Reflections

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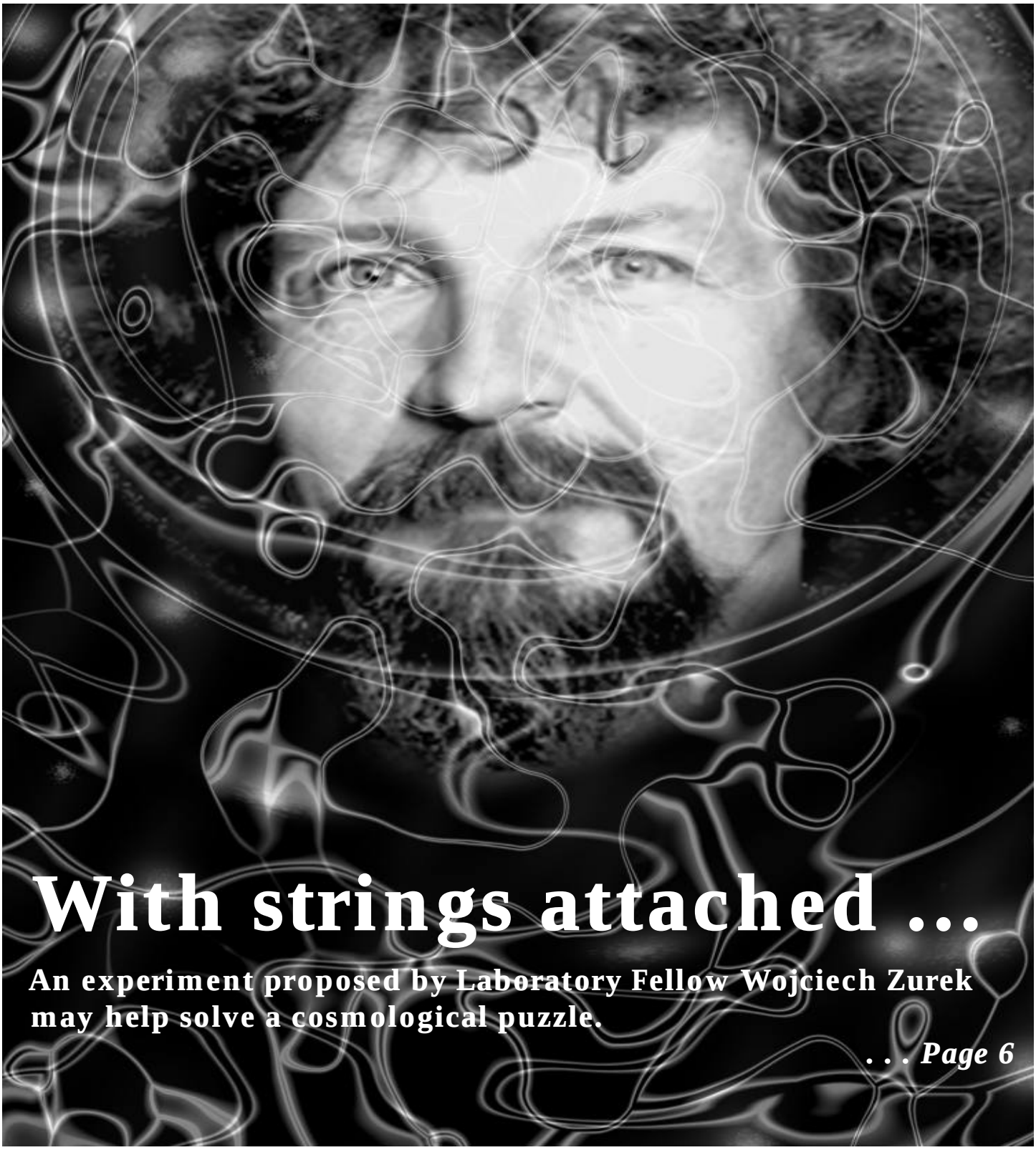

With strings attached ...

An experiment proposed by Laboratory Fellow Wojciech Zurek may help solve a cosmological puzzle.

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Inside this issue ...

Cover illustration by Edwin Vigil

Reflections

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editor's journal

Preoccupied with pondering

Maybe it's the winter weather, but I've been in a pondering mood lately. I've focused on nothing grand, mind you, such as the meaning of life, the wonders of science, whether other life forms exist in the universe or even why the number of working groups and action/CQI teams at the Lab seems to be on an upswing. No, my thoughts have run a less complicated course. For instance, I've recently pondered the meaning behind the number of events Americans observe each year.

For some time, I've thought the number of these events was on the rise, but it wasn't until a co-worker showed me a list of events observed in February alone that I really began to think about the things Americans observe and what I think this observing means.

Did you know that in February more than 25 month-long events are celebrated? February is American Heart Month, Human Relations Month, Marfan Syndrome Awareness Month, Great American Pies Month, International Friendship Month, Canned Food Month, Shape Up with Pickles Time, National Develop Your Self-Esteem Month, Creative Romance Month, National Cat Health Month, National Macadamia Nut Month, National Meat Month, American History Month in Massachusetts, Return Shopping Carts to the Supermarket Month, Virginia Reading Month, Humpback Whale Awareness Month and National Snack Food Month, just to name a few. Valentine's Day, Presidents Day, Be An Encourager Day and National Freedom Day also fall in February.

When I first looked over the list of February events, I chuckled and thought, "This is getting out of hand." But after giving it more serious consideration, I decided it's not for me to say something shouldn't be observed or commemorated just because the subject has no apparent relevance to me. After all, February also is Black Heritage and Black History Month, and I would be among the last to say we should do away with events acknowledging segments of the population that have contributed to the richness of American life but whose contributions often were overlooked or denied in the past.

I think observing events such as Hispanic Heritage Month, Native American Month, Asian-American Month, Women's History Month, Veterans Day, Presidents Day, Martin Luther King's Birthday, St. Patrick's Day, Columbus Day and Thanksgiving are important reminders to us and our children of what it takes to make a United States. The richness and uniqueness of our country is evident in the myriad events that we Americans deem worthy of celebrating.

