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Bethe, Agnew awarded Los Alamos Medal



Hans Bethe



Harold Agnew

by Chris Pearcy

The Laboratory has announced the selection of two pre-eminent scientists for its first-ever Los Alamos Medal, deemed the highest honor the Laboratory can bestow

on an individual or small group by Laboratory Director John Browne. Nobel Laureate Hans Bethe and former Laboratory Director Harold Agnew are the first recipients of the medal.

Bethe, who headed the theoretical group at Los Alamos from 1943 to 1946, was selected for his role as a scientific visionary and leader, mentor and role model to the

Laboratory from its inception, said Browne. In 1967, Bethe won the Nobel Prize in Physics for his contributions to the theory of nuclear reactions, especially his discoveries concerning energy production in stars. He is professor emeritus of physics at Cornell University.

Agnew, director of the Laboratory from 1970 to 1979, is cited for leadership during the Laboratory's formative years and ascension to international stature. Agnew's association with the Laboratory began in 1943 when he joined the Experimental Physics (W) Division. He was elected state senator for New Mexico in 1955, and in 1961 became science adviser to the NATO supreme allied commander in Europe. He returned to Los Alamos in 1964 to head the former W Division. Upon leaving Los Alamos, Agnew headed Gulf General Atomics in San Diego, a nuclear reactor builder.

Scientists make key finding underlying genetic stability

by James E. Rickman

Biologists at the Laboratory have discovered new insights into how two common proteins found in mammalian cells can cause chromosomes to fuse together—mutations that can destroy cells or give rise to cancer.

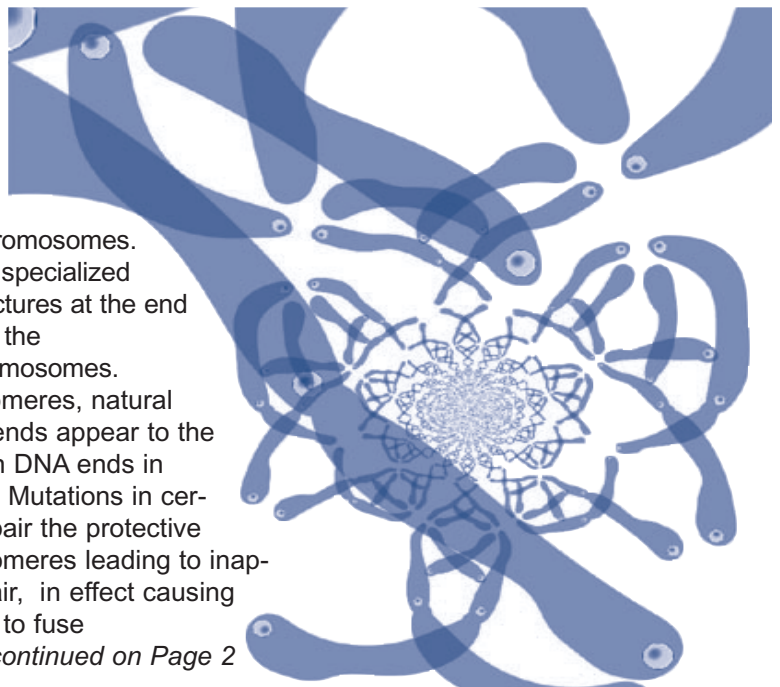
The research, by Susan Bailey and Edwin Goodwin of the Bioscience (B) Division, was published recently in the journal *Science*.

Bailey, Goodwin and their colleagues looked at the role of telomeres in protecting chromosome ends. Chromosomes are made of deoxyribonucleic acid (DNA) and are the carriers of genetic information. Human

cells contain 22 pairs of chromosomes plus two gender chromosomes. Telomeres are specialized protective structures at the end of each arm of the X-shaped chromosomes.

Without telomeres, natural chromosome ends appear to the cell like broken DNA ends in need of repair. Mutations in certain genes impair the protective function of telomeres leading to inappropriate repair, in effect causing chromosomes to fuse

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Key finding

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together end to end. Chromosome end fusions destabilize the orderly transmission of genetic information to the next generation of cells. The Los Alamos researchers studied telomere dysfunction to learn more about how a normal telomere works.

Each chromosome has four telomeres. Mammalian telomeres contain a unique DNA sequence, discovered earlier by Los Alamos Human Genome Project, as well as specialized proteins that together create a protective cap at the ends of chromosome arms.

Bailey and Goodwin looked at the role of two proteins in telomere function. One protein was known to play a role in telomere function and chromosome end capping. The other protein originally was shown to help repair damaged DNA, but later was shown by Bailey and Goodwin to also help protect natural chromosome ends.

