LANL
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Welding exotic materials

by Kathy DeLucas

Recently, the Laboratory's welding team successfully achieved the precision welding of a prototype niobium, five-cell, superconducting cavity for use in the Accelerator Production of Tritium (APT) program. This prototype benchmarks the feasibility of the radio frequency, five-cell cavity design, which can be used by industry when fabricating production units. The American Welding Society will publish a feature article highlighting the team's success in an upcoming issue of the Welding Journal.

Frank Smith, a member of the welding team in Metallurgy (MST-6), inspects the weld he completed on the flange. In the next step, Smith prepares the piece for welding on the opposite side. The final weld is made in the center of the third cell, in the middle of the component. Smith performs 21 welds to complete one component. *Photo courtesy of Mark Cola*

The APT program uses a high-energy proton linear accelerator to incorporate hundreds of superconducting cavities made of high-purity niobium. High-tech niobium cavities offer several advantages over the copper cavities of the past. For example, niobium cavities have very little electrical resistance, resulting in very little power loss — whereas the electrical resistance in copper cavities converts much of its radio frequency power into heat. In addition, niobium cavities can accelerate particles with a wide range of energies. These high-tech cavities also permit a large diameter borehole that doesn't pinch the beam, whereas conventional copper cavities cannot operate with such a large borehole.

One challenge in welding pieces of the cavity together was to create a uniform, exceptionally clean weld that does not arc or disturb the beam and operates leak-free at liquid helium temperatures near absolute zero.

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Lab prepares for DOE safety audit

by Fran Talley

"Is everybody aware that this is going to take place?"

That was Laboratory Director John Browne's question to workers at his recent "State of the Lab" address. He was talking about the Integrated Safety Management Verification, or ISMV, audit scheduled for April 16 through 24.

Department of Energy auditors will return at that time to complete the ISM verification for the Laboratory. In October 1999, DOE performed a Phase I (paper work) and Phase II (implementation) verification audit. At the conclusion of that audit, DOE decided to conduct a partial follow-up verification focusing on those parts of Phase II that were judged not to be adequately implemented.

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Lab prepares …

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A major focus of the audit that impacts everyone working at the Lab is demonstrating full management commitment and employee involvement in implementing ISM.

"People are going to show up at your workplace and they are going to ask you questions about ISM," Browne said. "They're not just going to ask you about the 5-step process; they're going to ask you what ISM means in your workplace."

To prepare for the ISMV audit, Browne encouraged everyone to discuss ISM in the workplace. "What does ISM mean to you? How are you dealing with ISM? What are you doing to improve safety locally?" he asked.

The ISM program office suggests the following talking points for group discussion:

Management Commitment and Worker Involvement:

• How is management commitment visible in our organization?

• In our organization, how are nonmanagers involved in work planning?

• How do we hold ourselves accountable to each other and to the Lab and how do we learn from our mistakes and incidents?

• What processes do managers use to monitor and improve the safety performance of our organization?

Hazard Identification and Control:

• How do we know that, before beginning work, hazards have been properly identified and that the appropriate controls are in place?

• What do we do to assure that procedures are followed and requirements are met?

• How do we assure that all work and workers are authorized?

According to Occupational Safety and Health Administration statistics tracked by Industrial Hygiene and Safety (ESH-5), since the implementation of ISM, the Laboratory's safety performance has improved by a factor of four in lost work days and by a factor of three in total recordable injuries. "You can be proud of achieving this," Browne told employees.

He said that he has set a new institutional goal for the next two years to reduce these rates by another factor of two.

"This Laboratory has a moral imperative to provide everyone with a work environment where they can be safe and injury-free," Browne said. "And, by practicing and continually reinforcing the guidelines and principles of ISM, that's what we intend to do."

For more information on ISM visit the Web site at *http://www.lanl.gov/orgs/ism/*.

Benefits Buzz

Laboratory employees pay among the lowest HMO premiums in both percentage and absolute terms of any of the major employers in New Mexico, according to a recent study by the Decision Applications (D) Division. The study shows that Lab employees pay about 15 percent of their personal insurance costs, compared to a national average of about 35 percent.