So what if the number of these events is growing? If designating February Humpback Whale Awareness Month educates or helps at least one person to appreciate the role these creatures play in Earth's cycle of life, it seems worthwhile to me.

And now that I know February is Return Shopping Carts to the Supermarket Month, I'm going to make a conscious effort to return all the shopping carts I use to proper stacking locations in my supermarket's parking lot. OK, so I'm not exactly doing what the name of the event asks. I'm sure my car, which has had its share of shopping-cart dings, and the cars of others will thank me nonetheless.

Now that I've pondered the growing number of events Americans observe, maybe I'll turn my thoughts to the real or imagined increase in working groups and action/CQI teams at the Lab.

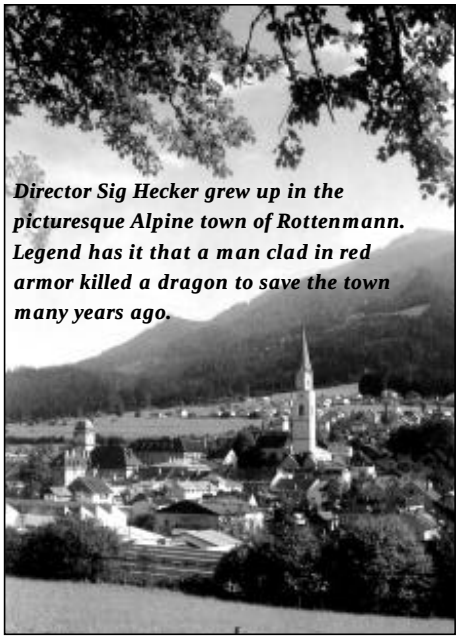
Then again, maybe not.

Love to ski

by Director Sig Hecker

Most people know I love to ski. For me it's no accident; I grew up in Austria where skiing is a way of life and Michael Jordan fame is reserved for superskiers such as 1976 Olympic downhill champion Franz Klammer.

I grew up in the small, picturesque Alpine town of Rottenmann, about 100 kilometers southeast of Salzburg. Legend has it that a man clad in red armor killed a dragon to save the town many years ago. Along with the other 4,800 residents, I was grateful for his deeds. Skiing was easy; the town was strung out along a river valley with mountains reaching high on both sides. There was plenty of snow. Lifts were a bit of a problem; there was only one J-bar on one of the hills and even that one my family could not afford to use.



Director Sig Hecker grew up in the picturesque Alpine town of Rottenmann. Legend has it that a man clad in red armor killed a dragon to save the town many years ago.

However, hiking up the mountain was made relatively easy because in 1949 when I got started as a six-year-old, bindings consisted of a metal toe-box and leather straps that allowed your heel to lift. Skis were one-piece construction of hardwood (typically ash or hickory). Boots were leather, lace type. Before I left for America as a 13-year-old, I acquired a love for ski jumping.

There was no Gore-tex fabric, of course. I still vividly remember coming in from skiing, taking off my frozen corduroy pants and standing them up by the wood and coal burning stove, hoping they'd be dry by the next day. Our family also lacked most other modern amenities since we lived in a converted German Army barrack. Electricity was all we had. We had no central heating, no running water and only outhouses a few hundred meters from our barrack. But, we didn't know any better, so we never considered these living conditions to be a hardship.

Skis served a practical purpose as well. Getting to school in the winter often was possible only on skis. We never had snow-day delays or cancellations. Skis also proved valuable when mother sent us to get milk from the local dairy farmer.

My skiing career was interrupted when my family immigrated to Cleveland, Ohio, in 1956. Cleveland had plenty of snow, but no mountains. I did not ski again until I was 20 years old. Even then, the hills outside Erie, Pa., and those in western New York state were a far cry from the Alps. I did not resume real skiing until I came to Los Alamos in 1968 for my postdoc years. Two winters here convinced me that I would wind up somewhere in the Rocky Mountain states.

Following my postdoctoral appointment at Los Alamos, I went to work for the General Motors Research Laboratory outside of Detroit. The Boyne Country in Michigan had hills with about half the vertical drop of Pajarito Mountain. Unfortunately, they typically were a four-hour drive from our house.

This is my 27th ski season on Pajarito Mountain, including serving on the board of directors of the Los Alamos Ski Club and as its president in 1980 through 1981. I have been quite fortunate in having had many occasions to ski the Rocky Mountains and Canada, including helicopter skiing in British Columbia.

I also have enjoyed the revolution in ski equipment over the last couple of decades. Solid wood skis gave way to laminated wood skis, followed by metal, fiberglass-reinforced plastics and ceramic-reinforced or graphite-fiber-reinforced composites (a testament to the ingenuity of materials scientists). Ski design has changed in revolutionary fashion just over the past six to seven years. The first breakthrough was the handy work of our own Bucky Kashiwa of Fluid Dynamics (T-3) (who used to design skis for K2 before joining the Laboratory). Bucky developed the cap ski concept: an ingenious technique of controlling the ratio of a ski's torsional flex to the longitudinal flex. He increased the torsional stiffness by shaping the top and side skins of the skis as one unit (like a cap). This allowed him to decrease the thickness of the ski for increased longitudinal flex. The result was a ski that can hold an edge on hardpack while conforming easily to uneven snow conditions or bumps. He made the skis out of stainless steel. Virtually every other ski manufacturer in the world has adopted this technique, but using different materials.

The second revolution came in powder skis. Most people have trouble keeping their skis afloat in powder snow. A few years ago, an Austrian company experimented with a very wide ski to provide floatation even in the deepest snow or on wind crust. After a few iterations, ski manufacturers perfected what is now referred to as the "fat" ski. It has changed powder skiing forever, making it easier for a beginner to learn and taking less of a toll on the legs for experts.

The third revolution was shaped skis. Skis were typically designed to be somewhat narrower in the waist than the tip or tail (generally referred to as the ski's sidecut). Just a few years ago a couple of ski designers experimented with wide tips and tails with very narrow waists. Born were shaped skis, or sometimes referred to as super-sidecut skis. These skis make turning easier and more precise because putting the ski on edge causes it to turn instantly.

