Reflections

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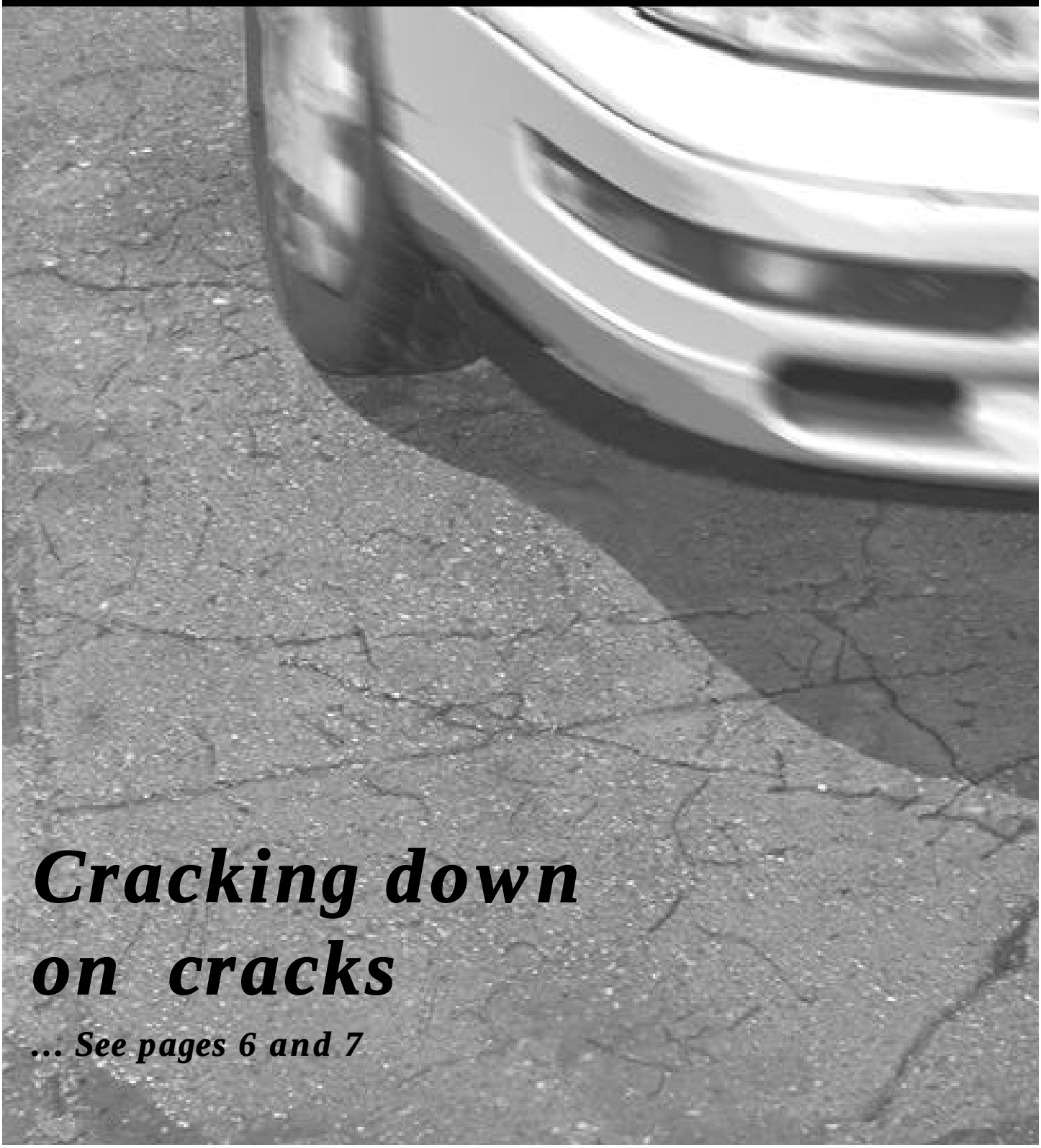

Cracking down on cracks

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Cover photo by Fred Rick

Reflections

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editor's journal

Safety at work ... and away

July is Safety Month at the Laboratory. While we're officially observing safety at the Lab a month later than it was observed nationwide, it doesn't hurt employees to have two months dedicated to getting across the importance of safety on and off the job.

I can't say it enough (some of you may remember I said it in the June "Reflections"), people who are safety conscious in their private lives are much more likely to be safety conscious on the job. That's why I believe the end result of any safety observance should be to get people to think of safety awareness as a way of life. In short, we should be aware of safety concerns no matter where we are or what we are doing. And we always should take the necessary steps to insure our safety and that of others.

With summer in full swing and the winter weary out and about, safety becomes a major concern for many people — but apparently not enough. Each year during the summer months thousands of people across the country are injured or killed in mishaps, particularly those involving cars, boats, bikes, swimming, hiking and home repairs. Many, and perhaps most, of these mishaps could have been avoided if simple safety precautions had been taken, such as not drinking alcoholic beverages and going into the water, wearing a bicycle helmet and obeying rules of the road, hiking with a companion and letting someone know where you are headed, and stabilizing ladders before climbing up.

And as a former speaker at the Lab attested to, some accidents in the workplace can be traced to summer and the tradition of taking a vacation. That is, some accidents happen because workers' minds are not on what they are doing but rather on how fast they can get it done and get out. Charlie Morecraft of Phoenix Safety Management Inc., who was seriously injured on the job during a fire at an Exxon refinery, told Lab audiences last year that it was his disregard for safety and his rush to leave on vacation that caused him to bypass safety procedures, an action that ultimately led to his accident. Morecraft, by the way, will return to the Lab to speak during this year's Safety Days, July 6 to 10.

I mention the connection between workplace accidents and the summer-vacation season not to suggest that we do away with vacations — that indeed could prove to be an "unsafe" move. The connection was mentioned to point out that once you truly become safety conscious, it doesn't matter whether it's an impending vacation or a project deadline; you aren't willing to take shortcuts with your safety or that of others, no matter how quickly you need to complete a task.