Welding exotic …

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To meet this challenge, the team decided to use electron beam welding. The niobium accelerator parts are placed into the electron beam's vacuum chamber, which is evacuated using a diffusion pump/liquid-nitrogen cryopump combination that prevents pumping oils from reaching the weld (the oils could form carbides, of which even the smallest amount would affect the propagation of the high-energy beam within the cavity). After welding and inspection, technicians chemically milled and polished the part.

The high-precision weld exceeded all requirements during performance testing. "Electron beam welding proved that it's a versatile process capable of the most demanding of welding jobs," Mark Cola, acting team leader said.

The welding team at the Lab consists of 16 people, specializing in arc physics, laser physics and optics, welding metallurgy, welding design, automation and control, and in-process quality assurance. "The Lab has one the largest groups of individuals dedicated solely to the understanding of welding science and technology in the DOE's weapons complex," Cola said.

For more information, contact the welding team at 7-7754. The team specializes in the weldability of difficult-to-weld materials and materials that pose a radiological or toxicological hazard — such as materials used in nuclear weapons, space power, accelerator technology and other applications — requiring high precision welding.

LANL

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NNSA

Guest Editorial

LANSCE leader looks to the future

A guest editorial by Paul Lisowski, Los Alamos Neutron Science Center (LANSCE) Division director

Despite several challenges over the last couple of years, LANSCE had many successes in 2000, including a high level of reliability for weapons neutron research and proton radiography.

Looking to the future, all of us at LANSCE need to redouble our efforts and push for even greater availability in 2001. It is incumbent upon us to extend that same level of reliability and availability to the Lujan Center operations.

Some changes are ahead for LANSCE and its employees, but they will be incremental in nature, primarily because I believe that the LANSCE organization is well structured. I don't plan any significant reorganization in the near future.

The largest immediate challenge that LANSCE faces is responding to the recent report issued by the Department of Energy Office of Basic Energy Sciences, known as the BESAC report. The report made recommendations for how LANSCE needs to improve its operations and meet the needs of the external user community, specifically by ensuring greater availability of neutrons for Lujan Center research.

Laboratory Director John Browne and I formally responded to the BESAC committee at a meeting in late February. Our presentation, which focused on a new governance model for LANSCE and a commitment to safely and reliably provide neutrons to the user communities, was well received. The committee's response was positive in large part because we have been proactively responding to recommendations in the report.

In a letter to the BESAC committee, Browne outlined several immediate initiatives. Among them, Associate Laboratory Director for Nuclear Weapons Steve Younger has been tasked to work with the National Nuclear Security Administration to develop plans for how NNSA can complement management priorities at LANSCE, establish priorities and resolve conflicts that might arise among the three major DOE sponsors of LANSCE: Office of Science, Nuclear Energy and NNSA/Defense Programs. Browne also has requested that the Lujan Center pause in its development of new instruments to focus on the safe and reliable operation of existing instruments for the user community.

The Laboratory has made a very powerful commitment to the future of LANSCE, as seen in a recent John Browne letter to BESAC.

Browne wrote, "I want to state my personal commitment to the success of LANSCE, the Lujan Center, and its national user program … It is a versatile and powerful facility capable of addressing several DOE mission needs while serving as a magnet for new scientists to join our Laboratory."

In addition to the BESAC response, my No. 1 priority is safe operation of LANSCE, with a high level of availability for all users.

My expectation of the dedicated LANSCE employees is their continued focus on excellence of mission and, in turn, they can expect my commitment to be responsive to their needs. I am very confident and optimistic that together we will succeed.

The full text of a recent Public Affairs interview with Lisowski is available on the LANSCE Web site at http:///lansce.lanl.gov.

ISSM Corner

Unattended classified matter

(Part of a 10-part series on easily avoided security errors.)

Leaving classified material unattended for any period of time is a serious occurrence. Left unattended, classified material is unprotected by authorized personnel and is therefore placed at risk for compromise to unauthorized, uncleared personnel, visitors and cleared personnel without a need-to-know. Placing classified matter in anything other than an authorized security container is strictly prohibited. Leaving classified documents, parts, chemicals or electronic media unattended and unsecured creates an unnecessary risk. Current University of California contract requirements may impose financial penalties against the Laboratory as well as disciplinary action on the personnel involved in these types of occurrences.

