory study of tire shreds for use as lightweight fill. The results were so promising, shredded tires were used as an insulating layer in a section of roadbed in Richmond, Maine.

"It was a success for Richmond," a small town just south of Maine's capital city, Augusta, Humphrey says. "The road had to be stabilized so that people could get home during spring melt."

"Temperature measurements showed the tire chips provided insulation that kept frost

from penetrating into the ground in the winter. Twelve inches of tire chips did what 24 inches of conventional construction material — gravel — could not."

Experiments continued, including the first-ever use of tire shreds as backfill for a retaining wall. Humphrey's studies found that tire shreds are lightweight, provide good thermal insulation and drainage, and can be compressed — "four characteristics that make interesting combinations for unique projects," he says.

The next milestones in the research came in 1996 when MDOT made use of large quantities of discarded tires — a total of 500,000 — on two more road construction projects.

Late that same year, a new interchange was designed to provide better access to the Portland, Maine Jetport. When the Maine Turnpike Authority faced the major challenge of finding suitable fill that would not sink into the thick layer of soft clay at the site, tire shreds were used.

The jetport interchange project used 1.2 million old tires from an abandoned stockpile and saved \$300,000 in construction costs. The innovative, cost-saving alternative earned Humphrey the 1997 Maine Governor's Special Teamwork Award. That year he also received the International Tire and Rubber Association Friend of the Industry Award.

"The tire chip industry in Maine has worked hand-in-hand with The University of Maine as we develop the technology for tire chip applications," Humphrey says. "As a result, companies in the state are way ahead of



Today, upward of 30 million old tires are being shredded each year for civil engineering projects nationwide. That compares to 1990, when virtually none of the millions of scrap tires generated annually were being reused.

their competition. Similarly, Maine DOT now routinely uses tire shreds for lightweight fill and drainage on highways. That's very different from other states, where only a few are including tire shreds as regular alternative construction materials. But that's changing."

Today, upward of 30 million old tires are shredded each year for civil engineering projects nationwide. That compares to 1990, when virtually none of the millions of scrap tires generated annually were being reused, Humphrey says.

Some of the first uses of tire chips in civil engineering projects occurred in the mid-1970s. At that time, whole tires were included in the construction of artificial reefs. Their use in road embankments and as backfill for retaining walls was on the increase in the early 1990s. Nationwide by the end of 1995, an estimated 10 million scrap tires were being reused each year in civil engineering applications.

What appeared to be an exponentially growing market for tire shreds came to a screeching halt in December 1995 and January 1996, when two roadbed embankments in Washington state and backfill in a retaining wall in Colorado caught fire. Humphrey was one of the researchers who joined industry and Federal Highway Administration representatives on a national committee to investigate the internal heating problems caused by tire chips,

which by the mid-1990s had been used in more than 70 civil engineering projects across the country.

Humphrey had already been working with the Scrap Tire Management Council to draft guidelines for use of tire shreds. He subsequently took the lead in writing the national standards for use of scrap tires in civil engineering applications, which are set by the American Society for Testing and Materials.

Those states now testing tire shreds in road construction include California, where in June Humphrey spent a week consulting on a project using shreds from 700,000 tires at a site just north of San Jose.

Among the regulations is a 10-foot limit on the depth of tire shred fill. At the three sites that burned in Washington and Colorado, fill depths were 25 feet or more, causing internal combustion.

Tire shreds can be up to 12 inches long. The larger the tire shred, the lighter the fill and lower the likelihood of heating.

In highway applications, Maine and Minnesota lead the way, says Humphrey. Other states now are experimenting with tire shreds or have recently completed their first projects.

Those states now testing tire shreds in road construction include California, where in June Humphrey spent a week consulting on a project using shreds from 700,000 tires at a site just north of San Jose.

"Today, the biggest hurdles are concern about water quality and people not wanting to try something new," Humphrey says. "A five-and-a-half-year study that ended last year showed tire shreds pose no threat to water quality. What's needed in these states is an advocate willing to explore alternatives. That advocacy often comes from a state environmental agency responsible for managing scrap tires, or from the scrap tire industry looking to expand markets."

Humphrey fields up to 200 telephone inquiries each year about his research, in addition to his duties in the classroom and as chair of the Department of Civil and Environmental Engineering.

In the summer, Humphrey travels coast to coast, helping other states build tire shred projects. On Monday he may be giving a how-to presentation in Indiana; by Friday, he's headed to Delaware to evaluate a tire shred drainage system in a landfill.

"The best part of being a faculty member is working with students and watching them grow into mature professionals," says Humphrey, recipient of UMaine's 1998 Presidential Public Service Achievement Award, and the University's 1994 Distinguished Professor and Carnegie Foundation Maine Professor of the Year awards. "A close second is helping the state solve some of its pressing problems, such as disposal of waste tires and improving the durability of our highways."

by Margaret Nagle

One Best Friend

Children's friendships are training grounds for adult relationships



Photo by Monty Rand



ALL IT TAKES is one best friend to stave off the loneliness and depression of a child — even if that youngster is considered an outsider

with the “in crowd” of peers, according to University of Maine psychologists studying childhood friendships.

The key is in helping children to establish high-quality friendships that provide validation, intimacy, companionship and conflict resolution skills. Such intervention, the researchers say, begins with involved parents.

“Even if a child is not accepted by the larger group, one close friendship can serve as a buffer to loneliness and depression,” says Cynthia Erdley, UMaine associate professor of psychology. “We know that children who are rejected by their peer group are at risk for a variety of negative outcomes that have implications for their psychological adjustment as adults. More recent studies are beginning to uncover similar risks for children who fail to develop close friendships. For instance,

children without friends appear to be at increased risk for depression, anxiety and low self-esteem. However, many questions remain about just how friendship impacts adjustment.”

The dynamics of children's friendships

Since the early '70s, when researchers became interested in group acceptance, it has been recognized that childhood friendships are not simply child's play but powerful predictors of social adjustment in adulthood. Yet through the years, studies have focused on children's group acceptance and popularity as primary determinants of future psychological adjustment, leaving childhood friendships an understudied area. The complex interrelationships between peer acceptance, friendship and adjustment are not adequately understood.

In their research, Erdley and Douglas Nangle, associate professor of psychology, are looking beyond the traditional theories of peer acceptance to explore the dynamics of children's friendships — and the very definition of friendship among youngsters.

Dear Anthony
I hope you had
Fun today. I am
going to Lisa's ho
do you want to
go? We mdy pi
apples. See yo
later,
your friend
Zachary



Childhood friendships are not simply child's play but powerful predictors of social adjustment in adulthood.

Though direct parental involvement should trail off as children develop, the need for monitoring remains. Knowing who children's friends are, where children are and what they are doing is important. Good communication and helping children negotiate problems in friendships also help.

Prominent theorists William Bukowski of Concordia University, Betsy Hoza of Purdue University and William Hartup of the University of Minnesota contend that, in order to better understand the role and importance of children's friendships, the definition of friendship must be expanded. A recent study by Nangle and Erdley was one of the first to explore this premise by focusing on the potential contributions of peer acceptance, having more than one friend, and friendship quality to children's psychological adjustment.

The UMaine researchers have edited a new book on the subject, *The Role of Friendship in Psychological Adjustment*. Nangle and Erdley, with UMaine doctoral students Julie Newman and Erika Carpenter, write of their pioneering research that examines how the various levels of friendship, as well as peer acceptance, relate to a youngster's psychological development. In the book, they are joined by some of the world's leading friendship researchers in addressing the impact of pre-adolescent friendship and peer status on early adulthood adjustment;

peer relationships and specialized interventions for children with attention-deficit/hyperactivity disorder; and the drawbacks of traditional group intervention for antisocial youth.

Learning what it means to be a friend

For the last 20 years, clinicians have looked at rejection by a peer group as a significant problem. It is widely recognized that children's friendships are the training grounds for important adult relationships, including marriage.

Most often, the therapeutic goal has been to make the child more accepted by the peer group at large, says Nangle, a clinical child psychologist whose research focuses on child/adolescent peer relations and behavior therapy. However, singling out anti-social children often serves to further alienate them from their peers.

One answer may be taking intervention and prevention measures with the peer group rather than individual youths in trouble. At UMaine, a new study by Ph.D. student Erika Carpenter is exploring the value of formalized social skills training as part of a school curricu-

lum. Her research focuses on what has become a steady stream of preschoolers in Head Start being referred for psychological counseling because of aggression and other forms of inappropriate behavior.

With this kind of intervention, the hope is that children will have improved behavior and greater interest in school, better academic performance, increased likelihood of staying in school and higher peer acceptance, Carpenter says.

Close friendships among children are characterized by affection, a sense of reliable alliance and intimacy — the sharing of secrets and personal information. The experience of having a friend in which to confide can promote feelings of trust and acceptance, and a sense of being understood. As a result, friendship mediates the link between acceptance and loneliness, says Erdley and Nangle.

Unlike close friendships, peer group acceptance offers children a sense of inclusion. Both social relationships offer nurturing and self-worth. But while peer acceptance influences children's feelings of belonging, friendships directly affect feelings of loneliness, says Erdley, whose research focuses on social cognitive processes or the thoughts that underlie youngsters' social behavior.

The Relationship between friendship and adjustment

The younger the children, the more on-again, off-again their friendships and group acceptance. But by ages 10–11, patterns of acceptance, friendship and psychological adjustment begin to gel.

This also is a time of transition from elementary to middle school. UMaine doctoral student Julie Newman is studying how the quality and quantity of children's friendships during this often tumultuous period can mean the difference between a smooth or rocky adjustment to this transition.

If peer friendship is found to be an important variable in children's middle school adjustment, it may be a component to add to programs preparing them for middle school. Such an intervention could be particularly pertinent to those children with poor peer relations who face the prospect of getting even more "lost in the crowd," Newman says.

During these transitional years for children, intimacy becomes more important in peer relations, especially between girls. By adolescence, it is estimated that 70 percent of teens report having stable friendships.

Currently, Nangle and Erdley are conducting research on the developmental differences in peer experiences and psychological

adjustment. They are exploring the hypothesis that, when it comes to adjustment, acceptance is more important in childhood and friendship is critical in adolescence.