Charlie Morecraft

In observance of Safety Month, the Lab has planned a number of activities that will help make all of us more aware of safety issues. Included in the activities are safety demonstrations and displays of ergonomic equipment. The Lab also will distribute information on safety-related topics.

For specific information about Safety Month and other safety initiatives at the Lab, watch the Daily Newsbulletin at www.lanl.gov/newsbulletin or check out the Integrated Safety Management Program home page at www.lanl.gov/safety.

Employee gets a blast from his job

by Ternel N. Martinez

It's approximately 11:45 a.m. on May 7. Brad Lounsbury of Emergency Management and Response (S-8) and his Los Alamos Hazardous Device Team colleagues are just about ready to test a new disruptor they are evaluating. The disruptor is from a bomb squad equipment company. The test site is an open area in one of the more desolate areas of the Lab, Technical Area 49, just off State Road 4.

If successful, the device will open a briefcase without causing the contents inside — a plastic bottle filled with liquid simulating biological/chemical agents — to be dispersed by the triggering device. If the test is not successful, well, good thing it's a test.

Everything is set. Lounsbury and company retreat to the secondary Emergency Operations Center nearby. Three sirens sound, followed by "Fire in the hole! Fire in the hole! Fire in the hole!" announcements by Lounsbury over a loudspeaker system. Finally, the countdown: "Three, two, one …" A push of a button, followed by what sounds like a cap gun firing, and it's over.

Brad Lounsbury of Emergency Management and Response (S-8) and leader of the Hazardous Device Team displays what's left of a briefcase shortly after being subjected to a mini-disruptor. The mini-disruptor made a small hole in the briefcase's side at the point of entry and blew out the side at the other end, which is exactly what should have happened. *Photo by Fred Rick*

The verdict? Interestingly, there is no consensus among the evaluators as to whether the chemical agents would have dispersed if this had been a real emergency. So they do it over again with some modifications. This time, the device opens the briefcase without breaching the contents.

Such is life for Lounsbury, leader of the Hazardous Device Team. Lounsbury and his team constantly train to make sure they are ready to handle threats to the Lab and Los Alamos County, which fortunately have been extremely rare. Most of the training exercises take place within the confines of Lab property, but a few exercises take place offsite annually.

Lounsbury is the person Lab employees do not want to see near their work areas, because if they do, it means something either may be wrong or is definitely wrong. Whether it be an actual bomb, unattended briefcase, suspicious package or hazardous chemicals placed in areas where they shouldn't be, he is one of the people who deals with them. While much of his professional background is sensitive information and cannot be disclosed — indeed, much of what he does at the Lab is sensitive — he has been leader of the HDT since Jan. 13, 1997.

He also is a U.S. Navy veteran of more than 23 years, 20 of those years in the area of explosive ordnance disposal, an area that required him to be proficient in diving and parachuting. His primary duties involved locating, identifying, rendering safe and disposing explosive ordnance, foreign and domestic. He has worked with conventional, chemical and nuclear devices, as well as "improvised" explosive and other hazardous devices.

Lounsbury has led several ship, shore, mine countermeasure and mobile detachment explosive ordnance disposal teams. He is proficient in demolitions and burn operations. He has worked with the Technical Security Division of the U.S. Secret Service and the State Department and also was a member of various counterterrorism teams operating in North America, Asia and Europe.

He and his six-member team train at TA-49 and other areas about 28 to 32 hours a month on average. By comparison, the guidelines set forth by the FBI call for a minimum of 16 hours of training a month. "We try to get in as much training as we can," said Lounsbury, adding that he felt the HDT was the best equipped bomb squad in the western region by far. What kind of equipment is he referring to? Sorry, that's sensitive information as well. Whatever the team learns from their training and research is immediately shared with several state and federal law enforcement agencies, including the Santa Fe Police Department Bomb Squad, Los Alamos Police Department, FBI, Bureau of Alcohol, Tobacco and Firearms, and the International Association of Bomb Techs and Investigators. "It doesn't do us any good learning something that could help save lives and keeping that information to ourselves," he said.

Such information often is used as part of new training exercises, said Lounsbury. "We received information from the FBI about the types of bombs used on the abortion clinics in Atlanta and Birmingham. We took that information and built four similar bombs for use in training."

Survival skills can come from unlikely sources as well. While stationed in San Francisco, Lounsbury and some of his fellow divers were helping hearing-impaired and deaf students further develop their math and writing skills at a local elementary school. Later, while conducting an underwater operation, one diver tried to tell another that he had found an explosive device, but his communications equipment failed.

"I remember him saying afterward that we need to learn sign language, so the children we were helping taught us some key sign language phrases for us to use in underwater

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Director's colloquia

Seeking scintillating speakers

by Ternel N. Martinez

It was the late J. Robert Oppenheimer who established what now has become a Laboratory institution. Over the past 50 years, hundreds of individuals have taken part. Everything from astrophysics to computing to national security to early child development has been covered. Those involved have included politicians, scientists, academics, military personnel, heads of state, Nobel Prize winners, writers and many others. The institution is the Director's Colloquium.

To be sure, there have been changes regarding the Director's Colloquium since it became part of the Lab's culture in the 1940s. The majority of colloquia are now held in the Physics Building Auditorium instead of the Administration Building Auditorium. Most take place at 1:10 p.m. instead of 8:10 a.m. (speakers now get to choose between the two times). And instead of a colloquium held every Tuesday morning, the average is now twice a month.

So how does a person get to speak under the banner of a Director's Colloquium? Katie Crawford of Conference and Visit Management (PA-4) and a member of the Director's Colloquium Committee said the committee looks for three things in speakers: eminence in a particular field, good speaking skills and topics of broad general interest to the Laboratory.

She readily admits that sometimes the speakers have not exactly met all three criteria. "Sometimes it turned out they were not good speakers. Other times the talks were too technical in nature. But for the most part, we've been pretty satisfied with the quality of speakers," she said.

Director's Colloquium Committee Chair Jack Hills of Theoretical Astrophysics (T-6) said the six-member committee meets the first Friday of each month to discuss who should be recommended to the Laboratory Director to give a colloquium.