Inattention or carelessness are the most common reasons classified materials may be left unattended. When handling or processing classified materials, do not allow yourself to be distracted. Be aware of your surroundings and others who are nearby, and always check for visitors in the area. Housekeeping is also important in guarding classified matter. When handling classified materials in your office, keep them in a separate, designated place. Remember, an ounce of prevention goes a long way in protecting our nation's secrets.

Resources at LANSCE

LANSCE comprises a high-power 800-million-electron-volt proton linear accelerator, a Proton Storage Ring, production targets at the Manuel Lujan Jr. Neutron Scattering Center and the Weapons Neutron Research Facility, and a variety of associated experimental areas, including one devoted to proton radiography for stockpile stewardship. LANSCE produces intense beams of pulsed neutrons at both the Lujan Center and the Weapons Neutron Research Facility, which provide the Laboratory and U.S. scientific community with the capability to perform experiments that support both defense and civilian research.

Deadline for Appendix O facility milestone nears

by James E. Rickman

This month — as part of requirements under Appendix O of the recently modified University of California management contract — the Laboratory issued a request for proposals to recruit outside assistance in improving the Laboratory's nuclear facility operations.

"Appendix O requires us to bring in a 'world class' company to assess our nuclear facilities operations and ensure that the Laboratory's performance in operating those facilities is in accordance with best practices in safety and facility operations," said Tony Stanford, director of Facilities and Waste Operations (FWO).

Stanford has been designated by Director John Browne as having lead responsibility for the facility safety improvement initiative required under provisions of Appendix O.

"Under the modified UC management contract, the Laboratory has 90 days in which to develop this subcontract mechanism. Consequently, this is one of the first major 'milestones' that the Laboratory must meet under Appendix O," Stanford said. "Of course, a number of subsequent milestones and requirements will follow from this first step, and we're going to need support and cooperation from the Laboratory's work force to be successful. Employee support is the key to success in Appendix O."

'Employee support is the key to success in Appendix O.'

And employees do have a stake in Appendix O. Requirements under the newly added appendix will be graded at the end of this year and at the end of 2002. Appendix O is a 'gateway' toward receipt of performance fees allowed under other sections of the contract. These fees fund joint research between national laboratories and UC campuses, the UC directed research and development program, costs not allowed under the UC contract and a contingency reserve.

After the subcontract is in place, the subcontractor will assess the Laboratory's operational policies, procedures and methods at its nuclear facilities. Based on this assessment, the subcontractor will recommend improvements for nuclear facility operations and facility safety. Finally, the Laboratory will implement operational improvements and continue assessing its performance in these areas.

"Success in the facility safety improvement initiative will depend on us embracing the opinions and recommendations of the new subcontractor," Stanford said. "Success will mean a cultural change for many of us here. I believe we can do it. The bottom line is we must do it."

Facility safety improvement is one of six focus areas identified by the Department of Energy under Appendix O. The other five major sections under the appendix are management accountability, safeguards and security, critical human resource skills, project management and construction project management, and evaluation and self assessment.

DOE News

The Department of Energy has cited the University of Chicago, operator of the Argonne National Laboratory-West Laboratory in Idaho, for several nuclear safety violations that took place in 2000. The enforcement action would have been accompanied by a civil penalty of $110,000, but since the university is a not-for-profit institution exempt from statutes from paying civil penalties, the penalty is remitted. DOE noted that management changes have been made since the violations occurred to put greater emphasis and visibility on nuclear safety requirements.

The 21st Century Truck Program, a major new multi-agency and industry partnership, has released a "technology roadmap" for developing commercially viable technologies to increase energy efficiency, reduce pollution and improve safety in the nation's trucking industry. The plan establishes technical targets and fuel-efficiency goals for 2010, along with safety performance targets. The program is a partnership between the trucking industry and several federal agencies, including the departments of Energy, Defense and Transportation.

Happy birthday, Harold

Harold Agnew, director of the Laboratory from 1970 to 1979, celebrated his 80th birthday in late March during a series of get-togethers with old friends and colleagues in Los Alamos.

Agnew, who turned 80 on March 28, was the Laboratory's third director, succeeding Norris Bradbury. The person who in turn succeeded Agnew, Donald Kerr, was on hand for the Lab's "official" birthday party in the Administration Building Auditorium.