The relationship between friendship and adjustment is a complicated one, says Nangle. "There are times when friendship is not a good thing. Children who get involved in more deviant peer networks are clearly at increased risk for poor outcomes," he says.

Studies by University of Oregon clinical psychologist Thomas Dishion and others are urging caution when using traditional intervention programs that put high-risk youth together. Because the impact of friendship isn't always positive, group treatment of high-risk adolescents can produce unintended consequences as a result of peer influence.

Good friendships don't just happen

Researchers stress that positive adult and family involvement in the lives of adolescents continues to be the most effective intervention measure.

Good friendships don't just happen. It is important for parents to play an active role, say Nangle and Erdley. Studies show an association between parental involvement in arranging children's peer contacts, and the social and academic adjustment of preschoolers and kindergartners. Parents who arrange play dates, enroll their children in structured activities, and monitor peer interactions appear to have more socially adept kids.

Warning signs that children may be lacking close friends include being unable to name specific close friends (or naming kids not really their friends), lack of incoming calls or invitations from peers, hanging out with friends who are significantly older or younger, and lack of regular peer contacts outside of school.

Though direct parental involvement should trail off as children develop, the need for monitoring remains. Knowing who children's friends are, where children are and what they are doing is important. Good communication and helping children negotiate problems in friendships also help, add Erdley and Nangle.

"As parents are increasingly pulled from the home by work and other demands, the question is what will become of the close parental monitoring of peer interactions that used to be more commonplace," says Nangle.

by Margaret Nangle



Positive adult and family involvement in the lives of adolescents continues to be the most effective intervention measure.

Music amid the madness

The Men and Women Behind the Music of the Holocaust

PHILLIP SILVER WAS IN LONDON when he first heard the *Third String Quartet* by Viktor Ullmann.

As a musician, he was struck by the quality of the music. As a second-generation Jewish American searching for his Judaic roots, Silver wanted to know about the composer behind the music.

When he learned that Ullmann had composed the work while in a Nazi concentration camp, Silver understood his mission as a music scholar.

“Once I heard the circumstances under which Ullmann composed in his last years, it was as if a door had opened,” says Silver, assistant professor of music at The University of Maine. “I had to find out more, not only about the music but the circumstances under which it was composed. I wanted to know how normal people — people like any of us — can be thrown into a nightmarish reality, where all norms of civilization are abrogated, and still find the inner resources to create music such as this.”

Ullmann was one of many prominent Jews, including visual and performing artists, who were rounded up and deported to a concentration camp in Terezín, Czechoslovakia. There he and other musicians continued to perform and, most importantly, to compose some of their most brilliant works before being murdered in the gas chambers at Auschwitz.

For years after the Holocaust, it appeared that the last music composed by Ullmann and others during their incarceration at Terezín had been lost. Only in the last two decades has research uncovered the music — and the stories of the courageous men and women behind it.

Today, international performers and scholars like Silver are ensuring that the voices of these composers are heard through their music. In addition to performing works by Ullmann and others, Silver has taught and lectured extensively, most recently in

London and Germany, on the music and musicians caught up in the Holocaust.

“This is a musical quest, a humanitarian quest,” says Silver of his years of research. “This is a generation of composers whose music has suffered from lack of exposure and we are the losers. We need to pay attention to this music both because of its relation to the human experience, as well as its innate artistic quality.”

These works become very different compositions once you know the environment of crisis and imminent destruction in which they were created, says Silver. “Despite the circumstances, we rarely find resignation in the music, but rather the philosophy and attitude of survival. It is a clarion call to strength and maintenance of civilization.

“Such music is proof that, without culture, we can not survive,” he says. “This music shows me that even in the midst of horror, we can rise above our immediate environment and find a way to believe in something better.”

Silver, a native of Brooklyn, N.Y., began his career in music at the New England Conservatory of Music in Boston and the University of Washington. He and his wife, cellist Noreen Silver, then spent six years in Israel.

“Israel was at times a frustrating place to live, a veritable pressure cooker, but at the same time, it was very nourishing,” says Silver, who participated in the peace effort in Israel. “There I became much more involved in the dynamic of music, its underlying meaning. The experience changed me and the way I play. My music

became much more whole.”

Silver first heard about the music of the Holocaust in Israel. But when he started his research, he found little information. By the time he joined The University of Maine faculty in 1998, German publishing companies had claimed the rights to some of the music and made it available.



Viktor Ullmann

***"This music shows me that even in the midst of horror,
we can rise above our immediate environment and find a way
to believe in something better."***

Phillip Silver



"I was struck by certain things, including the volume of music written in the camps," says Silver. "Initially, I imagined what the music would sound like — intense, depressing and harsh. While some works do manifest these elements, there are many that are polar opposites. These works are brighter, almost vivacious, tinged with nostalgia and sarcasm, but ultimately imbued with hope.

"That's when I knew, more than ever, that I had to analyze what was going on with these artists and their music. How could they be in camps and write music like this? Ultimately, I found myself fighting to preserve the memories of these artists and their music, to not allow evil to have its final victory."

Austrian composer Viktor Ullmann was particularly astute at using his music to preserve the memories of better times, Silver says. Ullmann was a highly respected musician whose works had been performed in many European centers. Before the start of the Second World War, he had composed almost 40 works, including orchestral, vocal, chamber and piano compositions.

In 1942, Ullmann and his family were sent to Terezín, a concentration camp designed as a showpiece for the International Red Cross and the rest of the world. As part of the Nazi public relations effort at Terezín, prisoners were allowed to partake in a rich cultural life, including musical performances, theater and lectures.

While thousands of prisoners died at Terezín from malnutrition and disease, the camp was considered more of a way station for Jews ultimately headed to death camps like Auschwitz.

In Terezín, Ullmann continued to compose, creating what are considered to be some of his finest works, such as the opera *Der Kaiser von Atlantis* (*The Emperor of Atlantis*).

Shortly after the completion of his opera, Ullmann was transferred to Auschwitz. He died in the gas chambers in October 1944.

For Silver, Ullmann's *Sonata No. 7 for Piano* is one of the most provocative and compelling of his compositions. In it are shadows and ever-present fear, darkness and dissonance, sarcasm and strength. Found mid-work are snippets of music banned by the Nazis, such as a Zionist song of the '30s and the Czech national anthem.

"This is the work in which Ullmann unambiguously declares a return to his Jewish roots and envisions a better future for his people," says Silver, who has extensively studied Ullmann in recent years. "He is composing for the people of the camp, imbuing the music with symbolism, using a type of underground language to urge the prisoners to live, survive and remember."

Ullmann "writes like someone possessed," Silver says. In those two years of internment, he composed 22 works.

Among the other extraordinary musical artists sent to Terezín was Gideon Klein who, like Ullmann, also is a primary focus of Silver's research. Klein's career in the performing arts was just getting started when he was incarcerated in 1941 at the age of 21. But in the concentration camp, Klein succeeded in writing some extraordinary music, Silver says, and would have been a major composer after the war.



Gideon Klein



Alma Rosé

"My favorite piece by Klein is a piano sonata," says Silver. "In it I hear an honest response to his situation. It is a violent piece of music. Obsessed. Dark. Expressionism on steroids.

"This is music that helps me understand (the Holocaust) better. Behind it is a young person who is denied the right to live, and he's not going out without letting you know how he feels."

As a result of his research, Silver has brought many Holocaust-related works to the stage. They include compositions by Czech composer Erwin Schulhoff, who wrote operas, symphonies and chamber music. Schulhoff, who also wrote and performed jazz works as a pianist, died in Wülzburg Concentration Camp in 1942.

In addition, Silver has performed a massive piano sonata by German composer Karl Amadeus Hartmann. Living in Germany during the Hitler years, Hartmann opposed the regime, suppressing all public performances of his music while secretly composing anti-fascist works. After World War II, his compositions surfaced, including a sonata subtitled *27 April 1945*, written after Hartmann witnessed a death march from Dachau Concentration Camp.

Last year, Silver started researching the life of Alma Rosé, a renowned violinist and member of one of Vienna's most respected musical families. Her father was Arnold Rosé, violinist and concertmaster of the Vienna Opera and Philharmonic Orchestras. Her mother, Justine, was the sister of Gustav Mahler.

Alma Rosé's story came to widespread public attention when the movie about her life, *Playing for Time*, was released in 1980. The film was based on a book of the same title by Fania Fenelon, a member of the women's orchestra in Auschwitz. Fenelon's negative depiction of Alma Rosé is at odds with accounts by other survivors. This discrepancy led Silver to research Rosé's life.

Among the milestones in Rosé's career was the founding of an all-women's orchestra called the Vienna Waltzing Girls. The formation of this orchestra, Silver says, was a foreshadowing of things to come.