I have enjoyed experimenting with the new generation of skis. They truly make skiing easier and more enjoyable. During the same time, ski bindings also have made great strides in improved convenience, performance, and most importantly, safety. Likewise, boots look totally different today — space-age plastics have replaced lace-up leather boots. Ski poles are now made of aerospace aluminum alloys or graphite reinforced composites instead of bamboo.

When it comes to ski lifts, I have actually retrogressed to my childhood days; that is, hiking up the mountain when the lifts are not running. It certainly keeps me in shape. You can think of it as the ultimate stairmaster, but with better scenery.

esa report

Serious about safety

This report was submitted by the Engineering Sciences and Applications (ESA) Division. If your organization wishes to report on its activities, please call us.

A little over a year ago an employee of the Engineering Sciences and Applications (ESA) Division was involved in a serious accident while at work. This accident, in which a forklift tumbled off a walkway, resulted in extended hospitalization, physical therapy and limitations on work when the employee returned. It occurred in the part of the division where risks were minimal and not in our high hazard areas such as the tritium facilities, shops or explosives work.

As a result of this accident, safety awareness has been heightened across the Laboratory. In ESA, we are serious about environment, safety and health, and we have initiated an aggressive safety program. This article briefly highlights some of the things we are doing.

We begin every management meeting with a briefing on some aspect of ES&H. This can range from reports on accidents or incidents to lessons learned. We are instituting a walk-around program to encourage managers to get into the field, learn the processes and interact with their personnel. This program is patterned after the one in the Nuclear Material Technology (NMT) Division, and we have been ably assisted by Ron Geoffrion and Jim Loud of Audits and Assessments (AA) in initiating this program. Every individual's performance appraisal contains a factor on ES&H. We have had an ES&H policy since the formation of the division and have required all employees to read and sign an acknowledgment form.

The division has two safety committees, one that covers the entire division and one that specializes on explosive operations at S-Site. In addition, the Tritium Safety Committee functions to make our tritium operations safe.

Inspectors examine a forklift that went off a walkway at Technical Area 35, resulting in serious injury to the Engineering Sciences and Applications (ESA) Division employee who was driving it. *Photo courtesy of ESA Division.*

The ESA safety logo was designed by Paul Smith, group leader of ESA-MT, after last year's safety-related work suspension.

A major step in our ES&H program was the formation of our Facilities Management (ESA-FM) Group two years ago. This group provides a single point-of-contact for ES&H functions; maintenance and plant engineering; and security, computers and communications. Many functions have been centralized to minimize costs and response time and to ensure that the safety envelope is maintained. The Facilities Management group includes ESA employees, Environment, Safety and Health (ESH) Division personnel, Johnson Controls World Services Inc. personnel and contractors. Dennis Carathers is the facility manager and group leader, and Bob Grace is the deputy.

In order to help ESA managers integrate environment, safety and health into their operations, ESA has a dedicated ES&H team to provide direct support to the groups. Dan Macdonell is the contact for the ES&H team, focused on providing on-site and centrally located ES&H services to the ESA groups, facility operations and maintenance, and construction contractors, while interfacing with the Department of Energy, other regulators and resolving ES&H issues. These services include support for National Environmental Policy Act and Resource Conservation and Recovery Act activities and support for risk analysis and safety analysis reports, as well as radiation protection, explosive safety, training, waste management, audits and assessments and emergency planning.

Jim Anderson is the contact for the engineering, maintenance and modification team, including on-site and centrally located engineering and maintenance services and interfaces with DOE and other regulators. The team includes building managers, maintenance technicians, JCI dedicated crafts, dedicated scheduler, plant electrical engineer and plant mechanical engineer. Jeff Stoddard is the contact and liaison for security, access control, computing network services, the wiring plant and communications hardware.

Last but not least, we have held people accountable for working safely and have taken disciplinary actions with employees and contractors who have chosen to ignore the safety requirements of the Laboratory and the division. These actions have included banning people from our work sites and the termination of a longtime employee.

We have seen many improvements in the measures contained in Appendix F of the University of California contract with the DOE. For example, our total radiation dose was down last year after increasing from 1994 to 1995, our violations associated with waste storage areas went to zero last year, our corrective actions for occurrences reported to DOE are now being done on time, and although the number of our environmental violations have increased this year, we have addressed and corrected the problems.

Lab and pueblos improve relations

by Steve Sandoval

The signing of a cooperative agreement between the Laboratory and Santa Clara Pueblo is more than just a ceremonial sign of good will, according to Gilbert Suazo of the Lab's Community Involvement and Outreach (CIO) Office.

Cooperative agreements signed with Cochiti, San Ildefonso and Jemez pueblos more than two years ago have improved Lab-pueblo relations and led to increased awareness of Lab activities and their effect on the pueblos, as well as improved opportunities for Native Americans at the Lab, said Suazo.

"Having cooperative agreements gives us an official incentive to work more closely with the pueblos," said Suazo. "The cooperative agreements provide the formal commitment to work cooperatively and collaboratively."

Suazo commended pueblo and Lab officials for recognizing each other's responsibilities and concerns and establishing a process to work out issues through cooperation and collaboration. "The tribes," Suazo said, "must be afforded due recognition and respect as sovereign governments, and the Lab and the Department of Energy have done this through the formal agreements and accords signed with the tribes.

"In turn, the tribes recognize the Lab's role in national security through its work under the University of California and DOE," he said.

In December, Laboratory Director Sig Hecker and then-Santa Clara Pueblo Gov. Gilbert Tafoya signed a cooperative agreement; the Lab also dedicated the North Gallery on the second floor of the Oppenheimer Study Center at the Lab as the Santa Clara Gallery to commemorate the signing.

"I've definitely seen an improved working relationship between the tribes and the Lab in the past two years," said Suazo, a 30-year employee of the Lab and its tribal relations coordinator. He cited Cochiti Pueblo environmental staff members who now have a working relationship with water quality staff at the Lab on issues of mutual concern.