Kerr was joined by retirees Bob Brownlee and Jay Wechsler and former Lab staff member Jay Keyworth in recalling Agnew's legacy, leadership style and personal quirks during the two-hour celebration, which was frequently interrupted by laughter and applause.

Agnew, who was joined by his wife, Beverly, concluded the party by showing some of his old photos and recounting stories from the first days of the Laboratory. He also showed some home movies which included Enrico Fermi mowing the Agnews' lawn in Los Alamos.

Agnew, who now lives in San Diego, was the youngest member of the group that, under Fermi's leadership, produced the first chain reaction in Chicago in 1942. He joined the research laboratory at Los Alamos in 1943 and flew as a civilian observer in the atomic bombing of Japan.

He returned to the Laboratory in 1949 after earning a doctorate in physics at the University of Chicago under Fermi. He was named head of the Lab's Weapons Division in 1964 and director of the Laboratory six years later.

Agnew, who was the first state senator from Los Alamos in the New Mexico Legislature, received the E.O. Lawrence Award from the Department of Energy in 1966 and was elected a fellow of the American Association for the Advancement of Science in 1975. He also served as an adviser to NATO and the U.S. Army and was a member of the General Advisory Committee of the U.S. Arms Control and Disarmament Agency.

Above: Former Laboratory Director Harold Agnew celebrated his 80th birthday during a variety of events, including this birthday luncheon at Fuller Lodge. Current Director John Browne, who served as host, wore a tuxedo for the occasion. Right: Bob Brownlee, center, and Jay Wechsler, right, were among those who shared reminiscences about Agnew, left, during Agnew's birthday celebration. They both wore their old LASL neckties to help mark the event. *Photos by LeRoy N. Sanchez*

As Laboratory director, Agnew brought his own style to the routine chores of talking on the telephone and handling paperwork. *File photo*

Agnew showed this picture of himself during his 80th birthday celebration in the Administration Building Auditorium, saying he was holding the core of the bomb dropped on Nagasaki. *File photo*

Kanako Seki

The Student Awards Committee of the American Geophysical Union has selected **Kanako Seki** of Space and Atmospheric Sciences (NIS-1) as this year's winner of the F.L. Scarf Award for her thesis, "On the origin and dynamics of lobe/mantle plasmas in the Earth's magnetosphere." The Scarf Award is given not more frequently than annually for an outstanding doctoral dissertation that contributes directly to solar, space and/or planetary science. The recipient gets the opportunity to present an invited talk on the thesis subject at the spring or fall meeting of the AGU.

Terry Hawkins

Terry Hawkins, director of the Nonproliferation and International Security (NIS) Division, was among the recent recipients of Aviation Week's annual Aerospace Laurels, which recognize significant contributions to the field of aerospace. Hawkins was honored with Sandia National Laboratories Director Paul Robinson and Bruce Goodwin, director of B Division at Lawrence Livermore National Laboratory. They were cited for their public warnings about risk to the viability of the U.S. nuclear weapons stockpile, deterioration of the national nuclear intelligence infrastructure and losses of weapons-design intellectual resources from the laboratories.

David Post

David Post is the new director of the Project Management (PM) Division. He has been acting division director the past six months. Post is a former deputy director for facilities management for the Nuclear Materials Technology (NMT) Division. He has also been facility section leader for plutonium facility management, deputy program director for the Special Nuclear Materials Laboratory Project and program manager for environmental management facilities. As acting PM Division director, Post was responsible for project management services such as the development, planning and execution of construction projects, including the new Strategic Computing Complex. The project is under budget and ahead of schedule.

Lab names newest Industrial Fellows

David Simons and **Stephen Knox**, both of Nonproliferation and Arms Control Research and Development (NIS-RD), are the Lab's newest Industrial Fellows. Simons will work at Motorola headquarters in Schaumburg, Ill., and Knox will work at Motorola's Physical Sciences Research Laboratory in Tempe, Ariz. Those selected for the program, which was started in 1994 by former Director Sig Hecker and Industrial Research Institute President Chuck Larson, typically work in industry for two years, then return to the Lab. During their fellowship, they work for selected companies with the goal of building strategic technical alliances and finding opportunities that result from collaborative research.