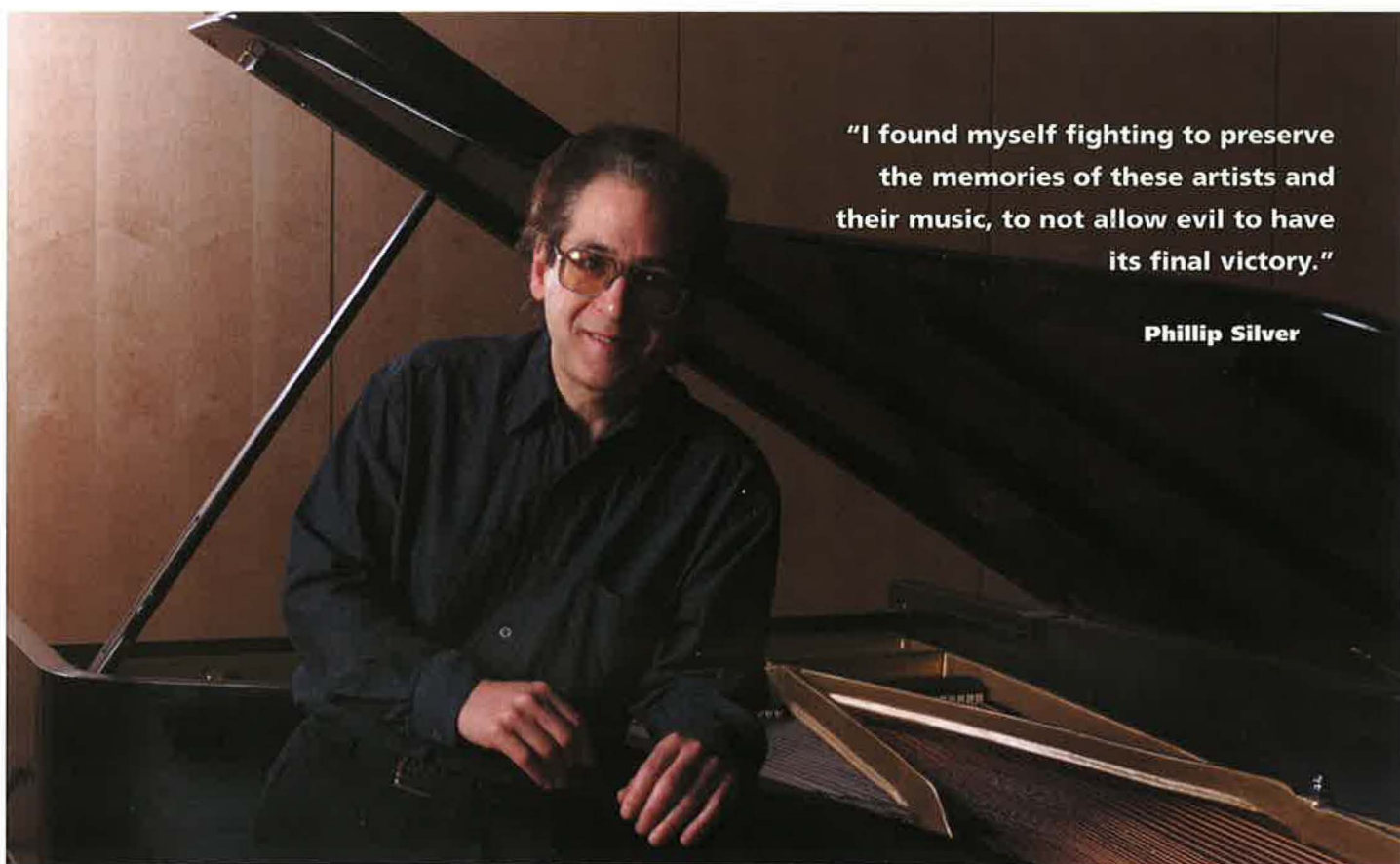
In 1942, Rosé was arrested in France as she tried to get to Switzerland to escape the Nazis. She was taken to the medical experimental block at Auschwitz, where she would have been put to death if she hadn't been recognized as a famous musician. Rosé was then transferred and put in charge of the camp's women's orchestra.

The women's orchestra at Auschwitz performed marches as laborers moved to and from their blocks every evening and morning. Rosé used her clout to put Jewish musicians in the orchestra, virtually ensuring that they would be spared the gas chamber. It is estimated that up to 40 women musicians owe their lives to their conductor, who herself died at Auschwitz after an illness.

"Like so many of the musicians in these circumstances, Rosé was an artist obsessed with details such as intonation, and she demanded all in the orchestra operate on this level," Silver says. "She knew the musicians' survival was dependent on the SS liking what the orchestra members did.

"Alma Rosé required strict performance standards from the women in her orchestra even as the smokestacks visible from the window belched human ash," notes Silver. "The music is what protected her and many prisoners like her from succumbing to total depression."

by Margaret Nagle



"I found myself fighting to preserve the memories of these artists and their music, to not allow evil to have its final victory."

Phillip Silver

Photo by Monty Rand

The Pier of the Future



Photo by Michele Stapleton

IT IS ONE thing for a student to get hands-on experience in field construction and another to be a project manager overseeing construction of Maine's first wood composite commercial pier.

University of Maine graduate student Melanie Bragdon is involved in fiber-reinforced poly-



Photo by Larry Ayotte

mer (FRP) composite research. Her work has taken her from UMaine's state-of-the-art Advanced Engineered Wood Composites (AEWC) Center laboratory in Orono to the shore of the Narragagus River, where her work was instrumental in the recent construction of Milbridge, Maine's new municipal pier.

As a student, Bragdon's research focuses on computer modeling and laboratory testing for commercial pier decks. The Milbridge pier project transformed theory and lab work into practice and success. The pier (approximately 16 feet by 160 feet) was constructed using FRP glulam panels, which are made of lumber vertically laminated to form a 4-foot-wide panel. "We had a company make

glulam panels and we applied the FRP to them in the lab," says Bragdon, who hopes to be a structural engineer working abroad when she completes her graduate degree in civil engineering.

The new pier replaces a deteriorated concrete-covered wooden structure. The reinforced glulam panels used on the new pier weigh a third as much as reinforced concrete, yet they have the same strength and stiffness. The cost of building the new pier with composite materials is \$670,000, which is comparable with prestressed-concrete construction. However, because of its design and materials, the composite pier is expected to last much longer than one made of concrete.

AEWC is an international leader in the research and development of the next generation in construction materials — advanced wood-nonwood composites. Its director is Habib Dagher, the University's Bath Iron Works Professor in Structural Engineering.

Intersection of Biology and Philosophy

AFTER FOUR years at The University of Maine, Kevin Peterson of Cumberland graduated in May with both a bachelor's degree and a year's worth of graduate-level experience at one of the world's most prominent research centers.

As an undergraduate, Peterson spent two semesters as an intern at The Jackson Laboratory in Bar Harbor, Maine, the world's largest mammalian genetic research institution. This summer, he continued to work at Jackson Lab and began his graduate program in biological sciences. He expects to earn his

doctorate from UMaine in four years.

In 1997, Peterson enrolled as an undeclared major in liberal arts. In his first year, he took a philosophy class that "had a big influence in making me ask questions and think about bigger issues," he says.

Those philosophical questions carried over into a developmental biology class taught by Professor of Zoology Mary Tyler, prompting Peterson's interest in developmental genetics and a fascination with "how life can begin from one cell."

For Peterson, biology and philosophy intersect. "Both use observation and hypothesis. Sci-

ence starts as a philosophical pursuit," he says.

At Jackson Lab, Peterson works on a research team led by Jackson Lab scientist Tim O'Brien. The team also includes UMaine alumnus Ian Welsh, a 1996 co-valedictorian.

In a comparison study of human and mouse

chromosomes, the researchers are trying to understand what genes are essential for development.

After he earns his Ph.D., Peterson plans a career in research. He also hopes to author his first book, which he says will blend biology, philosophy and ethics.

An internship at The Jackson Laboratory inspired Kevin Peterson to be involved in cutting-edge genetics research.

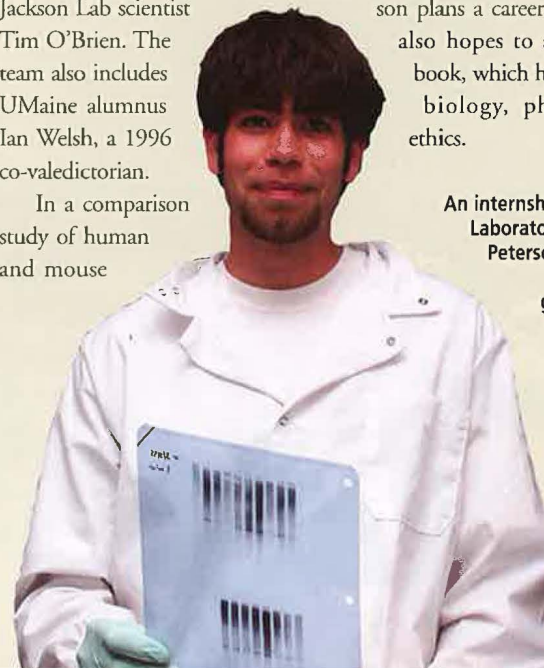


Photo by Monty Rand

What Matters Most

Battling cancer — and with a young family — Shawn Walsh knows life is far more than just hockey

SHAWN WALSH OPENS THE CENTER DRAWER of his desk and pulls out a slip of paper that he's kept from the day he was hired at The University of Maine. The note reads: "If you don't have the best of everything, make the best of everything you have."

As one of the most successful coaches UMaine has ever had, in any sport, Walsh knows a lot about being the best. He also knows what it's like when the odds don't seem to be in your favor.

For the past year, the coach of men's hockey has taken on his toughest opponent — cancer. It has been a private battle of a high-profile coach that has been followed by thousands of people in Maine and across the country. As with Walsh's leadership on the ice that has led UMaine to two national championships, supporters have been inspired by his strength of character. And his candor.

"I believe everyone is here for a reason," says Walsh. "That's one of the reasons why I'm carrying my fight public. Cancer is a word that scares people, but it doesn't have to end your life, it doesn't change your friends or your zest for life. I'm very appreciative of my lot in life."

Walsh has experienced a lot in his life, but the past 16 months have been the most challenging. In June 2000, he learned that the back pain he had been experiencing was the result of a cancerous kidney — specifically, renal cell carcinoma. The kidney was removed, followed by a series of immunotherapy treatments at UCLA's Jonsson Cancer Center. Earlier this year, Walsh had a lung removed as part of his battle with cancer, and spent 74 days at the National Institutes of Health (NIH) in Bethesda, Md., undergoing the last stage of his cancer treatment: a stem cell transplant. The donor was Walsh's youngest brother, Kevin.

Within days of returning home to Maine from Maryland, Walsh says he attempted to return to a normal routine — organizing things around his house in Veazie and in his office at Alford Sports Arena, traveling to the coast for family weekends, and "chasing the little one," his youngest son, Sean, 2.

He played golf four times in his first week and a half in Maine. And he prepared for his 18th season behind the bench.

In August, Walsh returned to NIH for treatment of a virus common to stem cell transplant recipients. He was back in his office two weeks later.

"With my personality, I don't get down or worried," Walsh explains. "Attitude is everything and only you can control it. You're the only one who can dictate how you feel. People need to take ownership in giving themselves a positive attitude."

Looking back, Walsh says he now realizes that some of the strength to face this chapter in his life is rooted in his childhood. Walsh grew up with eight brothers and sisters, and what he describes as "constant change." As a child, he moved with his family from White Plains, N.Y., to Wayne, N.J., where "the lifestyle we led was upper-middle class, with a pool in the backyard."

When he was a high school freshman his family moved again, this time to Nashville where his father opened his own business, only to see it fail. "We went from upper- to lower-middle class in a hurry with many mouths to feed," Walsh says. "I went to four different high schools. I've seen economic ups and downs, and how they can change in a family at the drop of a hat."