The researchers used human cells provided by Titia DeLange of Rockefeller University that contained

artificially induced changes to the first protein and mouse cells with mutations in the second protein. Under normal circumstances, when cells divide they produce exact duplicates, including exact duplicates of the chromosomes they contain. Bailey, Goodwin and their colleagues found that the progeny of cells containing the altered proteins often contained chromosomes that had fused with other chromosomes at one arm. The fused chromosomes had a sausage-like appearance and were easy to distinguish from normal chromosomes. Because of their genetic abnormalities, the damaged daughter cells often were unable to thrive.

The fusing chromosome arms in the dying daughter cells indicated that the malfunction might be associated with telomere replication and indicative that the protein changes induced in the original cells played a role.

But Bailey and Goodwin noticed something else—something extraordinary and unexpected.

Using a Los Alamos-developed technique called chromosome-orientation fluorescence in situ

hybridization CO-FISH that highlights which half strand of the DNA double helix underwent replication during the cell-division process, the researchers determined that the fusion only occurred on specific arms of the chromosomes. What's more, Bailey and Goodwin noticed that fusion never occurred in a chromosome on two arms on the same-side of the X; if more than one fusion occurred in a single chromosome, the fusion always occurred on opposite arms on opposite sides. This indicated to the researchers that not all telomeres in a chromosome are the same, because if they were, the researchers would have expected to see same-side fusion in at least some cases simply based on the laws of chance.

A lot of research has been done on telomeres in the biological
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New Calibration Lab opens for business

At the recent dedication of the Laboratory's new Central Health Physics Calibration Laboratory at Technical Area 36, Environment, Safety and Health (ESH) Division staff look on as Shawna Eisele, right, acting group leader of Health Physics Measurements (ESH-4), acknowledges former ESH Division Director Denny Erickson for his leadership in construction of the new facility. The building, designed to upgrade and consolidate all of the Laboratory's radiation instrument calibration capability, was the only Laboratory line item project authorized by Congress to start in fiscal year 1999. It was completed on time and under budget. The state-of-the-art facility and its equipment will provide advanced calibration capabilities for the next 20 years and enhances the safety of workers and the public. Photo by LeRoy N. Sanchez



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An interview with deputy director Immele

Below are excerpts from an interview with John Immele, deputy director for national security, by Alison Grieggs of Communication Arts and Services (IM-1). For the complete interview, go to <http://int.lanl.gov/taskforce/director/immele.shtml> online.



John Immele

John Browne has stated that there are great challenges facing the Laboratory and the nation today. This new management team is charged with implementation of the new approach of managing our stockpile stewardship program.

John Immele, deputy director for national security, believes that the most important feature of the recent changes announced by Director John Browne will be that the people and divisions who do the work will more directly control the resources and technical direction. The Senior Executive Team recently revised the Nuclear Weapons Council to become the Laboratory National Security Council.

LNSC will be focusing at the strategic level. Our role is to guide, listen to different issues and opinions

across directorates and provide perspective to the responsible associate director, said Immele.

Senior Laboratory managers sit on this council, which will serve as the weapons and threat reduction programs board of directors. The Laboratory director chairs the council as a clear indication of his ownership of our programs and will personally decide some issues.

Transforming deterrence to reflect fewer offensive nuclear arms and greater dependence on defense is the focus of the Nuclear Posture Review being led in Washington, as is our nation's expectation that the national laboratories will help in the aftermath of Sept. 11 with a much stronger and more unified counterterrorism program, including nuclear, chemical and biological terrorism; intelligence activities; and assessing infrastructure vulnerabilities.

The council is responsible for high-level planning and will play a role in the newly created integrated product teams. The director has chartered six IPTs; the council will nurture them. Immele sees the council as listener, motivator, mentor to the IPTs.

Initially the council will meet several times each month, as they establish their own team and educate each

other on programs and products. Later, they hope to meet only once a month, an achievable goal with their commitment to moving decisions closer to the work being done and holding leaders and teams accountable for executing their programs.

Another area requiring the council's attention is improving cooperation among the Defense Program laboratories. By reaching consensus among the laboratories and conveying unified recommendations to the National Nuclear Security Administration and the Department of Energy, we will have greater influence at headquarters, said Immele. So, we will be reaching out to Livermore, Sandia, Berkeley and other labs to make decisions and create recommendations for Washington on topics such as the balance among Directed Stockpile Work, experimental and calculational programs. Plans for new or upgraded plutonium facilities around the DOE complex are another opportunity for a unified approach among the NNSA, the laboratories and production sites. Immele noted that these are expensive, complex facilities and the more integration we have among them, the lower their operating costs and the better their product.