"Basically anyone can recommend a speaker to any committee member," he added. "The Director makes many suggestions as well." Speakers recommended by the director automatically are asked to speak at the Lab.

Regarding future colloquia, Hills remarked, "Many times, we've never even heard of the speaker being recommended. When that happens, the person who requested the speaker is asked to perform additional research on the speaker. Generally, I try to reach a consensus on whether we should try to bring someone to the Lab."

Committee recommendations are sent to the Lab director, who normally approves them and sends out invitations.

From that point on, it's pretty much a waiting game, said Crawford. "On average, six to seven weeks go by before we find out if the speakers have accepted our invitation. If they do, we pay them an honorarium of $700, plus a per diem. We pick up their transportation costs inside the United States and arrange for their stay in Los Alamos as well," she said.

In addition, many of the speakers are briefed after giving their colloquia on some of the current things the Lab is working on. "I like to plan their day with the help of a technical host, so that they can meet those working in their field and become familiar with the Laboratory," said Crawford.

With the speaker's permission, all colloquia are broadcast live on LABNET Channel 9. They also are taped and rebroadcast later on LABNET Channel 10. All speakers receive a tape of their talk, while the Lab keeps a copy to loan out to interested employees, said Crawford.

There are, Hills pointed out, some caveats to the honorarium. First, government employees do not receive an honorarium, nor do Lab employees. Second, and perhaps more important, the honorarium never exceeds $700. "We're trying to get that raised to $1,000," Hills said.

Both Hills and Crawford acknowledge that even if the amount of the honorarium is increased, it still is not enough for the Lab to attract many of the recommended speakers. "Some of the speakers that we would like to see come to the Lab even have agents, so you just know that attracting these speakers is next to impossible," Hills said.

Still, the Lab has been able to attract speakers who address standing room-only crowds, including Pulitzer Prize-winning author Richard Rhodes, geophysicist and comet-finder Eugene Shoemaker and Nobel Prize-winning physicists Steven Chu and William Phillips.

Nonetheless, Crawford and Hills both said they would like to see more recommendations for potential speakers from employees. They also said they hope more people start attending the Director's Colloquium. "We think there is a direct link between the level of morale at the Lab and the level of attendance," said Hills. "The level of attendance has improved over the past year or so, and we hope that continues."

"I remember the three years at Los Alamos as the most exciting in my whole life, both technically and personally. Three years … in which my metallurgical experience and imagination meshed intimately with the liveliest science and the strongest social currents of the time."

—Cyril Stanley Smith, circa 1944

Metallurgist remembered through scholar program

by Steve Sandoval

Cyril Stanley Smith was a pre-eminent metallurgist who came to Los Alamos during the Manhattan Project. He is remembered at the Lab today in part through the Cyril Stanley Smith Internal Scholar Program at the Laboratory's Center for Materials Science.

The program, now in its third year, is a one-year temporary staff member assignment to the CMS, which is part of the Materials Science and Technology (MST) Division. Cyril Stanley Smith scholars interact with the materials science community in several ways, according to Don Parkin, leader of CMS.

They provide mentoring opportunities for young staff members, promote and foster multidivisional participation in materials science, broaden scientific activities at CMS, build stronger interactions between the materials science community and Laboratory applied programs and contribute to intellectual growth in the materials science community, said Parkin.

"The Cyril Stanley Smith Internal Scholar program invests in Laboratory staff to contribute to their intellectual growth and value to the Laboratory," he said. Scholars and research topics are selected to enhance the Lab's productivity by combining fundamental materials science with the needs of applied programs, he said.

"Working at Los Alamos in wartime was an exciting and moving experience. The knowledge of the broad problems that would face mankind if the bomb was successful, the excitement of discovering the properties of a brand new element, the pressure and the isolation of the work, the personal association with many of the leading scientists of the day, the background of the fantastically beautiful New Mexico landscape — all combined to make the period unforgettable."

—Cyril Stanley Smith

Four Lab technical staff members have been Smith scholars. Their areas of research range from plutonium science to radiation damage of polymeric materials to plutonium resonant ultrasound spectroscopy, said Parkin. Present and former Smith scholars are Dean Preston of Nuclear and Hydrodynamic Methods (XNH); Olof Eriksson, formerly of CMS, Mechanics of Materials and Equation-of-State (T-1) and Condensed Matter and Statistical Physics (T-11); Joe Baiardo of Advanced Technology (NMT-6); and Pete Smith of Weapons Materials and Manufacturing (ESA-WMM).

"The program has been extremely successful so far … each one of the projects has made major contributions to the applied programs as well as educating the mentors and the fundamental materials science community on the materials science issues that are critical to the applied programs," said Parkin.

"In retrospect, the most valuable aspect from the point of view of a metallurgist is that physicists and metallurgists through enforced close association learned to appreciate the value of each others' special knowledge and viewpoint. This is in some degree responsible for the increased activity in the physics of metals that has been evident in the post-war period."

—Cyril Stanley Smith

Born in Birmingham, England in 1903, Smith worked at the Laboratory from 1943 to 1945. Educated at Massachusetts Institute of Technology where he later taught, Smith organized and directed the Institute for the Study of Metals at the University of Chicago after World War II ended. He died in 1992.

Laboratory technical staff members who want to participate in the Cyril Stanley Smith Internal Scholar Program should contact Parkin at at 7-9243, or write to *dmp@lanl.gov* by electronic mail.

Cracking down on cracks

by Steve Sandoval

George Guthrie or Bill Carey didn't come face to face with a giant pothole that swallowed their cars or even busted an axle, although that would be the more glamorous story to tell colleagues or at conferences in describing how they developed their alkali-silica reaction detection system.

It was actually in Baltimore in 1993, where Guthrie was giving a talk about, among other things, how minerals cause disease when inhaled and the adverse effects of silica minerals, when the two Laboratory researchers started down the road to developing the process they call ASR Detect. The technology could lead to a dramatic reduction in the construction costs and expand the lifespan of highways, dams, bridges and other concrete structures.