From his mother and father, Walsh learned perseverance and a drive to be the best you can be. A childhood of change taught him to be independent.

That childhood also led him to take up hockey. The game was "the clear passion in a life that had a lot of passions," he says. At Bowling Green, Walsh played as a reserve goalkeeper for one of the greatest collegiate hockey coaches, Ron Mason. From Mason, Walsh learned the art of and love for coaching.

Walsh became a student of the game, coaching as Mason's assistant at Bowling Green and later at Michigan State, where they rebuilt the program. Walsh then brought the blueprint to Maine.

Between the influence of his family, age and his battle with cancer, Walsh says he is more reflective, more appreciative of others and of life than ever before.

Walsh landed the UMaine head coach's job in 1984. He came to a program that already had strong community support, drawing close to 3,000 fans per game despite a team that won just 11 league games in three years.

Walsh quickly became popular — and successful. Under him, the UMaine men's hockey program became one of the most visible and strongest in the country. Walsh is the first to admit that for some fans, his popularity was challenged in the mid-1990s with the University's self-disclosure of NCAA rules violations.

"In 1993 (UMaine's first national championship), you could have put my face on a postage stamp, but in '95, some people didn't know which side to spit on," Walsh says. Today, Walsh looks back at his one-year suspension for rules violations as "a blessing in disguise" — something that led him toward a new understanding, both professionally and personally, of what matters most in life.

"Five years ago, I was a more one-dimensional person. Now I'm more balanced spiritually, socially, physiologically and psychologically. In a lot of ways, I feel blessed that I've been able to see the many things I've seen in the last 18 months."

Walsh gives much of the credit for his broader view of the world to his wife, Lynne,

whom he met during his suspension. "She's balanced, fun, very cerebral and opinionated," says Walsh, who has four children, two by a previous marriage. "I got through this past year with support from my family and loved ones, especially

Lynne. Her confidence is soothing. And she's very religious. She got me back into Catholicism even before I was diagnosed with cancer. In the past year, my religion has helped."

During his 74 days in Maryland undergoing treatment, Shawn and Lynne were frank with their children. "I've told the kids I've got cancer but it's beatable," he says. "I told them I'm going to do everything I can to be here. The most important thing is that I keep a good attitude."

Between the influence of his family, age and his battle with cancer, Walsh says he is more reflective, and more appreciative of others and of life than ever before. Walsh has started writing a book about his life with the help of Steve Klein, a former online editor at *USA Today*.

"It's a book I've thought about for a long time," he explains. "It's about perseverance in life. Just because you're knocked down, it doesn't mean that you won't be successful."

Walsh says that it's important for people to know that, no matter what adversity they encounter, handling it with a positive attitude will always make you stronger. "My illness has never seemed insurmountable. I haven't had the 'Why me?' syndrome. These are the cards I've been dealt and I can deal with it."

by Margaret Nagle



Photo by Monty Rand

Members of the University of North Dakota hockey team wore uniforms with the name "Walsh," in honor of UMaine hockey coach Shawn Walsh, during a game at Alfond Sports Arena last fall. Coach Dean Blais, who is a longtime friend of Walsh, came up with the idea for the tribute. The jerseys were auctioned or raffled to raise funds for a nonprofit organization that provides financial assistance to college coaches who face extraordinary expenses associated with serious illness.

*Paul Mayewski, a world leader in the collection
and analysis of ice cores, has changed
our understanding of climate*

THE ICE MAN

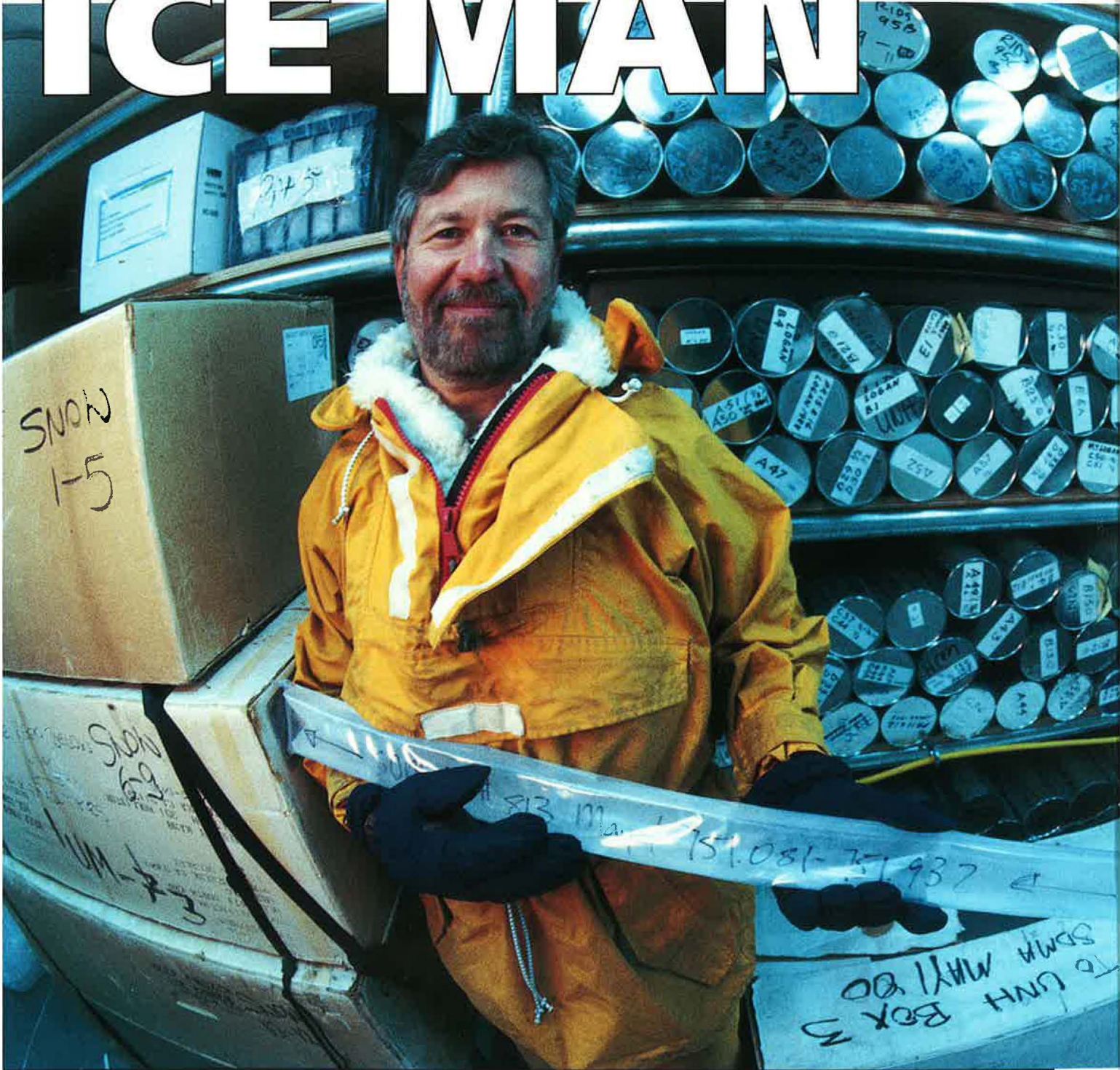


Photo by Michele Stapleton

A new ice core storage facility at UMaine provides access to "a type of historical library."

FOR SOME PEOPLE, it's a persuasive mentor or a flash of insight that propels them into a scientific career.

For Paul Mayewski, it was a photograph.

During his sophomore year studying geological sciences at the State University of New York at Buffalo, a picture taken in

Antarctica of snowfields and jagged mountain peaks caught his eye and led to his participation in a research expedition that changed his life.

"I saw the photograph and talked to the person who took it. I said I wanted to go there, and by the time I graduated, he had a project funded and off I went," says Mayewski, who was 22 when he made his first trip to Antarctica.

Today, Mayewski says, "it's the kind of thing that happens here at The University of Maine on a regular basis," noting the many opportunities UMaine students have to work with researchers in the field — even if that field is an ice sheet in Antarctica.

Mayewski founded the Climate Change Research Center at the University of New Hampshire. He came to UMaine in 2000, where he is co-director of the Institute for Quaternary and Climate Studies.

Mayewski is a world leader in the collection and analysis of ice cores, and the study of changes in climate and atmospheric chemistry. He has organized major scientific activities that have changed our understanding of climate.

SINCE HIS FIRST TRIP to Antarctica in 1968, Mayewski has led more than 35 Antarctic, Arctic and high-mountain expeditions, and accumulated a treasure trove of ice cores from around the world. Clues locked in the ice, some of which is stored in a -12 degrees C storage facility on the UMaine campus, are helping scientists to understand how the Earth's climate works.

In fall 2001, New England Press will release a new book written by Mayewski and Frank White of the Harvard Development Corp. *The Ice Chronicles* describes changes in climate and the atmosphere as recorded in ice cores. The book also relates adventures leading to the recovery of cores from remote regions of the globe.

Mayewski's scientific travels have taken him to the Tibetan plateau, the Himalayas, Iceland and the Greenland ice sheet. Along the

Mayewski highlights

- Organized and coordinated the Greenland Ice Sheet Project 2 involving 25 U.S. institutions. The data changed the way we view natural climate variability.
- Organized the International Trans-Antarctic Scientific Expedition, involving 15 countries, to study change in climate and the chemistry of the atmosphere. Led 10 U.S. institutions on traverses of Antarctica.
- Organized and co-organized several multinational expeditions to Asia.
- Identified major significance of natural climate variability.
- Identified human source emissions of pollutants in remote regions of the atmosphere.
- Contributed to understanding that climate is driven by several factors instead of one primary force.



Photo by Paul Mayewski



"If I had to put my research in one word, it would be 'time.' We're stepping back in time in many ways. Our world changes second-by-second over time, and you have to envision all of these different pictures." Paul Mayewski

way, he has come to appreciate the role of science in informing people about the world in which they live.

"We can say unequivocally that humans have had a dramatic effect on the environment," Mayewski says. "We know that we've made unprecedented changes, notably in air and water quality.