Laboratory on heightened security

On Sept. 11, the Department of Energy placed its facilities on heightened security as a result of the deadly terrorist attack on the east coast. Since that time, the Security and Safeguards (S) Division has issued numerous security bulletins.

For an archive of all the bulletins, go to <http://int.lanl.gov/security/sec-con/> online.

FEMA regional coordinator to speak at Laboratory's Veterans Day event

by Steve Sandoval

The Laboratory will honor the nation's veterans with a flag-raising breakfast in the Otowi Building Cafeteria and a talk beginning at 7 a.m. Tuesday, Nov. 13.

Sherry Wainwright of the Federal Emergency Management Agency's Region Six headquarters is the keynote speaker at the veteran's breakfast. Wainwright will talk about FEMA's role in the 1995 Oklahoma City bombings and the Sept. 11 attacks on the East Coast. Wainwright is a former U.S. Air Force lieutenant colonel.

Laboratory Director John Browne will be the keynote speaker at the flag-raising ceremony in the horseshoe area outside the Badge Office and Administration Building that follows the breakfast talk.

For more information, contact Randy Mynard of Environmental Dynamics and Spatial Analysis (EES-10) and chairperson of the Lab's Veterans Committee at 7-7335 or write to mynard@lanl.gov by e-mail.

EAP leader urges employees to take care of themselves

Editor's note: Tom Locke, clinical psychologist and team leader for the Employee Assistance Program (EAP) reminds the work force that by taking care of ourselves, we are taking care of business.

Friends,

Most of us watched and listened as the tragic events of Sept. 11 unfolded. Media coverage instantaneously informed us of events; it also exposed us to a level of trauma than can be disturbing and emotionally overwhelming. For all of us, our reality has been abruptly and forever changed.

Across our Laboratory, our town and our country, family, friends and colleagues talk about their disbelief, their horror, their vulnerability, their sadness, their fear and their anger. As the magnitude of that tragedy and other recent events unfold, those emotional reactions are likely to intensify. It is very important to talk with someone you trust about your reactions. Denying emotional reactions can lead to significant, long-term difficulties.

To focus only on what is bad is to miss the good that is everywhere. Now is the time to nurture ourselves and support one another as best we can.

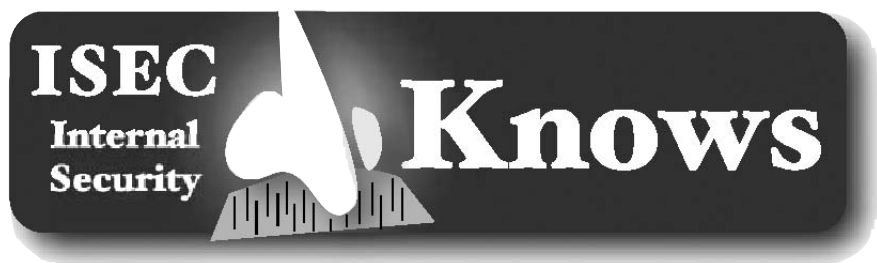
Sleep, eat as you should, exercise, do what you find enjoyable,

relax from time to time. If you do those things well, you will help yourself and be better able to help those around you cope with these traumas. Acknowledge that your ability to attend and stay focused on important safety and security tasks can be compromised. For a time, double-check and ask others to monitor tasks that are most sensitive.

As was true for the fire, the

hard-drive incident and all the other difficult situations we have faced, most will do well with time. For those who just cannot seem to re-establish a sense of equilibrium, consider talking to your doctor or another wellness professional.

And remember that the Employee Assistance Program is available for individual or group consultations and can be reached at 7-7339.



What the heck is OPSEC?

by Kevin Roark

In a nutshell, OPSEC, or Operations Security, is a process that teaches you to examine your day-to-day activities from an adversary's/competitor's point of view; to understand what an adversary/competitor can learn about you and/or your organization from these activities; to assess the amount of risk this places on you and/or your organization; and then, to develop and apply countermeasures so that the adversary/competitor doesn't win.

So the goal of OPSEC is to control information and observable actions about your capabilities and intentions to keep them from being used by your adversary/competitor.

OPSEC works best when incorporated in the planning stages of any project. To be successful, the folks who are the most familiar with the particular plan or project should do the integration of OPSEC early in the planning stage. Those are the people who can best identify the plan's or project's critical information.

OPSEC analysis focuses mainly on open source information and actions, those things that are unclassified or uncontrolled. The scary word here is uncontrolled. The very fact that the information and activities are open source makes the implementation of a good OPSEC plan much more challenging.