A representative in the concrete industry who was at the conference was concerned about the health effects of silica in sand and heard Guthrie's talk. He called Guthrie at the Laboratory, Guthrie recalled. A local television news station also had aired a story on bridges in New Mexico that were degrading due to alkali-silica reaction, or ASR, he added.

"It seemed like fate in a sense," said Guthrie, speaking from his office at Western Michigan University where he is teaching minerology, optical and environmental minerology this summer.

"It seemed like a good thing for us to be focusing on in terms of geochemistry and for the Lab," said Guthrie, who like Carey is in Geology and Geochemistry (EES-1).

Guthrie and Carey teamed with Robert Glasser, who formerly worked in the Lab's Energy Technology Program Office, and helped track down organizations concerned with ASR and concrete. Their investigations led to Ron Grover from the state Highway and Transportation Department in Santa Fe. Grover has long been interested in alkali-silica reaction and how the state road agency can more efficiently build and rebuild the thousands of miles of state roads the agency maintains, said Guthrie.

Bill Carey, left, rinses chemicals off a concrete core held by George Guthrie, before examining the core for the presence of alkali-silica reaction. Inset: An eyedropper is used to apply stain to a concrete core. The darker areas of the concrete core show where alkali-silica reaction has occurred. *Photos by James E. Rickman*

Hence the crash course in concrete. "We had to learn a lot about concrete. We were really novices," said Carey.

Concrete is a mixture of cement and aggregate, usually sand and rock. The alkali-silica reaction, which causes premature degradation of concrete, can occur when cement is mixed with aggregate rich in certain types of silica materials. The silica reacts with alkalis in cement and forms a gel inside the concrete. The gel expands dramatically in the presence of moisture and creates a network of microscopic cracks. Freezing and thawing make the cracks worsen over time, and eventually the concrete becomes structurally unsound.

Many of the world's bridges, dams, airport runways, roads and culverts show evidence of the alkali-silica reaction, which can significantly reduce the life of concrete structures.

Guthrie and Carey's invention is a fairly simple way of diagnosing ASR in concrete: a set of chemicals is poured on concrete core samples. If the degrading gel is present in the concrete, the chemicals stick to it and color it. Results can be obtained in minutes.

The technology has the capability of saving millions of dollars a year. Carey and Guthrie also are working toward a way of extending their technology to the early detection of ASR in individual concrete mixes. With early detection of alkali-silica reaction, contractors could determine whether the concrete they use is going to undergo quick degradation and find a different source of cement or aggregate, Guthrie said.

"But more important," said Guthrie, "we believe that with a greater understanding of these gels as a result of our research, we can now possibly determine exactly why these gels are forming and how to stop them."

The technology also won Guthrie and Carey and the Laboratory a 1997 R&D 100 Award, which signifies a new product, material, process, software or system with technological significance.

Carey said the state road agency has been instrumental in providing numerous core samples to test the technology. Last fall for example, Carey and Guthrie took core samples from Interstate 25 south of Albuquerque. The highway department was testing the effectiveness of lithium in preventing further damage due to alkali-silica reaction.

"They've been a really fantastic source to give this program a practical grounding," Guthrie said of the association with state road officials. Carey noted that both he and Guthrie are members of and are working closely with the American Association of State Highway and Transportation Officials.

Local governments also can benefit from the technology, the two Lab scientists said. Municipalities around the country, like state road agencies, typically resurface and rebuild city streets on a scheduled basis. Because concrete has developed a reputation of not being reliable, many local governments use asphalt on their roads. In reality, Carey said, concrete is cheaper and lasts longer than asphalt. Their technology can help road agencies weed out aggregates that are more susceptible to alkali-silica reaction, he explained.

Concrete dams also can be tested for alkali-silica reaction. Carey noted that the Army Corps of Engineers has tested their system on a dam in Alabama. It can be tested on airport runways and concrete railroad ties, said Carey, and on decorative or architectural concrete.

George Guthrie, kneeling, washes a concrete core taken from the Paseo del Norte overpass of Interstate 25 on Albuquerque's north side. The concrete cores were previously stained to test for alkali-silica reaction. Standing at right is Bill Carey. *Photo by James E. Rickman*

'Virtual Concrete Center'

by Steve Sandoval

Many companies have expressed interest in the ASR Detect technology developed by Bill Carey and George Guthrie of Geology and Geochemistry (EES-1).

The Laboratory's Civilian and Industrial Technologies (CIT) Program Office has received proposals from companies interested in commercializing the technology, according to Jolyn McTeigue of CIT. And several organizations, including the New Mexico Highway and Transportation Department, have tested the technology and are providing the researchers with results and independent evaluations, she said.

The Lab has established a "Virtual Concrete Center" that provides a mechanism to develop an integrated approach to concrete research. A World Wide Web site has been established to communicate Lab competencies as well as provide information about collaborative possibilities and funding sources for new concrete-related technology.

The CIT Program Office hosted two workshops last spring to promote internal and external collaborations in concrete. One was for 21 Lab scientists to talk about their research on concrete and to describe the Virtual Concrete Center. The other targeted businesses in the concrete industry for commercializing ASR Detect.

The commercialization workshop was held to answer any questions from companies interested in making ASR Detect commercially available. Industry representatives also provided additional information to Lab scientists on industry needs with respect to alkali-silica reaction.

Walterscheid takes helm of HR-7

Karen Walterscheid

Karen Walterscheid is the new group leader for Distributed Services (HR-7).

Distributed Services oversees the work of human resources generalists assigned to organizations around the Lab.

Human resources generalists oversee all HR activity for division and group offices Labwide.

Walterscheid has worked for the Laboratory since 1992. Most recently, she has run the Lab's Mediation Center in Human Resources.

Before joining the Lab, Walterscheid was a human resource generalist for the state Workers' Compensation Administration.

Walterscheid has a bachelor of science degree in psychology from New Mexico State University and a master's degree in public administration from University of New Mexico.

She has completed course work in mediation and advanced mediation from Pepperdine University School of Law.

Gourdoux named Lab fire marshal

James Gourdoux

James Gourdoux, group leader for Fire Protection (FE-21), has been named fire marshal for the Laboratory. Gourdoux has 25 years of fire protection experience, about 20 of those years at the Lab.