"You may expect things to stay the same, but when you start adding in things — dramatically higher greenhouse gases and new chemicals that have never been there before — you're in for a big surprise."

It was in Antarctica that Mayewski first understood he could make a difference by doing science.

"I had occasion to show around a U.S. senator from Georgia. He said that within 25 years, if I stayed with it, what I was doing would be of significant value to people. That

had an immense effect on me. I was beginning to realize that, as scientists, we have this fantastic opportunity and that we need to return something."

TO MAYEWSKI, that meant gathering accurate data and interpreting it in a way that scientists and non-scientists could understand and appreciate. Over the years, the job has become more important to people in and out of the scientific community.

"Fifteen years ago, I would probably have had to pay a university for the right to come and talk about what I wanted to do," he says. "Now it's something that people are very interested in. I take the greatest satisfaction in being able to provide information to colleagues in fields from mathematics to solar physics to computer science, music, atmospheric chemistry and archeology."

To get that information, Mayewski uses ice cores, an average of 100 meters long, taken from below the Earth's surface. Ice cores are made of layers of ancient snow. As snow falls and accumulates, it retains a record of the environmental conditions in which it was created. Chemicals and dust offer clues about the source of moisture, the temperature of the air and the direction of the wind.

Those layers are like chapters in a book. By putting the chapters together, scientists create a story of how the atmosphere behaved in the region over hundreds and thousands of years.

"If I had to put my research in one word, it would be 'time.' We're stepping back in time in many ways. Our world changes second-by-second over time and you have to envision all of these different pictures. The question is, how do you put them together in any reasonable sequence?" Mayewski says.

That has been a primary challenge for geologists, chemists, physicists and other scientists working on climate. In the near future, Mayewski expects a highly reliable picture to emerge of how the climate system works on large scales.

"I think we're really close on scales of several hundred years and greater," he says.

However, shorter periods are more relevant to people living today. For example, when governments plan large construction projects, they have to anticipate changes in the environment over decades. Policies related to agriculture, forestry or fisheries need to account for how plants and animals may respond to changing temperatures or moisture patterns. Ironically, it is more difficult to predict climate over such short periods.

"Understanding of the climate system year to year or decade to decade will happen in the next 10 to 20 years," says Mayewski. "Even if we don't get there completely, just understanding the dynamic range — how changeable climate is, understanding what controls climate — is already a giant step forward in the last 10 years."

Getting to this point has taken Mayewski and his colleagues to the most inhospitable places on the planet. For its beauty and pristine condition, Antarctica has become one of his favorite places, despite a few unpleasant experiences there, such as being pinned down in a tent for three days by winds blowing up to 120 miles per hour.

ALL HIS LIFE, Mayewski has treasured the opportunity to see clearly across long distances and to breathe air that is clean. As a young boy in Scotland, his parents took him on walks in the countryside. The scenery was open to the horizon and the conversation turned occasionally to the Asian steppes or to the sands of North Africa, where his father served during World War II.

Faraway lands are a natural part of Mayewski's heritage. Unlocking their secrets is his life's work.

by Nick Houtman

Global Initiatives of the Institute for Quaternary and Climate Studies

The University of Maine Institute for Quaternary and Climate Studies has expanded the scope of its activities and put an increased emphasis on climate research.

"Climate has always been a key integrating feature of our work," says George Jacobson, director of the institute, which conducts interdisciplinary research on the natural world during the Quaternary, the geological period that spans approximately the last 2 million years. "Our research is very broad: paleoecology, archaeology, glaciology, oceanography and other topics. Climate links them all."

The institute now is the home of the Maine State Climate Office, led by climatologist and research associate professor Gregory Zielinski. Co-directing the institute is Paul Mayewski, one of the world leaders in the field of ice core research.

Established in 1972, the institute now includes 22 faculty members from six departments: anthropology, geological sciences, biological sciences, history, computer science and marine sciences. The first of the non-agricultural research units on campus, it integrates scientists across departmental lines, and enables faculty and students to share laboratory facilities. The stable isotope laboratory in the Sawyer Environmental Research Center and the ion chromatography lab in Bryard Global Sciences Center are managed directly by the institute.

A new ice core storage facility on campus provides access to "a type of historical library," says Mayewski, who has developed many of the techniques that are standard in ice core research today. Currently, stored cores come from Asia (including a 23,000-foot high glacier on Mt. Everest), the Arctic, the Antarctic, South America, the Yukon and Iceland. Some of the Antarctic cores contain ice layers that are as old as 500,000 years, while some of the Arctic cores go back 250,000 years.

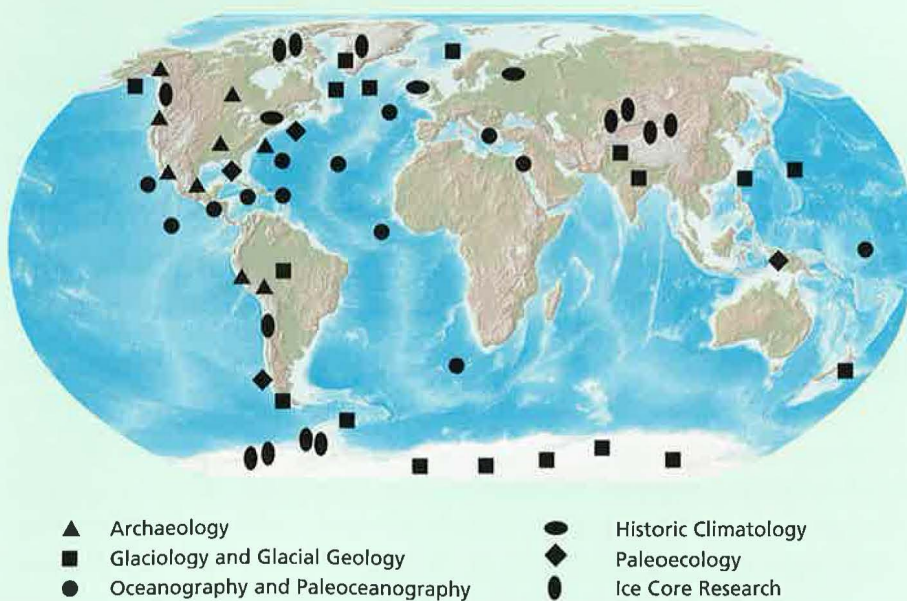
Institute faculty and students have focused on Maine, but they also pursue answers to questions worldwide.

"The scientific questions that we deal with require us to go where the answers are. We can't understand how the global climate system functions without understanding the geographic patterns in atmospheric and ocean circulation. We have to know how the system functions, and with what timing, to know what's happening in Maine," says Jacobson.

Memoranda of understanding have been drawn up between UMaine and many research institutions, such as the Chinese Academy of Sciences, the Department of Hydrology and Meteorology of the Kingdom of Nepal, and the University of Newcastle in Australia. In addition, the University is associated with laboratories at the University of Stockholm and the Southampton School of Oceanography, among others.

Mayewski works with the Museum of Science at Boston (www.secretsoftheice.org), as well as with the American Museum of Natural History in New York, where a permanent ice core display developed by Mayewski is in the Hall for Planet Earth.

UMaine Quaternary and Climate Study Research Locations



Mastering teaching and

FOR MORE THAN 18 YEARS, Karen Baldacci has had a successful career as a registered dietician working in clinical and public health settings. When her son Jack started school, she also became an active volunteer, both in the classroom and as a leader in the local Parent-Teacher Organization.

Baldacci's positive involvement in the local school rang true to her own experiences as a student who benefited from inspirational educators.

That's when she knew it was time to go back to school, this time to pursue a second career as a teacher.

"I was intrigued and thrilled with the whole concept of watching a child grow through learning," says Baldacci, a resident of Bangor, Maine. "As an educator, you aren't just a teacher, facilitator or mentor. You are also a learner in a dynamic situation, constantly assessing all students and getting to know them in order to teach them better."

Twelve months ago, Baldacci returned to her alma mater, The University of Maine, as a graduate student in the new Master of Arts in Teaching (MAT) program, offered by the College of Education and Human Development. MAT, launched in 1997, is a high-caliber, intense preparation for aspiring teachers, including those whose academic coursework or careers are in areas other than education.

MAT is part of the college's Professional Development Network, which is based on partnerships between UMaine and area schools committed to improving teaching and learning at all levels. In particular, the network is designed to prepare preservice teachers,

provide professional development for practicing educators, and emphasize exemplary practice to maximize K-12 student achievement.

The model for teaching and working with interns and teachers on-site at elementary schools is spearheaded by two of UMaine's

considered to be an initiative at the forefront of educational reform, contributed to the College of Education and Human Development's recognition in the *U.S. News & World Report's 1998 Guide To America's Best Graduate Schools*.

"It's an intense commitment.

You have to be ready to unplug your life for a year, refocus your energy and manage time as never before," says Baldacci, whose life has long been hectic with her husband, John, serving his fourth term as a Maine congressman in Washington, D.C.

But where else, she asks, can you end up with a master's degree and certification in such a short time, and, most importantly, with the confidence and ability to be the kind of teacher you aspire to be?

For MAT students, courses are offered at the University and on-site in schools during the day and evening. In addition to coursework, there is an intensive in-school experience. The UMaine interns spend 40 to 60 hours a week with their mentor teachers during the full-time internship in the spring.

Baldacci received small-school experience at Newburgh Elementary in SAD 22, doing a first grade placement and taking a social studies methods course taught on-site by UMaine faculty. Lessons she

learned in the methods course were immediately applied in the classroom with mentoring teachers. In the city of Brewer, Baldacci interned in both the fifth and first grades.

This year, she became one of 93 new teachers to graduate from UMaine's MAT program in the past four years.



"As an educator, you aren't just a teacher, facilitator or mentor. You are also a learner in a dynamic situation, constantly assessing all students and getting to know them in order to teach them better."

Karen Baldacci

leading education professors, Brenda Power, the University's 1999 Distinguished Maine Professor, and Constance Perry, recipient of UMaine's 2001 Outstanding Teaching Award.

The goal is to help address the shortfall of well-qualified teachers in Maine and across the nation. The success of the MAT program,

learning

The MAT program is in sync with the public school calendar rather than the University's academic year. In June, even before the children return to classes in the fall, UMaine students dive into educational psychology, foundations, research and assessment courses in preparation for their school-based experiences.