Suazo said at nearby San Ildefonso Pueblo, whose boundaries touch DOE-owned property, a pilot environmental restoration project started last March. The project — the Lab's Environmental Restoration (EM/ER) Project is spearheading it with the pueblo — involves characterization and background sampling of pueblo soils, water and groundwater, as well as cultural resources and archaeological surveying.

Suazo said members of San Ildefonso Pueblo who work at the Lab have been assigned to this project to advise Lab field unit personnel on the "do's and don't's about working on tribal land."

Another example of pueblo-Lab interactions was Jemez Pueblo's environmental fair for pueblo residents to learn about its DOE-funded environmental program and other environmental protection efforts by the Lab, said Suazo. "The Lab was invited to set up exhibits on the Lab's environmental surveillance and monitoring programs," he said.

Suazo said the Lab also is making inroads in the number of Native American students who work summers at the Lab. In the past two years, at least 45 Native American students worked in areas such as water quality, environment, safety and health, radioactive waste management, environmental restoration and cultural resource protection. This compares to 15 students several years ago before focused outreach was initiated, he said.

Suazo credited Barbara Grimes from CIO in improving the Lab's educational outreach efforts with the pueblos.

At the December cooperative agreement signing with Santa Clara Pueblo, Hecker and Tafoya cited Santa Clara Day School's new computer and math laboratories. Tafoya invited Lab staff to share their expertise in these areas with the school.

Suazo said the next step in the maturing of Lab-pueblo relationships is to increase awareness in pueblo communities of the cooperative agreements. "A lot of our meetings have been at the official level," he said. "The cooperative agreements do call for informing pueblo communities of Lab activities and for establishing educational forums to carry this out.

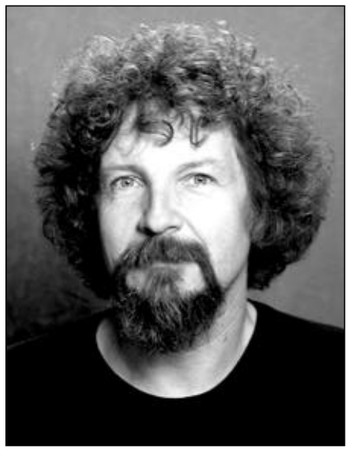
"As [the pueblos] make further progress in developing their environmental and other programs, we're going to see interactions intensify even more.

"The overall goal is to continue to attain working relationships that will help address and find resolution to issues that may come up in the future under the auspices of the cooperative agreements, and continue to build on the foundation provided by the formal agreements."

Pat Longmire of Environmental Science and Waste Technology (CST-7) uses some charts to explain to Santa Fe Indian School students about water chemistry conditions in Los Alamos Canyon and how potential contaminant migration may occur in the canyon. The students were on a field trip to Laboratory-owned property near San Ildefonso Pueblo. Behind Longmire is David Broxton of Geology/Geochemistry (EES-1). Also pictured is Louis Naranjo of Environmental Assessment and Resource Evaluations (ESH-20). As a result of a cooperative agreement between the Lab and San Ildefonso Pueblo, a pilot environmental restoration project was started last spring by the Laboratory's Environmental Restoration (EM/ER) Project. *Photo courtesy of the Community Involvement and Outreach (CIO) Office*

With strings attached

'Cosmic strings are believed to be of importance ... for the formation of galaxies.'



Wojciech Zurek

by John A. Webster

Eleven years ago, Wojciech Zurek proposed a laboratory experiment to help understand a cosmological puzzle. The results of two recent experiments and the citation accompanying the 1996 Nobel Prize for physics appear to have justified the unlikely combination of bench science and the origin of the universe.

Zurek, a physicist who was appointed a Laboratory Fellow last year, is delighted with the recent recognition his proposal has received.

"I hope that it spurs enthusiasm for basic science because it can suggest new ways of looking at things. Needless to say, basic science often translates into things of very practical interest," he said. "This area has a number of practical implications, as well as cosmological implications."

The results of the laboratory experiments by separate teams in Finland and France were published last July. They involved research with helium-3, an isotope of helium that becomes a frictionless "superfluid" a few thousandths of a degree above absolute zero.

The Nobel Prize was awarded last fall to David Lee and Robert Richardson of Cornell University and Douglas Osheroff of Stanford University for their 1972 discovery of the superfluidity of helium-3. Zurek's work and the recent experiments were cited by the Royal Swedish Academy of Sciences in announcing the award.

The cosmological riddle involves the formation of the structure of the universe. A number of exotic theories have been proposed to explain what happened moments after the Big Bang to perturb the uniformity of space and time, allowing matter to coalesce into stars, galaxies and other structures spread unevenly across the universe.

One theory suggests that one-dimensional fractures, dubbed cosmic strings, formed as the universe began to cool fractions of a second after the Big Bang. The theory holds that the strings contained enough energy to exert a gravitational attraction, thus pulling enough matter together to form objects in space. It also suggests that their formation resulted from one or more transitions of energy or matter from one form to another.

These phase transitions, much like steam turning to water and water to ice, also occur when a fluid becomes a superfluid, a state in which it flows without resistance, and they gave Zurek the clue for his proposal to test the cosmic string theory in the laboratory.

"The nice thing about phase transitions is that once you've figured out one, you've figured out a whole class," he said. "The mathematics turns out to be the same."

In a 1985 paper, Zurek said cosmic strings and vortices in a superfluid are analogous and suggested a laboratory experiment to test for key elements of string formation by forcing a fluid into the superfluid state rapidly.

The French and Finnish experiments involved cooling helium-3 to the temperature at which it undergoes the phase transition, moving it quickly back and forth through the transition, and watching what happens. In both cases, vortices were formed that the researchers said behaved the way the theory says cosmic strings behave.

"The validity of a theory formulated by Zurek ... thus seems to have been confirmed," the Swedish Royal Academy said in the Nobel Prize citation.

"The cosmic strings are believed to be of importance ... for the formation of galaxies."