The selection of a fire marshal at the Lab fulfills a provision in Appendix G of the Department of Energy/University of California contract. Gourdoux had been the "de facto" fire marshal since becoming the FE-8 (then ENG-8) group leader back in 1983. "DOE had always abided by National Fire Protection Association fire codes," said Gourdoux. "The new DOE/UC contract also now formally refers to the NFPA, which stipulates that a fire marshal be selected."

He also said formally establishing this position should make it easier for Lab employees to know who to go to in case of emergency or for fire protection-related information.

Gourdoux, an Air Force veteran who at one time worked on infrared and radar-guided missile systems as an electronics technician, received a bachelor's degree in electrical engineering from the University of Florida in 1973. He then worked as a fire-protection engineer for Factory Mutual Engineering Association for three years before coming to the Lab in 1976, working in Engineering Design (ENG-2).

Krauser new leader for X-TA

Bill Krauser

Bill Krauser has been named group leader for Thermonuclear Applications (X-TA). Krauser served as acting group leader for X-TA for about a year prior to receiving the position permanently. The group is responsible for, among other things, the ongoing certification of thermonuclear weapons and inertial confinement fusion target designs. Most recently, Krauser served as leader for two-dimensional, integrated modeling robustness studies of the National Ignition Facility designs for the Lab's inertial confinement fusion program.

Krauser's other leadership positions have been deputy group leader for X-TA from July 1995 to June 1997 and associate group leader for Weapons Physics (X-2) from October 1980 to May 1985. The 26-year Lab veteran has expertise in physics design, analysis and assessment of thermonuclear weapons; physics design and analysis of ICF targets; analysis and assessment of foreign thermonuclear devices; code development; transport theory; alternative fusion concepts; and other technical fields. He also has several years of experience in line and project management and program development.

Krauser received his bachelor's degree in physics with special honors from the University of Colorado and his master's degree in physics from the University of New Mexico. He is a member of the American Physical Society and received the Department of Energy's Weapons Recognition of Excellence Award for NIF Target Design in 1994.

Woodruff receives award for contributions in science

William "Woody" Woodruff

William "Woody" Woodruff of Bioscience/Biotechnology (CST-4) recently received the Distinguished Alumnus Award from his alma mater, Purdue University. The 14-year Lab veteran and Laboratory Fellow received the award April 24 at Purdue for his contributions in science. He is an expert in the use of laser-based spectroscopic methods in biochemistry, bioinorganic chemistry and inorganic chemistry.

Woodruff received his master's and doctorate degrees in chemistry from Purdue in 1969 and 1972, respectively. He received his bachelor's degree in chemistry from Vanderbilt University in 1962, then spent the next five years in the U.S. Navy before pursuing advanced degrees at Purdue.

The Distinguished Alumnus Award is the third award received by Woodruff over the past 16 months. Last March, the Biophysical Society presented Woodruff with the Elisabeth Roberts Cole Award for his "pioneering developments of time-resolved infrared and Raman spectroscopies as structure-specific probes of solution dynamics of metalloproteins and photoactive states of inorganic complexes."

Later that same month, the Coblentz Society and the Society for Applied Spectroscopy presented Woodruff with the Bomem-Michelson Award for his "outstanding efforts in vibrational spectroscopy, particularly in its use in understanding the structural dynamics of biomolecules." Woodruff is the only scientist to have received both the Elisabeth Roberts Cole and Bomem-Michelson awards.

June service anniversaries

35 years
Bruce Erkkila, NIS-7
Robert Jameson, LANSCE-1
David Romero, BUS-5
Earl Tech, NIS-3
John Vigil, STB-LDRD

30 years
James Baran, NIS-IT
Robert Hotchkiss, X-CM
Jerome Jacoby, X-NH
Maxie Kelly, ESA-WE
Luke Ney Sr., ESA-WE
Roger Stutz, NIS-DO
David Watkins, NIS-NAC
James Wilmarth, LANSCE-6

25 years
Eugene Farnum, MST-8
Peter Garcia, CIC-10
Roger Johnson, LANSCE-5
Richard Keller, CST-1
Donila Martinez, DIR
Ralph Martinez, FE-9
Victor Martinez, X-CI
Donald Salazar, NIS-3
Cathy Stallings, CIC-3
Cecil Stark Jr., DX-6
Gerald Strickfaden, NIS-9
Donald Temer, NMT-1
Olin VanDyck, GR
Gary Worth, NIS-6

20 years
Michael Banaszek, BUS-4
James Blacic, EES-4
Leonard Busch, NMT-5
R.A. Christensen, NIS-3
Jadine Davis, NMT-1
Clarence Duffy, CST-7
Guy Estes, X-TM
Michael Fletcher, DX-2
David Gallegos, MST-6
James Gourdoux, FE-21
Terry Hahn, NMT-1
Robert Harris, EM-RLW
A. Levonne Hoerr, P-DO
Faye Hsue, NMT-4
Wallace Hunter, LANSCE-1
N. Jacques-Martinez, NMT-9
Nathaniel King Jr., AA-2
Carol Ladelfe, EES-1
Richard Less, MST-6
Stephen Levings, CIC-12
Mark MacInnes, LS-6
David Mandell, X-CI
Fredie Marshall, CIC-5
Leonard Martinez, CIC-1
Charles Montaño, AA-3
Yvonne Montoya, ESH-12
David Nochumson, ESH-18
Carl Ostenak, S-DO
Edward Partridge, LANSCE-5
David Poling, X-TA
Richard Prael, X-CI
Robert Pruner, NMT-8
John Purson, NMSM-MS
Gary Rich, CIC-13
Cora Roybal, ESA-WMM
Mary Ruminer, CIC-1
Elmer Salazar, CIT-TC
Roberta Salazar, LANSCE-4
Gary Secrest, MST-FAC
William Spencer, DX-8
Barbara Stine, NWT-PO
Michael Stout, MST-8
R.B. Strittmatter, NIS-7
Daniel Strottman, DDT-DO
Paul Trujillo, FE-9
Charles Wingate, X-HM