At right, Steven Knox of Nonproliferation and Arms Control Research and Development (NIS-RD) talks with Laboratory Director John Browne. At left,Terry Hawkins, Nonproliferation and International Security (NIS) Division director, talks with David Simons, also of NIS-RD. *Photo by Presley M. Salaz, Imaging Services(IM-4)*

Airport relocates rental car pickup and return facility

The Albuquerque International Airport has relocated its rental car pickup and return facility to University Boulevard south of the airport. Laboratory employees are reminded that this new facility is for rental vehicles only. No personal vehicles should be parked at the new parking facility, which is part of a planned redesign of the airport.

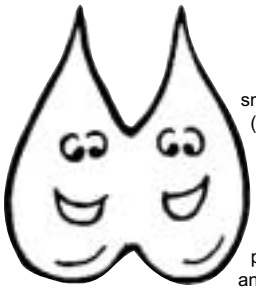
To reach the new parking facility from Interstate 25 northbound or southbound, take the Airport/Sunport Boulevard Exit 221. From eastbound Airport/Sunport Boulevard, follow the rental-car-return sign by taking the southbound University Boulevard exit. Stay on southbound University Boulevard; after crossing George Road get into the left lane and turn left into the rental car center at the traffic light.

Questions regarding the new rental car procedures can be directed to Guy Sandusky of (BUS-1) at 5-0459, or write to *sandusky@lanl.gov* by e-mail.

"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.

Does a waterdrop have skin?

Why are water drops always curved on top? How come bubbles are always round? How do water-spiders and similar pond creatures glide across the surface of the water without getting wet? The answer to all these questions lies in a force called surface tension. In this activity you will observe how the force of surface tension works and test to see how chemical change in water either "makes" or "breaks" the force. Before conducting the tests make sure all your materials are clean and free of grease or detergent.



The stuff you'll need

A small glass of water; a small bowl; a penny; a 6 inch (15 cm) sheet of wax paper or aluminum foil; butter knife or medicine dropper; toothpick; liquid dish washing detergent; a flat surface covered with a plastic garbage bag; pencil; and notebook paper

Here's the plan

1. Predict how many drops of water can sit on a penny without spilling over the edge. Write your prediction down.

2. Use a medicine dropper or butter knife to drip drops onto the center of the penny. Count each drop.

3. Without touching the puddle on the penny, continue dripping drops until the water breaks and flows off the penny. On the sheet of paper, record the number of drops you counted before the water broke and compare the number with your prediction. Was the actual number more or less than your prediction? Were you surprised at how many drops the penny held? What happened as you added each drop?

4. Again, fill the top of the penny with water.

5. With your eyes at table level, look at the water on the penny. What do you notice? What do you think is keeping the water on the penny?

6. Pour a few drops of dish detergent into the bowl.

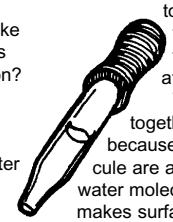
7. Soap a toothpick by dipping into the detergent so you have a small drop sticking to the end of the toothpick.

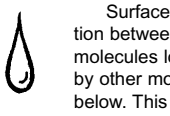
8. Put the soaped toothpick into the center of the water on the penny. What happens? Why do you think there was a change?

9. Pour a small amount of water onto the middle of the wax paper or aluminum foil.

10. Compare the water on the paper or foil to the way the water looked on the penny before you put the toothpick into it. How are they similar? How are they different?

11. Pick up the wax paper or aluminum foil by the edges and carefully slide the water around. See if you can capture runaway water drops.





12. Slide the water down to one end of the wax paper. Wipe your finger across the paper or foil where the water used to be. What do you notice? What did you expect?

13. Lift the wax paper or foil and carefully pour the water back into the glass.

14. With a clean toothpick, poke 10 small holes in the wax paper or foil away from the center (diagram 1).

15. Pour a small amount of water back onto the center of the wax paper or foil. Slide the water around the wax paper, over the holes. What happens? What if you let the water just sit on top of the holes? Is it leaking?

16. Soap up the toothpick and dip it into the water on the wax paper. What happens? Touch your finger to the wax paper where the water was, what do you notice? How is it different from what you felt before detergent was added? Let the water sit on top of the holes for 10-20 seconds. What happens? Is it leaking? Based on the changes you made what do you think caused this reaction to happen?