The Nobel citation also made reference to the work of another researcher with a Los Alamos connection. John Wheatley, who worked at the Lab from 1981 until his death in 1986, headed a group at the University of California at San Diego in the 1970s that confirmed the superfluidity of the new phases of helium-3 and performed much of the fundamental thermodynamic research on the new phases.

Zurek was a J. Robert Oppenheimer Fellow in theoretical astrophysics at the Laboratory when he proposed conducting experiments with superfluids to study cosmology. His research interests also include quantum computing, relativistic astrophysics and quantum physics.

He said scientific interest in the study of the dynamics of second-order phase transitions, such as those that occur in superfluids, is growing rapidly.

"There's a good chance that interest in the field will explode. It's interdisciplinary, and it's very exciting scientifically," he said. "It's one of the few areas in physics where you can tie abstract and concrete thoughts together.

"The next big step will probably involve superconductivity. By studying dynamics of the superconducting phase transition, one can learn a lot about superconductors, and there are also a lot of issues that have to do with the strength of materials. I think there's a gold mine there."

people

Eden new CIC-10 group leader

Earleen Eden is the new group leader of Information and Records Management (CIC-10).

Earleen Eden

CIC-10 is responsible for the storage, maintenance and retrieval of official Laboratory records, both electronic and hard copy. The group also is responsible for the daily distribution of Lab mail. The group has about 60 employees.

Eden has worked at the Lab 25 years. She was most recently the Quality Project Leader for the Computing, Information and Communications (CIC) Division. Prior to this job, Eden was deputy division leader in the former Information Services (IS) Division.

Eden is a native of the Pojoaque Valley.

Repa named program manager

Joe Repa is the new program manager of the consolidated Conventional Weapons and Nuclear Weapons High Explosives programs at the Laboratory.

Joe Repa

Repa of the Department of Defense (DoD) Programs Office, will report jointly to Walt Kirchner, DoD Programs Office director, and Steve Younger, director of Nuclear Weapons Technology (NWT). The appointment establishes a single, integrated high explosives program at the Lab and is intended to strengthen and enhance the Lab's contribution to its national security missions in both stockpile stewardship and conventional defense.

The move also is designed to reinforce the Lab's role as a strong international leader in high explosives.

Repa has worked at the Lab 23 years, primarily in DoD technologies. He has bachelor's and master's degrees in civil engineering from University of Texas at Austin.

Kaye named HR-6 group leader

Judith Kaye became the new group leader for the Human Resources (HR) Division's Training and Development Group in January.

Kaye formerly headed HR's Science Education and Outreach (SEO) Group, which is now part of the Science and Technology Base (STB) Program Office.

Judith Kaye

Kaye has worked at the Lab since 1985, mostly in education and outreach activities.

She has a bachelor's degree in sociology from the University of California, Los Angeles, and a master's degree in social work from San Diego State University.

There are about 45 employees in the HR-Training and Development Group.

Patent Award winners named

Laboratory scientific and technological personnel whose work earned patents in 1995 and 1996 were recognized at a ceremony in the Study Center.

A former Life Sciences (LS) Division staff member, Mark Bitensky, received the Lab's Distinguished Patent Award for his work using carbon monoxide to extend the useful storage life of refrigerated red blood cells.

Mark Bitensky

Bitensky worked at the Lab from 1981 until he resigned last summer to become a senior research professor of biomedical engineering at Boston University. The University of California retains the ownership of the patent, explained Susan Potter of Laboratory Counsel (LC) and coordinator of the inventor awards ceremony.

Bitensky's research is significant because chilled red blood cells deteriorate during storage, limiting their effective shelf life to about five weeks. When red blood cells are at body temperature, they can effectively defend themselves against oxygen attack — hemoglobin's principal role is to carry and release oxygen. However, these cells are defenseless when chilled.

The research resulting showed that carbon monoxide stabilizes hemoglobin in refrigerated red blood cells.

The carbon monoxide basically replaces oxygen, thereby improving the shelf life of the red blood cells. The carbon monoxide must be removed from the refrigerated blood cells before transfusion because carbon monoxide is toxic.

Bitensky received undergraduate and doctorate degrees from Yale University. He also spent three years studying enzymology and metabolism at the National Institutes of Health, taught medicine at New York University, and medicine, pathology and biochemistry at Yale.

Others Lab employees recognized at the ceremony were: Ricardo Schwarz, MST-CMS; Gregory Swift and Al Migliori, both of MST-10; Blake Wood, P-24, Kevin Walter, Michael Nastasi and Kevin Stewart, all of MST-4; Raymond Dixon and Lawrence Roe, MST-6; James White, Vance Faber and Alexander Katsevich, all of CIC-3; Jeffrey Saltzman, CIC-19; George Yates, P-23; Kevin Albright, P-22; Robert Garnett, AOT-6; Michael Kang, DX-6; Xin Di Wu, Prabhat Tiwari and Stephen Roltyn, all of MST-STC; Dennis Phillips, Russell Gritzo, Malcolm Fowler, Wayne Taylor, Richard Heaton and David Jamriska, all of CST-11; Elliot Douglas, David Langlois and Brian Benicewicz, all of MST-7; Kenneth Uher, DX-2; Melvin Prueitt, EES-5.

Also: Raymond Dixon, MST-6; Judith Mourant, Irving Bigio and Tamara Johnson, CST-4; Richard Bolton, John Bounds, Mohini Rawool-Sullivan, Duncan MacArthur, Krag Allander, all of NIS-6; Scott Willms, ESA-TSE; Mahlon Wilson, Andrew Rudge, Shimshon Gottesfeld, Antoinette Taylor, Fernando Garzon, Brandon Chung, Ian Raistrick and Eric Brosha, all of MST-11; Larry Avens and Laura Worl,

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Obituaries

Stanley Hipwood

Stanley Hipwood

Stanley J. Hipwood died Nov. 27 at Los Alamos Medical Center. He was 76.

A retired teacher and World War II veteran, Hipwood was born in Flint, Mich. He moved to Los Alamos in 1954 and taught at Los Alamos High School, the former Cumbres Junior High School and Munich, Germany, American School for 13 years. From 1967 to 1970 he was a principal and superintendent of schools at Platte Canyon School District in Bailey, Colo.