"The MAT students are in the classroom from day one. They watch our summer assessment with the students, plan and assess activities, attend meetings and workshops, help with classroom inquiry and data analysis, and conduct their own research," says Laurie Richards, Baldacci's mentor teacher from Brewer's Pendleton Street School.

"They accomplish a tremendous amount of work in one year because they really want to be here and this commitment is reflected in the classroom."

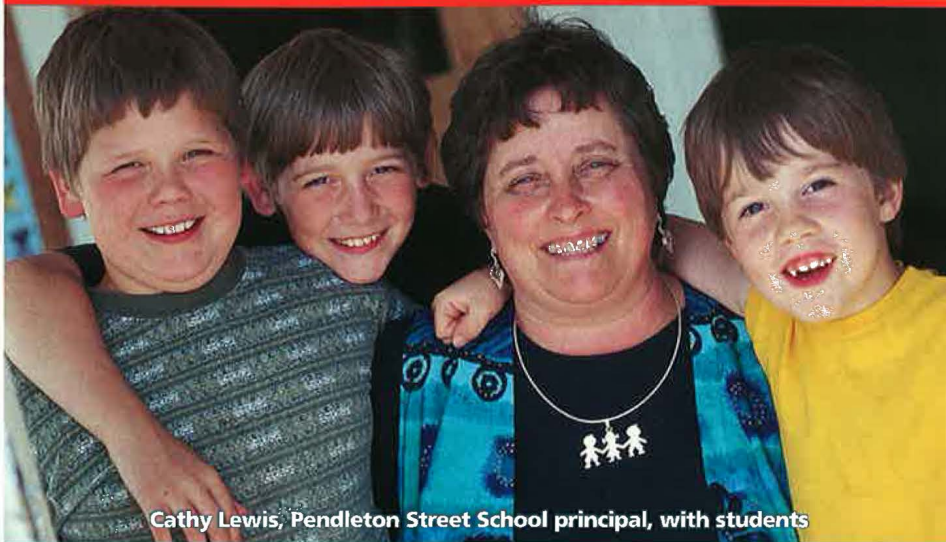
The MAT program is good for the children and for the teaching profession, according to Richards. "The program allows for two teachers in the classroom, which means more one-on-one time for each child with a teacher. The interns also bring experience from other jobs, as well as fresh ideas and the latest in research from their classes," she says.

As part of the MAT program, on-site learning labs in the schools encourage sharing of strategy and expertise. Mentor teachers host colleagues and interns to their classrooms to observe instruction. A subsequent debriefing session focuses on theories linked to what happened during the lesson, and connections to other classrooms, curricular projects and needs of individual children.

"It's like an apprenticeship program where you can see different master teachers approach the same lesson in different ways, which is wonderful for all the learners," Baldacci says.

by Kay Hyatt

Innovations in teacher education



Cathy Lewis, Pendleton Street School principal, with students

Photos by Michele Stapleton

In a paradigm shift from the traditional model of placing and supervising student teachers in K-12 schools, the College of Education and Human Development's Master of Arts in Teaching (MAT) program involves entire school communities in educating the next generation of teachers.

In return, teachers receive a rare commodity in today's schedule- and standards-driven public schools. They get the time to work together with colleagues and young students, to do research and evaluation, to create new curricula and materials, and to improve their own instruction.

The University of Maine is now contributing more than ever to a national conversation about new ways of preparing teachers, and helping veteran teachers and administrators develop new schools.

The MAT program, rooted in collaborative research-based work with both future and practicing teachers, is attracting a high-quality national pool of liberal arts and science graduates seeking initial teacher certification. They are graduates from public universities and private colleges from Georgia to Canada, with majors in subjects from art history to veterinary science, and they come from a variety of work experiences, from ship's captain to engineer, from social worker to forest ranger.

In its first year, MAT was piloted in three partnership schools in Maine. Since then, its success has served as the model for the college's restructured undergraduate teacher preparation program. Both programs are based on a Professional Development School (PDS) model of public school/university collaborations that go far beyond providing a new setting for traditional student teaching.

The focus is professional development and children's learning at all stages of teacher and student interaction, and can include the education of administrators and other educational personnel.

Being part of a PDS is not just an experiment, according to Cathy Lewis, principal of Pendleton Street School in Brewer, Maine, which has been recognized by the national Holmes Partnership as a "Best Practice Site." "It means we have established a permanent relationship with the University to improve teaching and learning," she says.

The MAT Program gives every young student the opportunity to connect with a larger pool of competent and caring adults, which is especially helpful for at-risk children, says Lewis. The added value for all is continuous learning with additional human and fiscal resources and opportunities. Voluntary involvement in on-site staff development opportunities and research-based reflection on practice provides motivation and increased self-esteem for staff involved in the Professional School model. At all levels, teachers, interns and children have the opportunity to model and be involved with life-long learning.

Since 1987,
The University of Maine
Cooperative Extension
has been there to help the
state's microenterprises
every step of the way

When Smaller Is Better



MAYRA DONNELL first added goats to her farm menagerie because her three children were allergic to cow's milk. Eventually, she also used goat's milk to make cheese to sell at the local farmers' market.

As her children grew, so did her herd. By 1984, Donnell had children in college and too many goats on the farm. That's when she decided to find another use for goat's milk, this time to make soap and other personal care products.

"Soap of goatmilk was so much better than anything I'd made before," says Donnell, owner of Mayari Inc., based on Verona Island, Maine. "I use my own formulas and all-natural ingredients, from the preservatives to the thickeners.

"What started with two bars of soap has turned into 27 different products sold around the world."

Donnell is one of Maine's more than 118,000 owners of very small businesses employing four or fewer people — from bed and breakfast proprietors and small-scale food processors to producers of Maine-made goods and childcare providers — who have success-



fully capitalized on their great ideas. Using creativity, ingenuity and independent spirit, these entrepreneurs have found ways to make a living in their rural communities and contribute to the economic vitality of the state.

Since 1987, The University of Maine Cooperative Extension has been there to help them every step of the way.

"I have been very impressed with the knowledge and integrity of Cooperative Extension educators and specialists," says Donnell. "I went from attending talks and workshops to individual consultations with them. I learned not only the practical nuts and bolts of running a small business, but I received validation for what I was doing. Extension guided us, keeping us on track.

Having a home-based business can be so isolating, but the (Extension faculty and staff) help break that isolation through workshops and conferences, small business clinics and by networking us with other people.

"With their help, my business went from mail order and (participation in) a few shows to selling products through our own gift shop and marketing on the Web. I went from a sole proprietor business to a partnership and now incorporation. I also went from attending Extension's home-based business workshops and conferences to being a participant and presenting workshops to small businesses."

In June, Donnell's son, José, opened the doors on his home-based business called Engineering Commando, providing Web-based professional engineering consultation for



Mayra Donnell, left, of Verona Island has worked with The University of Maine Cooperative Extension business and economics specialist Jim McConnon for 12 years. Mayari goatmilk soap and other personal care products are now marketed worldwide.

“I’ve seen people reach their own goals and objectives by using research-based information to make better decisions.”

Jim McConnon

customers ranging from homeowners to corporations. Like his mother, José has already consulted with Cooperative Extension’s business and economics specialist Jim McConnon.

“In Maine, we are more active than many states in looking at the importance of small businesses in providing jobs and incomes to people, and in recognizing entrepreneurship as a viable economic development strategy,” says McConnon. “As a result, we are a leader in this country in the way we’re diversifying our

economy by balancing small, medium and large business development.”

THE UNIVERSITY OF Maine Cooperative Extension, directed by Lavon Bartel, provides Maine people with research-based educational programs to help them live fuller, more productive lives. Its involvement in small and home-based business development strengthens families and communities, and contributes to the state’s economic vitality.

In 1997 in Maine, microenterprises (including home-based businesses) represented a majority of business enterprises in Maine. These microenterprises provide about 20 percent of the employment opportunities in the state.

Approximately 50,000 Maine households have at least one person earning a significant income working in home-based businesses, McConnon says. Over the years, there have been declining opportunities in large-scale businesses in Maine. Especially in rural areas where job opportunities are limited or declining, small and home-based businesses enable people to live and raise their families in their communities.

Home-based businesses are integral to community building, says Joyce Kleffner, an Extension educator in Hancock County who has spent more than six years working in the field. By their very nature, small business owners can maintain closer relationships with customers and be more responsive to community needs for a product or service.

The success of small and home-based businesses in Maine can be attributed in large part to what a team of UMaine faculty and staff in Extension has been doing for many years. “Our purpose is to help these businesses succeed, and a lot of people are working to make that happen every day throughout the state. As a result, these businesses have been validated as a legitimate part of our business community,” says McConnon who, in addi-

tion to his educational outreach activities, conducts research on retail trade patterns, microenterprise and small business development as a UMaine associate professor of resource economics and policy.

Extension offers individual, confidential consultations for entrepreneurs, and publications and information through a Web-based virtual resource library. It also co-sponsors the popular Mid-Coast Home-Based Business Conference, and produces a regional radio show.

More than 30 workshops on topics such as developing a business plan, pricing products and knowing your market are held annually throughout the state.

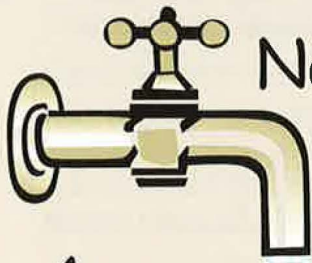
McConnon, who has worked with small and home-based businesses in Maine since joining the UMaine faculty in 1989, and his Extension colleagues assist people in any stage of their business life, especially if they are at the “thinking about it” stage. Extension’s small and home-based business program has helped 600 small businesses form, continue or expand their operations.

IN THE PAST DECADE, a high-caliber, visible and supportive climate has developed for entrepreneurs statewide. Coupled with a significant recession and relatively high unemployment in Maine in the last 10 years, more people than ever have pursued or contemplated the start of a small or home-based business.

McConnon credits the success to an effective team of Extension educators, as well as to Extension’s strong collaboration with other local, state and federal organizations.