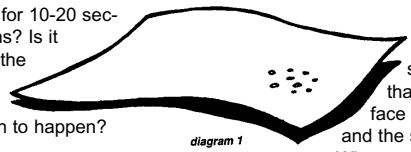


diagram 1

Wrap-up

Surface tension not only holds the top of a water drop together, but when more water drops come near, the water molecules attract each other and make one large drop. When detergent is added to the water, the drop spills off the penny because the detergent molecules break the attraction between the water molecules. For this reason, when pure water flows over a piece of wax paper or foil, its trail is dry and it will not drip through small holes in the wax paper or foil, but soapy water will.

What's going on here?

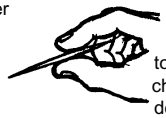
All matter, whether it's the air we breathe, the rocks we walk on, or the water we drink is made up of many billions of tiny particles called molecules. Each type of matter, called a compound, is made up of its own set of molecules, and each molecule is composed of a combination of even smaller particles called atoms. Atoms can be thought of like the letters of the alphabet. In order to form words, you join letters together according to specific rules. In the same fashion, atoms follow special rules when they "bond together" to make molecules. Water is a fairly simple molecule composed of just two hydrogen atoms and one oxygen atom.

When you get a bunch of water molecules together, they are attracted to each other because the hydrogen atoms of one water molecule are attracted to the oxygen atom of another water molecule. This force of attraction is what makes surface tension happen. In some cases, the force of attraction between molecules is so great, they even defy gravity. That's why the clean water didn't drip through the holes in the wax paper.

Surface tension results from the unequal attraction between molecules at the top of a liquid. Those molecules located below the surface are surrounded by other molecules on all sides, including above and below. This makes the forces of attraction between the molecules even in all directions. For those molecules on the surface, however, there is nothing to pull up on them, so they are pulled down into the liquid by the molecules below them, curving the top of the liquid surface.

Since the surface tension of the water keeps the molecules together, they don't wet the wax paper and you can pile many water drops on a penny. Detergent molecules are very large molecules which attract water at one end and repel water at the other end. When detergent is added to water, the attractions and repulsions disturb any attractive forces present in the water molecules by themselves. This reduces the surface tension so much that the water flows freely, running off the penny surface and through the holes of the wax paper. Water-spiders glide on the surface without getting wet because surface tension forms an invisible skin on top of the water.

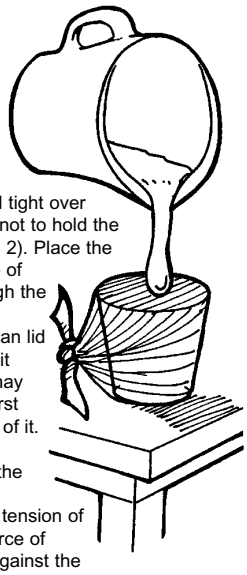
Where does this happen In real life?



Surface tension doesn't just happen to water. Almost any liquid from oil to chicken soup will exhibit it to some degree. Because of the structure of the water molecule, however, its surface tension is extremely strong. One of the reasons it is so difficult to get water to flow through soils that are rich in clay has to do with this high surface tension. Clay particles are extremely small and the spaces between them, called pores are tiny. When you pour water onto a clay-rich soil, it just sort of beads up on top. That's because the cohesive forces between water molecules are actually stronger than gravity, so the water drops hang together rather than flow down into the soil. If you want to get dense, compact soils to absorb water, you must increase the size of the pores or add special chemicals to the water so that it can flow through more easily.

Detergents and soap are chemicals called surfactants designed to help reduce the surface tension of water, allowing the water molecules to penetrate the narrow openings between the fibers in our clothing. The term surfactant is short for surface active agent. Surfactants not only help to make the water "wetter," but they help to dissolve oil and grease, which are not normally soluble in water. You may have noticed that if you spill some clean water on your jeans, the water just sort of sits on top. If you add some detergent to the water, however, the water will soak in. As surface tension is reduced, water becomes "wetter" and is free to flow into smaller spaces.