From 1970 to 1980 he was registrar and director of admissions at New Mexico Highlands University in Las Vegas, N.M.

In 1980, Hipwood returned to Los Alamos; he worked at the Lab for 10 years in the Educational Outreach Department, retiring in 1990.

Hipwood earned bachelor's and master's degrees in industrial arts from the University of Michigan and a doctorate in educational administration from the University of New Mexico in 1968.

Hipwood is survived by his wife, Rubee; two sons, Peter and wife, Rita, and Rob and wife, Kathy; two daughters, Krysia and Delores; five grandchildren; and four great-grandchildren.

John Hahn Jr.

John Hahn Jr. of Albuquerque died Dec. 9 in Albuquerque. He was 62.

Hahn worked for the Laboratory 30 years before retiring in September 1993.

A staff sergeant in the Air National Guard, Hahn attended the University of New Mexico from 1955 to 1957, where he studied engineering.

He worked in the former Field Testing (J) and Mechanical and Electronic Engineering (MEE) divisions.

Hahn is survived by his wife, Barbara; daughter, Valerie Sedor and her husband, John, of LaVerne, Calif.; two sons, Michael and Larry and wife, Amy, all of Albuquerque; one grandchild; sister, Lynda Hahn of Los Lunas; and other

Patent Award winners ...

continued from Page 8

NMT-6; Dallas Hill and Coyne Prenger, ESA-EPE; Walter Stewart, ESA-13; Timothy Carrig, CST-2; Herbert Funsten, David McComas and Earl Scime, NIS-1; Richard Keller, CST-1; James Jett, Babetta Marrone and John Martin, LS-5.

The complete list of individuals recognized for 1995 and 1996 patents and the titles of the patents can be found on the Industrial Partnership (IPO) Office home page at http://www.lanl.gov/Internal/projects/IPO/PDAT/IAM/patents96.html/ on the World Wide Web.

January anniversaries

30 years
Darrel Farmer, ESA-FM-ESH
Anthony Montoya, EES-5
Frederick Rick, PA-1
Patricia Rood, FSS-16
Frederick Ross, CIC-7
Thurman Talley, ESA-WE

25 years
Ira Agins, CIC-18
Elizabeth Byrd, FSS-6
Dennis Erickson, ESH-DO
Michael Garcia, CST-18
R. Ronald Geoffrion, AA-2
William Gula, X-TM
Robert Hardekopf, DoD-PO
Darryl Holm, T-7
Rhonald Keinigs, X-PA
Kenneth Klare, P-24
Chester Painter, TSA-DO-SA
J.F. Rodriguez Jr., ESH-4
Juanita Salazar, T-3
Gary Salzman, LS-5
F.J. Steinkruger, ESA-TSE

20 years
Joseph Banar, CST-7
John Booth, AOT-8
David Broxton, EES-1
Rickey Faehl, X-PA
Wayne Fox, NMSM-SD
Sandra Hull, TSA-DO-SA
Marie Kaye, HR-5
David Melton, CST-7
Stewart Mosso, X-HM
C. Randall Mynard, ESA-EPE
Gregory Nunz, NIS-3
Dorothy Quartieri, HR-5
Josephine Rael, BUS-2
Jeffrey Roybal, ESA-DE
Paul Roybal, P-22
Tom Sedillo, P-24
Thomas Seed, DX-DO
Jack Simpson, NMT-8
Joseph Thompson, CIC-8
Judy Velarde, BUS-1
Victor Vigil, AOT-2
Duane Wallace, T-1
Richard Yactor, DX-1

15 years
Daniel Comstock, CIC-15
Brent Brutschell, FSS-6
Christian Burks, T-10
Keith Despain, X-TA
Yolanda Galvez, HR-5
Cynthia Hills, NIS-8
Douglas Hof, CST-25
John Keady, T-4
Ross Lemons, MST-DO
Lori Padilla, ESA-FM-ESH
Daniel Pappas, NMT-8
Carolyn Robinson, CIC-1
Irina Velarde, ESH-2
C. Philip Wood, CIC-5

10 years
Richard Fortson, CIC-3
Kenneth Fuller, NIS-4
Timothy Hayes, NMT-2
Joel Katz, MST-6
Robert Kraus Jr., P-21
Joseph Laia Jr., ET-PO
Francis Lamb, NMT-7
Eva Martinez, EES-13
Frances Martinez, CIC-2
Jeanette Martinez, NIS-6
Lorraine Ortiz, BUS-5
Roger Pynn, LER-PO
Philbert Romero, ESH-5
Harry Rosenblum, NIS-8
Boris Rosev, EM-RT
Patrick Ruminer, P-21
Grace VanDuyn, HR-6
George VanTiem, FSS-20

5 years
Christina Archuleta, FSS-DO
Ruth Barks, CIC-1
John Davey, MST-11
Denise Derkacs, CIC-1
Patricia Fierro, PA-3
E.C. Flower-Maudlin, X-NH
Christopher Fontes, X-TM
Randall Frye, BUS-1
Warren Hsing, P-24
Marion Hutton, PA-4
Bryan Lally, ESA-EPE
Anthony Lombardo, CST-12
Mercedes Lujan, ESA-TSE
Catherine Macken, T-10
Roman Movshovich, MST-10
Cynthia Phillips, CIC-1
David Powell, FSS-6
Mohini Rawool-Sullivan, NIS-6
Sean Reilly, CST-11
Bradley Schake, CST-7
Gerald Schlapper, ESH-12
Craig Simpson, BUS-1
Joan Williams, BUS-8
Giday Woldegabriel, EES-1
Blake Wood, P-24

This month's science experiment is presented by Bradbury Science Museum educator Garry Franklin, who prepares and demonstrates scientific facts and fun for hundreds of students and other museum visitors. We encourage readers to share these experiments with their families.

Colors from sunbeams Colors from color

Make a Rainbow

You will need the following materials: a sunbeam, a glass partially filled with water (or a prism) and a piece of white paper.