“The most rewarding thing for me is being part of an effective team, and seeing the new skills that people learn and use to improve their businesses,” says McConnon, whom the U.S. Small Business Administration named the Home-Based Business Advocate of 2001 for Maine and New England.

by Margaret Nagle



Natural Arsenic

A STUDY OF high arsenic levels in the groundwater of the coastal Maine community of Northport has led to a new understanding of how the toxic element migrates under some conditions from bedrock into well water.

The results suggest that in some locations, high arsenic concentrations in groundwater are caused by natural conditions underground, rather than by land use activities, such as pesticide applications or industry pollution.

Northport residents first discovered unusually high arsenic levels in their groundwater in 1998. The

U.S. Environmental Protection Agency says that arsenic levels in well water should be no greater than 50 parts per billion. But in parts of Northport, the level was about 5,500 parts per billion. Arsenic can cause liver and kidney damage, as well as cancer.

Pursuing the mystery, UMaine hydrogeologist Andrew Reeve spent two years collecting water samples and conducting chemical analyses to determine the cause of the high arsenic levels. He found arsenic contamination was occurring naturally, apparently traveling from the bedrock itself into groundwater.

The UMaine examination gives communities and policymakers greater information with which to protect and remedy groundwater contamination.

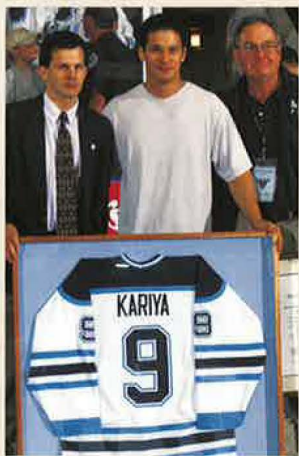


Photo by Monty Rand

Paul Kariya's Number Retired

THE UNIVERSITY of Maine officially retired ice hockey jersey number 9 worn by Paul Kariya during his career for the Black Bears. A presentation to commemorate the retirement was held July 1 as part of the Alumni Hockey Game.

Kariya, an all-star member of the NHL's Mighty Ducks of Anaheim, played hockey at the University from 1992-94, serving as captain of the team in his sophomore year. He helped to lead his 1992-93 team to a 42-1-2

record, one of the best seasons in college hockey history, and Maine's first Division I team national championship.

Kariya, an All-American while at UMaine, is the first and only freshman to win the Hobey Baker Award as the nation's best college hockey player. He was named to the Hockey East All-Decade team and inducted into The University of Maine Sports Hall of Fame in 1999.

Kariya is the 13th Black Bear to have a number retired.

Despite the recent roller coaster ride on Wall Street, student investors are playing the market and coming out on top.

SPIFFY Students Succeed

STUDENTS AT UMAINE are making money. A lot of it.

Forty students, mostly business majors, oversee the Student Portfolio Investment Fund of the University of Maine Foundation (SPIFFY). Meeting weekly to discuss the news on Wall Street and to make investment decisions, the students manage a portfolio worth more than \$900,000.

SPIFFY began in 1993 with an initial investment of \$200,000 provided by the University of Maine Foundation. Two years later, the foundation added another \$150,000. In each of the past five years, SPIFFY's funds grew an average of 15.3 percent.

The educational value of investing real money has been especially beneficial in recent months because of the stock market's decline, says Robert Strong, professor of finance and SPIFFY advisor.

"Most students have only seen a market that's gone up," Strong explains. "Now companies everyone thought were great investments are being hammered down. It's educational for students to see that the market can move substantially in both directions."

In April, SPIFFY was one of five student investment groups to be named "value style" finalists in the first annual University of Dayton National Student Investment Strategy Symposium. Nearly 50 universities from the U.S. and Canada participated. Strong says the judges were particularly interested in the group's use of options to reduce risk and to create additional portfolio income.

Virtual Vision

TWO UNIVERSITY OF MAINE engineering students have turned a bright idea into a low-cost prototype device to assist people who are blind.

Rachel Morehouse and Eric Soucie designed a "virtual cane" — a portable electronic device that transmits an ultrasonic wave and indicates to the user the presence of an object up to 8 feet away. The virtual cane senses how close it is to objects, and vibrates with different intensities depending on the distance.

Already the potential of the device is gaining recognition; it recently won the "Most Marketable" award in the Rochester Institute of Technology Student Design Contest.

The device, which measures 6 inches by 2 inches and can be

made smaller, operates on three AA batteries. The students kept the cost of building the virtual cane low — about \$20 worth of electronic parts and plastic casing — to create a device that consumers could afford.

The idea for such a device came from Brian Higgins of Brewer, Maine, president of the National Blind Veterans of America.

Morehouse and Soucie developed the virtual cane for their capstone engineering project, a final academic project graduating students undertake in which they identify and resolve a challenge through application of their engineering studies.

Morehouse and Soucie both received their bachelor's degrees in electrical and computer engineering May 19.

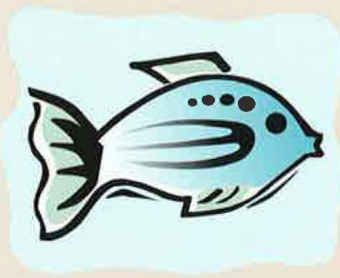
Monitoring Dioxin with Fatbags

A COLLABORATIVE effort guided by a graduate student in UMaine's Ecology and Environmental Sciences Program has resulted in a new technology to improve pollution monitoring of Maine's rivers.

Heather Shoven, a native of Kankakee, Ill., conducted the project in collaboration with environmental agencies, the Penobscot Indian Nation and other scientists in UMaine's Senator George J. Mitchell Center for Environmental and Watershed Research.

The technology Shoven studied is known as a "fatbag"—a semi-permeable membrane device, or SPMD, containing highly refined fish oil encased in a

membrane. The fatbag absorbs certain types of pollutants in the water and enables scientists to determine their concentration over



a specific amount of time. Through her work, Shoven has helped to develop ways to strategically deploy fatbags in Maine rivers and to analyze the data collected. The information gathered will give

environmental scientists a more consistent and accurate picture of dioxin levels in the water and the possible sources.

Environmental regulators currently monitor dioxin in Maine rivers by testing fish. But since fish are mobile and accumulate the toxin throughout their lives, that method is not as effective in pinpointing dioxin sources or concentrations that vary over time.

In 1997, Maine adopted a state law calling for more effective monitoring of dioxin levels in rivers, requiring the collection of information on dioxin concentrations both upstream and downstream from pulp and paper mills. The deadline for establishing an effective measur-

ing protocol is just two years away.

"By 2003, we need to determine the way to monitor dioxin to comply with the 1997 upstream-downstream law," Shoven says. "While the (conventional) fish test has proven effective, the high variability of dioxin concentrations in the fish has fueled a need to find a better test that can detect smaller potential differences."

Racing with the Sun

TWO STUDENT-designed vehicles powered by alternatives to fossil fuels gained attention at the annual Tour de Sol: The Great American Green Transportation competition that ended May 26 in Boston.

The University of Maine Solar Black Bear pickup truck took first in the solar commuter class, while a second UMaine entry, the Phantom Sol, a sleek electric-powered car, did not place but completed the race after the crew replaced a faulty component in the motor.

The nine-day event began in Waterbury, Conn., and covered a 324-mile route through New York and southern New England. The Tour de Sol is organized by the Northeast Sustainable Energy Association (NSEA), which promotes electric-drive vehicles and other transportation solutions that are fueled by cleaner, healthier, renewably produced electricity and fuels. The event includes entries from car manufacturers, as well as experimental vehicles from businesses and universities. In addition to solar power and electricity, sources of power



The Phantom Sol was equipped with a sophisticated braking system that recovers energy normally lost during deceleration, allowing the vehicle to travel further on a single charge of its batteries.

Photo by Paul Van Steenberghe

include biodiesel fuel, liquified natural gas and ethanol.

Both UMaine entries boasted distinctive features. The Solar Black Bear pickup truck was equipped with a large solar panel that could be folded for storage. When fully open, the panel covers 164 square feet and provides enough energy to power a home.

The electric Phantom Sol was equipped with a sophisticated braking system that recovers energy normally lost during deceleration. The car also has a sleek new lightweight body made of Styrofoam covered with fiberglass.

UMaine's team of students raised about \$20,000 from businesses, the Maine Department of Transportation and UMaine's College of Engineering to cover the cost of materials.

Team advisors Paul Van Steenberghe of the Department of Mathematics and Statistics, and Ben Dresser of the Department of Bio-Resource Engineering received the George Bradford Teacher Award from NSEA for their work on the Tour de Sol.

Pushing Up Daisies

They're pushing up daisies at The University of Maine.



Two new perennials — The Plainview Farm Daisy and the UMaine Daisy — have been developed for the nursery industry by researcher Donglin Zhang, assistant professor of horticulture.

Both plants are derived from the black-eyed Susan. But unlike the widely recognized late-summer flower with a single row of gold petals around a dark center, the blossoms of the new plants have multiple rows of yellow petals.

It took more than 11 years of breeding to produce the new plants.

The Plainview Farm Daisy was made available to Maine nurseries this summer as part of the ongoing efforts of UMaine's Landscape Horticulture Program to explore and develop new garden plants in the state. The UMaine Daisy is still in the testing phase and has not been released to the public. The goal is to develop new cultivars of native plants in an effort to increase the market share of Maine's nursery industry.

Photo by Donglin Zhang

DECOMPOSING Pesticides

A TEAM OF University of Maine chemists has reported that exposing pesticide-contaminated water to natural light and a mineral known as zeolite can dramatically speed up the breakdown of the pesticide. The finding could be useful in developing technologies for protecting drinking water supplies or improving environmental quality.

Among the pesticides studied was malathion, which is suspected of being a contributing factor in the recent deaths of lobsters in Long Island Sound. Malathion had been sprayed in the New York area to control mosquitoes thought to be carrying the West Nile virus.

Zeolites are naturally occurring volcanic minerals. Because of their honeycomb structure, they can absorb other materials, much as a sponge absorbs water. They are currently used in a variety of industrial processes and products, such as cat litter, shoe deodorizers, and aquarium and pond filters.

The UMaine team may be one of the first to study the technology for reducing pesticide concentrations in water, says UMaine Professor of Chemistry Howard Patterson, who led the research team.

In laboratory experiments, UMaine scientists tested commonly used agricultural insecticides that

have been detected in rivers and drinking water supplies in the U.S. Each compound breaks down naturally in sunlight, but the decomposition process showed “astonishing increases in the rate of each reaction” when an A-type zeolite was present, the researchers reported.