15 years
Cindy Bell, ESA-WMM
Carlos Cabildo, CIC-4
Kenneth Chidester, NMT-9
William Coulter, DX-5
Theresa Cull, MST-FAC
B. Joan Essington, ESH-2
Jo Fowler, QP
Larry Hersman, LS-7
Rebecca Johnson, EES-IGPP
Andrew Lawson, MST-8
Eugene Lemanski, FE-6
Christina Lynch, NMT-9
Angela Martinez, BUS-2
Joseph Martz, NWT-STKMGT
Cindy McAtee, CIC-1
Mary Ellen Ortiz, CIO
Joseph Pilat, NIS-NAC
Donald Prather, AA-3
Dennis Remelius, CST-1
Debbie Rodella, MST-6
Marvin Sanchez, CIC-4
Cathy Schuch, CST-DO
Karl Shrouf, NIS-4
Harold Sullivan, TSA-11

10 years
Barbara Addessio, CIC-12
Susan Bailey, LS-4
Ileana Buican, CIC-1
Susan Coghlan, CIC-ACL
Wolfgang Dworzak, NMT-6
Shirley Herrera, CIC-13
Donna Hofmann, NMT-1
Robert Kelly, P-22
David Knapp, EM-RLW
Victoria Moya, CIC-9
Jon Nielsen, NMT-2
Ida Romero, FE-6
Peter Sheehey, X-NH
Kendall Springer, MST-11
Daniel Taggart, CST-7
Shirleene Westerhold, BUS-1

5 years
Stephen Betts, CST-7
James Carey, EES-1
Stephen Costigan, ESH-1
Krystyna Dziewinska, CST-7
Jacek Dziewinski, CST-7
John Finn, T-15
Terry Holesinger, MST-6
Allan Johnston, BUS-DO
David Lee, ESH-12
John MacDonald, NMT-3
Frank Perry, EES-13
Daniel Quinlan, CIC-19

Employee gets a blast ...

continued from Page 3

training and operations," he said. Incidentally, the volunteer work that Lounsbury and his team performed for the children earned them a 1,000 Points of Light Award from President George Bush in 1991.

Lounsbury considers himself very lucky to have suffered few accidents throughout his career as a bomb tech, both in training and in real life. He credits his good fortune to the various teams he's been on. "You've just got to have teamwork and trust among your fellow team members to do the kind of work we do. If you don't have that trust, if you can't count on your fellow team members, people die," said Lounsbury.

"These guys are just so professional and knowledgeable. I couldn't have asked for a better bunch of guys to work with. Without them, I'm nothing."

Like everyone else at the Lab, Lounsbury certainly hopes he never has to respond to a real bomb situation at the Lab, but he and his team are ready and on call 24 hours a day, just in case. So if one day you happen to hear some kind of boom emanating from somewhere out in the middle of nowhere, don't assume you just heard a test shot conducted by some division or program office. It may be Lounsbury performing more tests or exercises, honing his skills for a day that he hopes never comes.

In Memoriam

Tom Gregory

Retiree Tom Gregory, one of the first electron microscopists in the country, died March 30 in Batesville, Ark. He was 68. He came to the Lab in 1963 and first worked in GMX Division, where he was responsible for transmission and scanning microscopy of a variety of materials and microscopy technique development. He also performed small particle characterization and was an electron optic consultant. At one time, Gregory was in charge of the Lab's electron microprobe, deemed essential in the field of petrology. He left the Lab briefly in 1974 but returned a year later, working for a number of groups in the Laser Research and Technology (L), Materials Science and Technology (MST) and Chemistry-Metallurgy "Baker" (CMB) divisions. During his career, Gregory patented a method for inspecting inaccessible surfaces. He retired in 1984.

"Science at Home" is a publication developed by Science Education (STB-SE) to interest children, particularly those in grades four through eight, in science through hands-on activities. We are reprinting experiments from the book, along with other scientific activities, for employees to share with their families, or just to enjoy themselves.

Pumping Up

Air, like water or rock, is a type of matter. In order for something to be matter it must have volume and mass. Air can be weighed, it has mass, and it has volume, meaning it takes up space.

In 1654, Otto Von Gueicke devised an awesome experiment to prove how forceful air can be. After sealing together two hollow copper hemispheres, which were about 20 inches (50 cm) in diameter, he pumped out all the air and challenged anyone to pull this air-tight ball apart. Finally, after numerous failures, two teams of eight horses, broke the seal and pulled the hemispheres apart. What force held the hemispheres together? **Air pressure!**

In this activity you will change air pressure to pump water from one place to another. You will also discover how matter changes when it is heated and cooled.

The stuff you'll need

1 flexible straw; 1 small 16 ounce plastic soda bottle; glass of water; clay or electrical tape; blow dryer; and food coloring

diagram 1

diagram 2

Here's the plan

1) Put a straw in the plastic bottle and press clay or tape around it to seal the opening around the straw (diagram 1). Make sure the seal is complete.

2) Mix two drops of food coloring into the glass of water until the color is even.

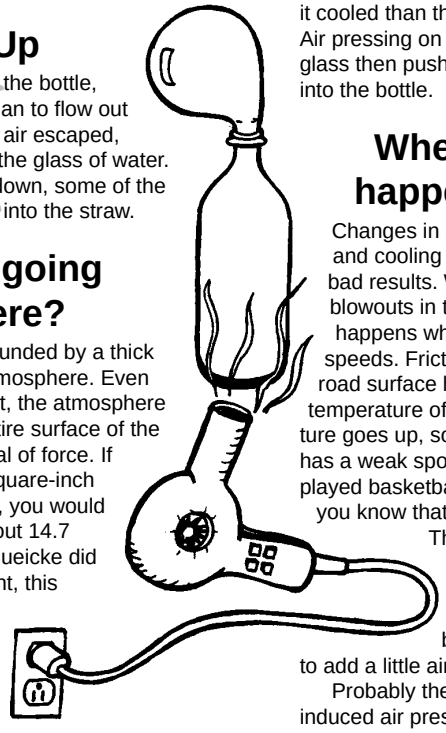
3) Place the bottle upside down into the water (diagram 2).