Place the glass of water in a window that has a sunbeam shining through it. The white light will separate into its individual colors, a rainbow. Place the white paper underneath the rainbow to make the colors brighter and more distinct. Can you name the colors in the rainbow from the top band down to the bottom band?

What is going on?

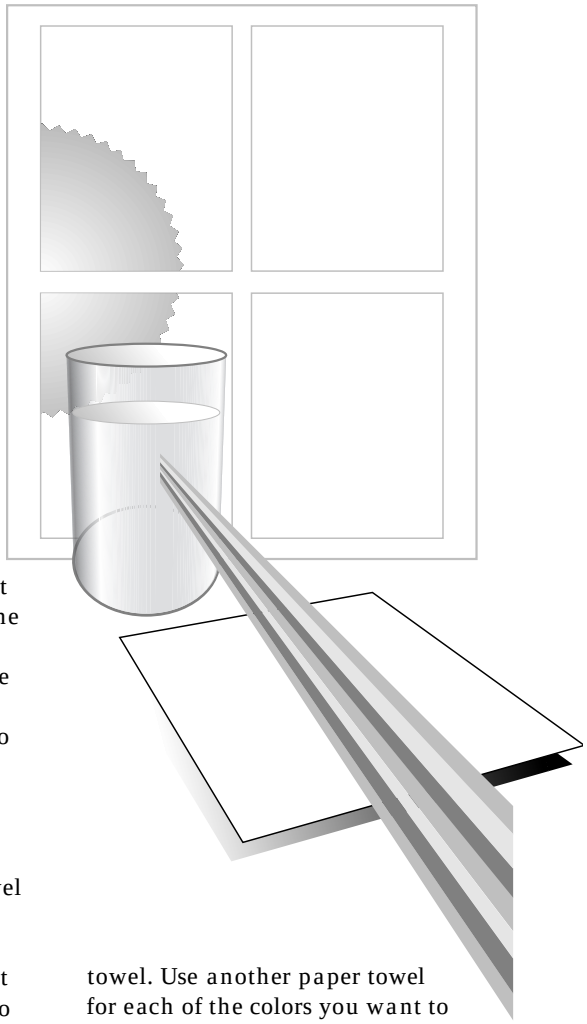
The rainbow is called a **continuous spectrum** (a spectrum with no breaks between the colors). The sunlight is bent by the water. This is called **refraction**. It is actually bent twice: once when it enters the water and again when it leaves the water. This bending of light twice causes the separation of the colors. The colors from the top band to the bottom band are: red, orange, yellow, green, blue, indigo and violet.

Colors made up of colors

Some colors are made up of combinations of many other colors. Try this experiment to determine the colors that make up ordinary marking pen ink.

You will need the following materials: various **water-soluble** marking pens of different colors, paper towels, a clear glass of water and scissors.

Turn the glass upside down so that the mouth is on a paper towel. Use the scissors to cut a circle of paper towel that is about one inch larger than the mouth of the glass. This is to be sure that the paper towel does not fall into the glass during the experiment. Use the scissors to make two parallel cuts into the paper towel circle from the edge to about the center. This will make a strip or 'tongue' of paper towel that will hang down into the glass. (See illustration below.) Bend the tongue down so that it hangs straight down. Use one of the marking pens to color a small spot on the paper towel at the bend. Fill the glass with enough



water so that the tongue of paper towel will hang into the water about an inch. Place the paper towel on the rim of the glass.

The water will rise up the strip to the colored spot. The process will take about 15 minutes. Different colors will appear as the water passes through the color spot and spreads across the paper towel. Use another paper towel for each of the colors you want to test. Mark the outside edge of the paper towel with the original color so that you will remember later what it was. Compare the various paper towels to determine the different colors that make up each original color.

What is going on?

Marking colors, inks and dyes are composed of mixtures of many different colors. When they are blended together we see only one color. The individual colors have a different rate of dissolving and also a different rate of moving along the paper towel. Because of these differences the colors in the pen mark will separate into all of the component colors or dyes used to make the original color of the pen. This process is called **chromatography.**

You can find out more about the science of color and light by visiting the Bradbury Science Museum in downtown Los Alamos.

This month in history

February

1879 — The railroad arrives in New Mexico

1930 — Astronomer Clyde Tombaugh, who later became a professor at New Mexico State University, discovers Pluto

1932 — British physicist James Chadwick discovers the neutron

Klaus Fuchs

1941 — Plutonium is discovered at UC-Berkeley by Glenn Seaborg, Edwin McMillan, Arthur Wahl and Joseph Kennedy

1950 — Klaus Fuchs is arrested on charges of treason

1957 — The security gates around the Los Alamos townsite are taken down

Security gate east of Los Alamos

1962 — Astronaut John Glenn becomes the first American in space

1968 — Groundbreaking ceremonies are held for LAMPF

1970 — Ross Aviation takes over air service to Los Alamos under a three-year contract with the Atomic Energy Commission

1980 — The Laboratory conducts the first successful test of the Radio Frequency Quadrupole (RFQ)

1991 — US and UN forces begin a ground offensive against Iraq in the Persian Gulf War

1995 — The Galvin Report, an extensive study recommending non-federal management of the national laboratory system, is released

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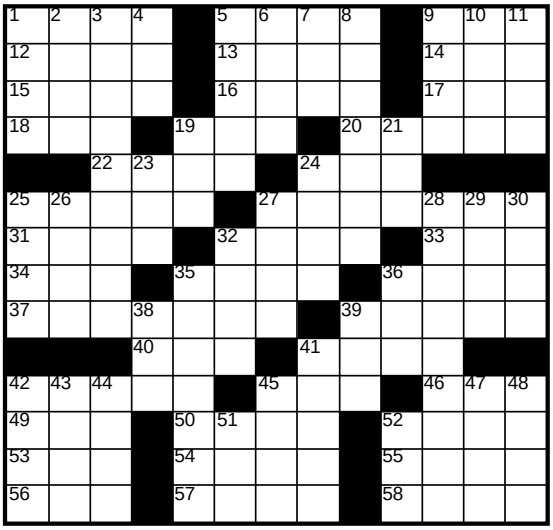
Crossword puzzle