The reaction rates for malathion, carbofuran and carbaryl were 35, 120 and 164 times faster, respectively, than the rates for those compounds when the zeolite was not present.

To be used effectively to treat pesticide pollution, “it’s important to find the zeolite with the right size channels and surface chemistry” to facilitate the decomposition, says Patterson. “You want it tailored to the size of the molecule that you want to break down.”



Saxl with UMaine gavel

Space-Age Gavels

IN THE LATEST session of the Maine legislature, at least nine wooden gavels were broken in the House of Representatives by House Speaker Michael Saxl as he pronounced votes on bills and other matters.

That’s when a legislative colleague turned to The University of Maine for a solid solution to a problem of smashed gavels that, for years, has sent more than one House staffer ducking for cover.

At the request of Rep. Shirley Richard, the House chair of the legislature’s Education Committee, a UMaine engineer from the Advanced Engineered Wood Composites Center on campus designed and built three “space-age” gavels. The new gavels are made of wood laminates covered with a carbon fiber material to make them almost as strong as concrete.

Similar fiber-reinforced polymer (FRP) composite technology is being used by the center for bridge and pier construction projects throughout the state. Researchers also are exploring the use of advanced engineered wood composites in construction of disaster-resistant housing.

In June, the wood composite gavels were presented to Saxl, Maine Senate President Michael Michaud and President Pro Tempore Richard Bennett.

Photo by Andy Molloy

Sizing Up Ice Sheets

WHETHER THE ANTARCTIC and Greenland ice sheets are shrinking or growing has become one of the central questions in the study of global change and a focus of research in the Institute for Quaternary and Climate Studies.

University of Maine scientists are working to understand the physical processes that control ice sheet movement and the steps leading to their collapse after the end of the last Ice Age. One of the latest research initiatives is aimed at understanding how ice sheets respond to factors such as changes in climate.

“We use GPS (Global Positioning System) technology to make measurements of the ice sheets in Antarctica and Greenland,” says Gordon Hamilton, a research assistant professor. “We want to understand if the ice sheets are currently changing size and contributing to sea level rise.”

Hamilton has spent most of the last decade perfecting field techniques to collect reliable data. His field experiments entail measuring the vertical velocity of ice and comparing that with snow accumulation rates derived from ice core analyses. If vertical velocity exceeds snow accumulation, the ice sheet is getting thinner, and vice versa.

So far, the results of work by Hamilton and others suggest that the ice sheets may be thinning at the edges but getting thicker inland. Nevertheless, some stations show little movement while others are rising or falling, and no clear pattern has emerged.

Hamilton and a colleague, Ian Whillans of The Ohio State University, are currently funded by the National Science Foundation to carry out measurements as part of the International Trans-Antarctic Scientific Expedition.

Data collected will assume new importance after the December 2001 launch of ICESat (Ice, Cloud and Land Elevation Satellite) by NASA. ICESat will use lasers to measure elevations across the world’s ice sheets. Results of Hamilton’s work will be critical to the process of validating data from the satellite.

In advance of ICESat’s launch, Hamilton and colleagues have been conducting measurements in Greenland as part of the Program for Arctic Regional Climate Assessment (PARCA). This NASA-funded initiative combines ground-based GPS work with overflights by a research aircraft equipped with a laser similar to that on board ICESat. PARCA is providing valuable experience that will guide future work interpreting data from the satellite mission.

THE LAST VISIT TO MAINE by President John F. Kennedy included a stop at The University of Maine, where he gave an address and received an honorary doctor of laws degree.

That was Oct. 19, 1963. A month later, Nov. 22, 1963, he was assassinated.

The president was in Maine for an inspection flight over the proposed Passamaquoddy Power Project.

Kennedy appeared as part of a special convocation ceremony on Alumni Field during Homecoming. The 11 a.m. event drew an audience of 15,000; thousands more in Maine watched on television.

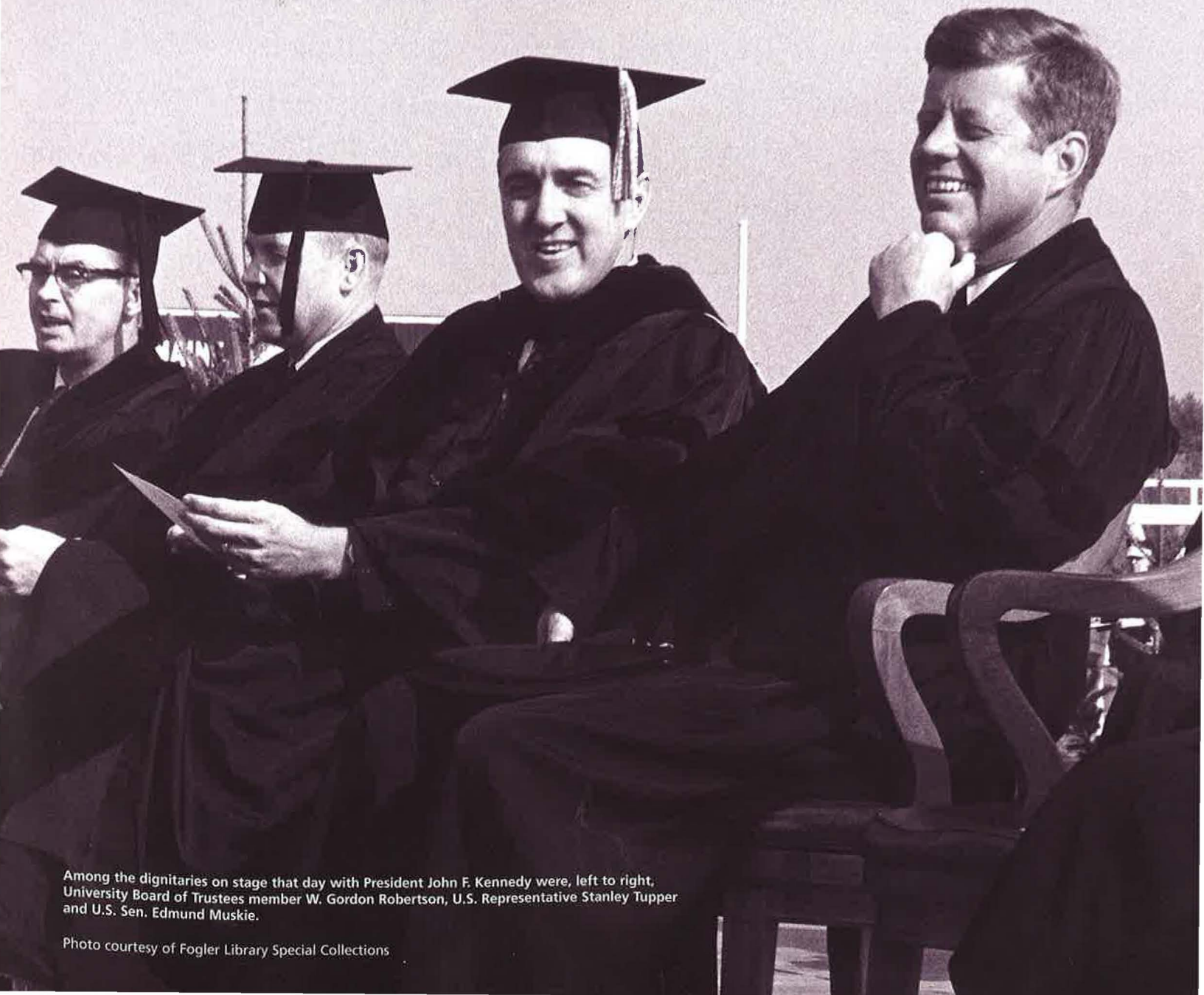
Kennedy's address focused on the meaning of the test ban treaty between the U.S. and the Soviet Union. He spoke on the need for a

more exact understanding of the "correlation of forces" needed to conduct foreign affairs, and the spirit of "both preparedness and peace" that made the nation strong.

"In the months and years ahead, we intend to build both kinds of strength, during times of détente as well as tension, during periods of conflict as well as cooperation -- until the world we pass on to our children is truly safe for diversity and freedom and the rule of law covers all," he said in his address.

It was the last policy speech the president gave.

In each issue, "Lasting Impression" features a memorable person or event in UMaine history.



Among the dignitaries on stage that day with President John F. Kennedy were, left to right, University Board of Trustees member W. Gordon Robertson, U.S. Representative Stanley Tupper and U.S. Sen. Edmund Muskie.

Photo courtesy of Fogler Library Special Collections

Emerick Endowment Honors Vision of Hudson Museum Founder

FOR MORE THAN four decades, Richard Emerick has helped young people understand the world around them. Initially, they were University of Maine students enrolled in the University's first introductory course in anthropology. Through the years, children of all ages benefitted from his commitment to creating an anthropology museum.

He did it, he says, to reach them.

"The Hudson Museum is where more than 76,000 people come to visit each year, including 3,500 school children and 900 UMaine students," Emerick says. "The museum is the place where the people of Maine can see and touch the wonder and the splendor of the human experience — things people of the world have made, used, loved and held in awe, and proudly left for us to gently care for and gratefully learn from."

Emerick spent his academic career at UMaine. What began as a classroom display of his ethnographic collections from the Arctic, Oceania and the American Southwest grew by 1964 to be an anthropology museum on the third floor of South Stevens Hall. With construction of the Maine Center for the Arts in 1986, the Hudson Museum became a reality.

Last year, in recognition of the vision and contributions of the museum's founding director, the Hudson Museum Advisory Board established the Richard Emerick Endowment Fund at the University of Maine Foundation. The endowment fund has a \$1 million goal, with \$16,600 raised to date. It is the largest endowment established on behalf of the museum.

"Such a fund is an important step in our growth as a professional museum," says Hudson Museum Director Stephen Whittington. "Museums everywhere have created endowments to support programs and exhibits, and to allow more flexibility in public offerings. The ultimate goal is to create a stable source of reliable income year after year."

Emerick retired from the University in 1991, ending a nearly 40-year teaching career in the classroom, but not in the world around him.

Richard Emerick, Iglulik Island, Northern Foxe Basin, Northwest Territory, Canada, 1953

Photo courtesy of the Hudson Museum



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