4) Use the hair dryer to slowly heat the bottle. Make sure you keep the heat on low or you may melt the plastic. What is happening? Why do you think this happened?

5) What do you think will happen when the air in the bottle begins to cool down? Turn the hair dryer off and set it aside. Observe what happens as the bottle cools.

Wrap-Up

When you heated the bottle, the air inside of it began to flow out through the straw. As air escaped, bubbles appeared in the glass of water. As the bottle cooled down, some of the water was sucked up into the straw.



What's going on here?

Our Earth is surrounded by a thick layer of gas called atmosphere. Even though we don't feel it, the atmosphere is pressing on the entire surface of the Earth with a great deal of force. If you could cut out a square-inch chunk of atmosphere, you would find that it weighs about 14.7 pounds. When Von Gueicke did his famous experiment, this weight or air pressure kept the hemispheres stuck together.

Air pressure continuously changes as it heats and cools. To understand how this happens, we must look at the structure of matter. All matter, regardless of whether it's a solid, liquid, or gas, is made up of tiny invisible particles called molecules. They constantly move, vibrating back and forth. In gases like air, the molecules are fairly spread out. When heated, the molecules vibrate faster, bouncing off each other and causing the gas to expand. When gases are cooled, the vibrations slow down and the gas contracts.

When heating air in a sealed container, the trapped gas tries to expand and the pressure inside the container increases. You may have noticed that spray paint and other aerosol cans have a warning label that tells you not to incinerate, or burn, them. That's because they have so much gas in them, that even a little extra heat would increase the pressure and blow up the can!

The relationship between gas temperature and pressure was discovered in the late 1700s by French scientist Jacques Charles. Known as Charles' Law, it states that the volume of a gas is equal to the temperature divided by the pressure. This formula explains what happened in your experiment. At first, the air in the bottle was the same temperature as the air outside, so the pressure was the same. When you heated the air inside the bottle, it expanded, but because it was confined, its pressure also increased. Since there was a small opening through the straw, however, some of the high-pressure air escaped the bottle into the straw and bubbled out through the water in the glass. This reduced the total amount of air left in the bottle. As the air in the bottle cooled, it contracted and its pressure decreased. Since some of the air escaped, the air pressure inside the bottle actually wound up lower after it cooled than the pressure of the air outside. Air pressing on the top of the water in the glass then pushed the water up the straw and into the bottle.

Where does this happen in real life?

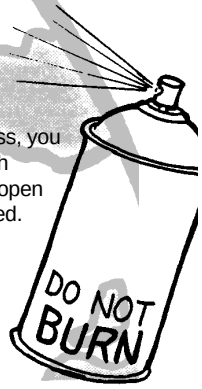
Changes in air pressure due to heating and cooling happen all the time, often with bad results. When people experience blowouts in their car tires, it usually happens when a car is traveling at high speeds. Friction between the tire and the road surface heats the rubber, raising the temperature of the air inside. As the temperature goes up, so does the pressure. If the tire has a weak spot, ka-boom! If you have ever played basketball or volleyball on a cold day, you know that the ball often "goes flat." That's because the cold temperature makes the air in the ball contract, reducing its volume and pressure. To make it bounce again, you have to add a little air.

Probably the most common temperature-induced air pressure changes have to do with the weather. When the sun shines on Earth's surface, it begins to get hot. Air at the surface expands and rises. Since air is a fluid, new cool air rushes in to take the place of the warm air and presto! The wind blows.

Now try this

A good place to observe changes in air pressure is in a hot air balloon. To make your own, place a flexible, round balloon over the top of an empty 2-liter soda bottle. Heat the bottle with a hair dryer for one minute and observe what happens to the balloon. After allowing the bottle to cool down, remove the balloon and stick the bottle into the refrigerator for five minutes. Take the bottle out and replace the balloon and heat it again for one minute. What changes occurred?

Use air pressure to crush a bottle without ever touching it. Use a plastic 2-liter bottle with a cap. Open the bottle and heat it with a hair dryer for one minute. Quickly screw the cap on very tight. Allow the bottle to cool and observe what happens. To speed up the process, you can place the bottle in a bowl with some ice. When you heated the open bottle, some of the hot air escaped. When the bottle cooled with the cap on, the pressure inside became less than the outside pressure, so the bottle gets crushed by air pressure.



This month in history

July

1598 — Don Juan de Oñate reaches the confluence of the Rio Grande and Chama River, where he establishes the first Spanish capital in New Mexico

1884 — The Statue of Liberty is presented to the nation by France

1866 — The metric system becomes a legal measurement system in the United States

1908 — The Federal Bureau of Investigation is established

1941 — The British MAUD committee reports that an atomic bomb is feasible

1945 — The USS Indianapolis delivers atomic bomb components to Tinian Island for final assembly

1946 — Operation Crossroads begins with atomic bomb tests at Bikini Atoll

1957 — The International Atomic Energy Agency is established by the United Nations

1967 — The Freedom of Information Act goes into effect

1976 — The first pictures from the surface of Mars are received, courtesy of Viking I

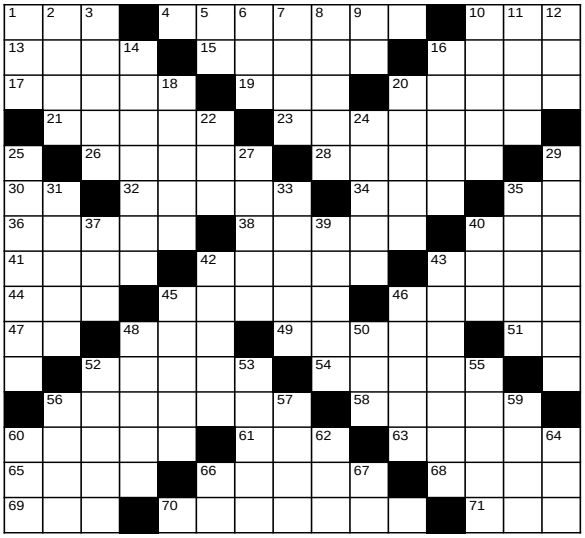
1981 — The Laboratory signs a contract for a private company to operate its security force