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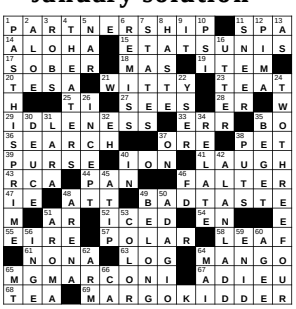
ACROSS

1 December holiday
5 Entangle
9 Psyche parts
12 Reign
13 — — Wonderful Life
14 Soap ingredient
15 Associate
16 Clever sayings
17 Lodge
18 Cry of affirmation
19 Craving
20 AKC concern
22 Back
24 Average mark
25 Newspaper-vending structure
17 Estimates
31 Entre —
32 Rotate
33 Actress Lupino
34 Possess
35 Lion's neck hair
36 — — the Mood for Love
37 Packing tightly
39 Woodwind instrument
40 Dentist's degree
41 Grinding machine
42 Feline name
45 Builder's unit
46 Actress — MacGraw
49 Freshwater fish
50 Exude
52 How sweet — —
53 Actor Chaney
54 To the sheltered side
55 Nasty
56 Attorney's degree
57 Split
58 Attention-getting sound

DOWN

1 Medical picture
2 Stubborn animal
3 Comprehensive
4 Pollack fish
5 Imitator
6 Type of jacket
7 JFK sight
8 Once famous person
9 Tennis player — Nastase
10 Force unit
11 Mail
19 Beast of burden
21 Thing in law
23 Double curve
24 Heal
25 Recognize
26 Des Moines state
27 — - ho
28 Pretends
29 Work on text
30 Sensible
32 Brown shades
35 Important exam
36 Not well
38 Insecticide
39 — to be tied (angry)
41 Sacred song
42 Nullify
43 Matinee man?
44 Watch over
45 Willingly
47 Geological division
48 Doesn't exist
51 Roman 1,051
52 Urchin

January solution



spotlight

A winter-like Fourth of July

Jerry Brock, left, of Fluid Dynamics (T-3) and Stephen Doorn of Inorganic Trace Analysis (CST-9) at the summit of Mount Olympus. *Photos courtesy of Doorn and Brock*

by Ternel Martinez

Most people don't associate the Fourth of July with ice and snow — that's more in line with February — but for five Lab employees, the holiday was a time for climbing mountains, hiking through rain forests and scrambling across glaciers.

The employees — Gina Pasquale of Advanced Technology (NMT-6) and leader of the team, Richard Robinson and Stephen Doorn of Inorganic Trace Analysis (CST-9), David Rogers of Water Quality and Hydrology (ESH-18) and Jerry Brock of Fluid Dynamics (T-3) — decided to celebrate Independence Day by climbing 14,410-foot Mount Rainier in Washington.

The summit of Mount Rainier is nothing but glacier. "The glacier is like a desert, and it's extremely harsh," said Brock, who was going on his first glacier climb. Glaciers cover about 36 square miles of Rainier's surface and are constantly moving. In fact, the mountain is surrounded by the largest single-mountain glacier system in the United States outside Alaska, with 41 glaciers radiating from the broad summit.

Pasquale was well aware of the conditions on Rainier, having climbed it before. As a precaution, she and the others trained by climbing a couple of mountains in Colorado. They also went on several backpacking trips weeks beforehand. And for added safety, she had the team practice glacier crevasse rescue techniques before heading to Washington.

The team began its climb July 4. Almost 10,000 feet of Mount Rainier is made up of snow and ice, so the team had to carry special equipment, such as ice axes, slings, ropes and crampons.

Add to that lots of snacks, dehydrated and instant foods, granola bars and a portable stove and fuel (they melted snow for water), and each person ended up carrying at least 60 pounds.

Despite the heavier than normal load, the team reached base camp (elevation approximately 10,000 feet) at about 3 p.m. July 5. The glacier stage was next.

"You have to climb at night when you're walking on glaciers, because you want to cross when the snow is hard and reduce the risk of falling through a snow bridge or into a crevasse. We began climbing the summit from base camp at about 1:30 a.m. on July 6," said Pasquale. The team was roped to each other.

There are several routes by which a climber can reach the summit, some more dangerous than others. The team decided to take the second most popular route, called Emmons Glacier Route, which Pasquale said is considered the safest and easiest.

The weather was so agreeable the climbers reached the summit at 9:30 a.m. July 6. "Given the strong climbing team I had, I figured we were going to climb Rainier rather quickly anyway," said Pasquale. The team has more than 35 years combined mountain-climbing experience.

The team didn't spend too much time celebrating its conquest, though. Pasquale said because she already had climbed Rainier before, she wanted to climb another mountain. She chose Mount Olympus, a mountain with an elevation of 7,965 feet.

A major glacial mountain, Olympus can be climbed safely only by persons experienced in correct climbing techniques. Falling into a hidden crevasse is the major hazard, and knowledge in crevasse rescue techniques is essential.

Brock checks his equipment while on descent from Mount Olympus.

Rogers and Robinson decided to return home, so Pasquale, Doorn and Brock took off by car to their next challenge, which was about a half day's drive. They began their climb July 8.

Mount Olympus' terrain is different from Mount Rainier's in some respects. Unlike the latter, which is more than two-thirds snow and ice, climbers have to backpack through 17 miles of rain forest before reaching snow and ice on Olympus. Technical rock climbing is necessary in order to reach the true summit. And the snow around Olympus' summit already had melted somewhat, meaning the team would have to be extra careful when crossing the glacier.

The trio made it to Olympus' base camp (elevation approximately 4,500 feet) at 3 p.m. July 9, again without incident. After resting a while, they began the summit climb at midnight that day. Again, the weather never played a factor, and they reached Olympus' summit at 9 a.m. July 10. In fact, Brock said the team never saw a single cloud during the 12-day adventure.

Reflections
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