Now try this

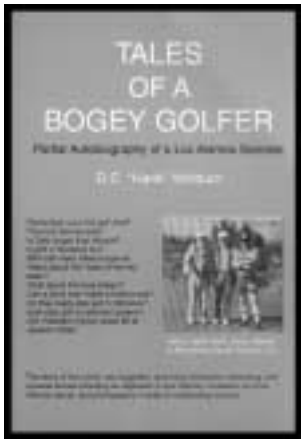


To demonstrate just how strong the force of surface tension can be, get a clean glass, a sheer nylon stocking, the plastic lid from a coffee can, and a pitcher of clean, pure water. Put the glass inside the stocking and stretch the material tight over the opening to the glass. Tie a knot to hold the stocking firmly in place (diagram 2). Place the glass on a table, and pour some of the water from the pitcher through the stocking into the glass until it is about 1/2 full. Place the coffee can lid on top of the glass, and holding it firmly, turn the glass over. You may want to try this over a sink the first few times until you get the hang of it. Slowly remove the lid from the mouth of the glass, and presto, the water should stay in the glass! What's happening? The surface tension of the water actually defeats the force of gravity. If you poke your finger against the stocking, the water will run out because you broke the surface tension.

diagram 2

Playing golf on 'the second best-kept secret'

"England's prime minister Winston Churchill has been quoted as saying, "Golf is a game whose aim is to hit a very small ball into a very small hole with weapons singularly ill-designed for the purpose." And America's western philosopher and wit Mark Twain sarcastically described the game of golf as "a good walk spoiled."
—From "Tales of a Bogey Golfer," by Hank Winburn



by Steve Sandoval

Duane Clinton "Hank" Winburn has led a charmed life, he says, working at the Laboratory during the Cold War years, and living on 35th Street only a half block from Los Alamos Municipal Golf Course.

His work as a metallurgist and his love for the links led Winburn to write "Tales of a Bogey Golfer: Partial Autobiography of a Los Alamos Scientist." The Vantage Press book was released late last year.

"I've been very fortunate in my lifetime to be exposed to the game of golf," said Winburn, who now lives in Sun Lakes, Ariz. "The Lord blessed me … I was able to take advantage of some of the world's greatest golf courses."

Today Winburn still rates Los Alamos as his favorite "local" course, even though he's played more than 100 courses in the United States and around the world, including the Old Course at St. Andrews in Scotland, the Holy Grail for golf aficionados.

"That's where it all started," said Winburn, recalling playing at St. Andrews with his son Randy in the mid-1970s. "When I stood up at the No. 1 tee I had to take a very deep breath. It was very exciting," he said.

A self-described poor kid from a small town in South Dakota, Winburn came to Los Alamos in 1946 to work on the best-kept secret of the war. He calls the Los Alamos course "the second best-kept secret of the war."

Winburn, 79, worked at the Lab from 1946 to 1982. After graduating from South Dakota Tech — he attended college on a basketball scholarship — with a degree in metallurgy, he went to work for an aeronautical company in New Jersey. By way of a friend, Winburn eventually was assigned to work on the metallography of plutonium at Los Alamos.

In his book, Winburn also talks about the Brooklyn Dodgers — he's now an Arizona Diamondbacks fan — jazz greats like Russ Morgan and Duke Ellington coming to Los Alamos in the 1940s, the Atomic City Invitational Golf Tournament, which has been played in Los Alamos continuously since 1950, and when he and his golfing buddies attended the 1986 Master's at Augusta, Ga.

The Los Alamos Municipal Golf Course was the second best-kept secret of Los Alamos, according to author and golfer Hank Winburn. This photo was taken near the first tee box looking east over the green of the ninth hole, a par 4. *Photo by Denise Bjarke*

Winburn also commends Tiger Woods, arguably the premier golfer on the Professional Golf Association tour, for his approach to the game. "He's a very personable young man. He's definitely coachable. There are certain athletes that when they get to a certain level they think they are the best evaluators of themselves. Tiger's not like that. He's getting more mature all the time."

Winburn also talks about his prowess on the golf course. "Whatever golf is, I've been fascinated by it for [more than] 60 years. During this period I have had experiences that I feel would be of interest to those golfers of my ilk, bogey shooters, who love the game and enjoy the fellowship, the scenery and, of course, the personal challenge of applying our limited physical and mental skills to trying to get that little ball into that little hole."

Winburn will be in Los Alamos to sign copies of the book beginning at noon May 1 at the Episcopal Church basement. The Los Alamos Kiwanis Club arranged the book signing.

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