1994 — The Lab's Materials Science Laboratory is dedicated

1996 — The Laboratory halts work for safety reviews following an accident involving a student who received an electrical shock

Syndicated material Removed at the request of the syndicate

Declarers of Independence



ACROSS

1 Signer from Virginia
4 Signer from Connecticut
10 Small marsh or swamp
13 Sworn declaration
15 20th century conductor
16 Island that disabled Napoleon
17 Musketeer
19 Posed as a model
20 Type of firecracker
21 "— — Cerebus," bribe to conciliate troublesome person (2 words)
23 Greek god
26 Toast in Scandinavia
28 Be a stool pigeon, again
30 Equally
32 Signed one's name to
34 Woman's nickname
35 Symbol for lightest metal
36 Onetime person of rank in Scotland
38 Clever, scintillating
40 Part of overalls
41 Signer from Pennsylvania
42 Arranged layers
43 Possess
44 Exasperate
45 Italian song composer
46 Provide food
47 Above and in contact with
48 Benign skin tumor
49 Has killed
51 Saint (abbrev.)
52 Harbors
54 Signer from South Carolina
56 Signer from Maryland
58 Busybody
60 City where declaration was signed (abbrev.)
61 Objective
63 Describing common skin problem
65 Female red deer
66 Signer from Massachusetts
68 — Coast in Hawaii
69 Frozen water
70 Signer from Connecticut
71 Sought public office

DOWN

1 Mauna —
2 Consumes
3 Thought processes characteristic of an individual or group
5 Bone
6 — Alamos
7 Tribal group
8 Often wet mammal
9 Note on scale
10 Brusque; dull
11 Award for off-Broadway theater
12 Dubious "gift"
14 Signer from Rhode Island
16 "… that all Men are created —…"
18 Signer from Maryland
20 Wander off
22 Type of tree
24 Nuisances
25 The signers were not the sunshine version of this
27 Signer from New York
29 An Unalienable right
31 Removed by cutting or clipping
33 Tries to lose weight
35 Mutually pledged by signers
37 Question
39 Sound made by some birds
40 Club, mallet
42 National forest in Arizona
43 Signer who was also president of the Continental Congress
45 Earth
46 One of the conspirators against Caesar
48 — Series
50 Affirmative votes (alt. sp.)
52 Signer from Massachusetts
53 U.S. Sen. — Gorton
55 Mutually pledged by signers
56 Smart, swank, modish
57 Fibber
59 Recent secretary of energy
60 Greek letter
62 Signifying a Minnesota company
64 Man's nickname
66 Exclamation of surprise
67 South America (abbrev.)

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spotlight

Puppets pave way to communicating with kids

Editor's note: Liz Padilla is an undergraduate student in Public Information (PA-1), where she is learning about communication and helping the group, particularly in taking photographs. We learned that Liz has been involved in a particular form of communication that is important for one segment of the community and asked her to write about what she does and how she got started.

by Liz Padilla

Trying to capture, and then hold, the attention of young children is a true challenge. While teaching Sunday school to 5- to 8-year-olds in Chimayo several years ago, I tried doing it with homemade puppets. It seemed to work, and now I have a family of 14 life-size puppets that helps me entertain children and young teenagers and give them guidance about some of the difficult choices they will face in life.

The first puppet I made was a mouse whose name was "Kiko," short for Francisco. Kiko told stories about past experiences at church using pictures I illustrated. This was basically a way of teaching children how to behave in Sunday school. The children soon forgot I was in class and talked to the puppets.

Later, I created three adult puppets who took on different characters at different times and started performing for other church activities. I used two of these puppets to portray two old-time favorites in Hispanic folk stories, Don Cacahuate (Mr. Peanut) and Dona Cebolla (Mrs. Onion), who argue and quarrel about every issue on Earth. Dona Cebolla is always right, and Don Cacahuate is always being corrected for his silliness. In the end, they find a way to kiss and make up.

To make the puppets, I use a plastic butter lid as the foundation for the mouth. I cut it in half and glue it to the upper and lower parts of the mouth, which I have already cut from flannel material and sewn together to form the head. Then, I cut out the arms and sew them to the body. I can now stuff the puppet with polyfil, a soft fill material, leaving a slit at the bottom to put my hand through and maneuver the mouth.

I design each puppet's face to emphasize unique characteristics. I use yarn or a costume wig for the hair, felt or plastic for the eyes and a big piece of flannel stuffed with polyfil for the nose, which can be any size. The ears are cut from material and molded with a needle and thread.

I then look for used clothing to dress them up and give them a personal look or appearance. Some people have told me that some of my characters look like their friends and relatives.

In 1994, I brought my puppets to Northern New Mexico Community College, which I was attending as a fine arts student. Cipriano Vigil, director of the Fine Arts Department and a musician, loved the puppets, and we started performing for college activities. Arsenio Cordova, theater instructor and musician, also helped bring the puppets to life by playing the guitar and singing.

In addition to promoting the cultural tales of the Hispanic people of Northern New Mexico, I use the puppets to urge students to remain in school and not use drugs. I have created several 10- to 15-minute scripts on these issues and others such as self esteem, sex, eating disorders and gangs.

Liz Padilla and her puppet family. *Photo by LeRoy N. Sanchez*

In 1997, Northern New Mexico Community College and I jointly received a grant from the New Mexico Women's Foundation to create workshops and puppet shows based on issues important to seventh-grade girls. I prepared 200 kits with materials, instructions and a pattern on how to make a hand puppet. I helped the girls prepare their own scripts, and the workshops came to an end with a carnival, during which they presented their shows to the community.

So far, I estimate I have given more than a hundred shows and performed before thousands of children. I believe the puppets have been an effective educational tool because they're fun for the children.

After my last presentation and the workshops at the college, I received a lot of positive feedback from the schools. I was especially touched by one little girl who said the shows made her feel good about herself. I believe if there is one person who is touched by the messages, it makes all the work worthwhile.

Reflections
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