Future ISEC Knows articles will take a closer look at the OPSEC process, comprised of five steps designed to determine how your adversaries or competitors might obtain your critical information in time to be of value to them, and how you can keep that from happening.

Step 1: Identify the critical information.

Step 2: Analyze the potential threats.

Step 3: Analyze your vulnerabilities.

Step 4: Do a risk assessment.

Step 5: Apply countermeasures.

For more information on OPSEC, call the OPSEC Program Office at 5-3372.

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Atlas machine begins experimental work

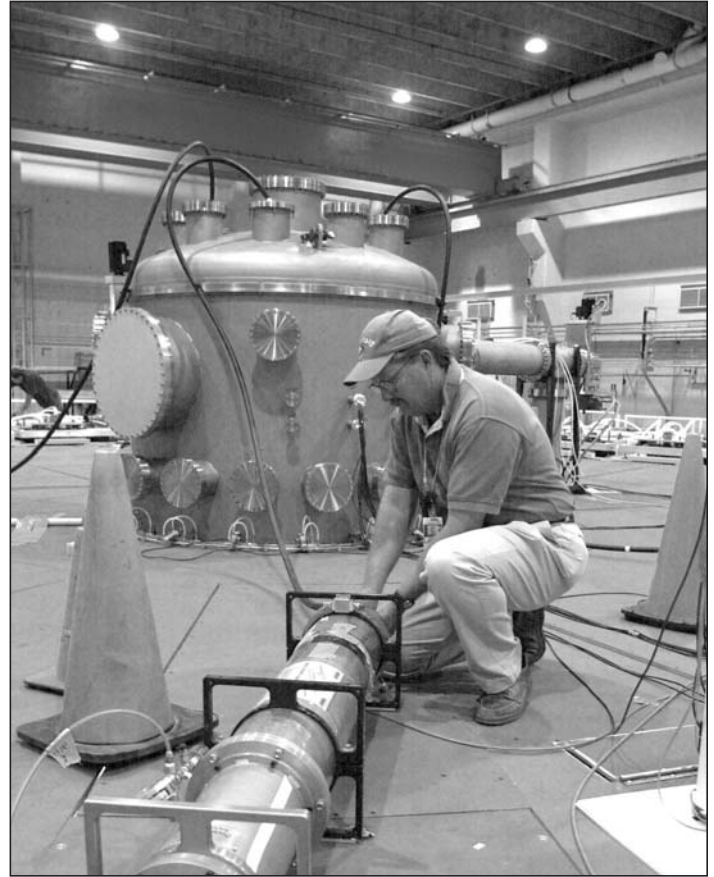
by Todd Hanson

Scientists at the Laboratory performed the first liner implosion shot on the Atlas pulsed power facility recently. This successful experiment demonstrated that the Atlas facility is ready to support the Laboratory's research work relating to the certification of the nuclear weapons stockpile. In the shot, the 650-ton Atlas pulsed-power generator successfully discharged approximately 20-million amperes of current through an aluminum cylindrical shell or liner about the size and shape of a tuna can, causing the liner to implode at very high speeds.

The purpose of this first experiment was to demonstrate Atlas was capable of the implosion quality that had been obtained with an earlier Los Alamos pulsed power machine, Pegasus II. Pegasus II produced the most uniform, symmetric and controllable implosions ever achieved. The experiment also demonstrated successful delivery of electrical energy at high currents and voltages and successful collection of complex data at the Atlas facility.

Essentially, Atlas is a giant power multiplier using energy that is accumulated slowly and stored in the machine's capacitor banks for sudden release into a roughly four-inch-diameter liner. As the electrical current surges through the Atlas machine, it crushes the targets at velocities nearly high enough to escape Earth's gravity—22,000 miles per hour or 10 times the speed of a high-powered rifle bullet—and at pressures that occur at the center of Earth, or millions of times that of Earth's atmosphere. During the few millionths of a second that it is operating at full strength, the tremendous electrical output of Atlas is roughly equal to four times the world's total electric power production.

The Atlas pulsed-power facility was designed as a tool to provide basic physics data suitable for validating the



Brodie Anderson of Hydrodynamic and X-Ray Physics (P-22) makes a final adjustment to one of the Bechtel Nevada's X-ray instruments that were used as part of the diagnostic systems in Tuesday's experiment. The Atlas shot was a collaborative Los Alamos and Bechtel Nevada effort. Photo by LeRoy N. Sanchez

computer codes used for weapon certification and to help scientists improve the models in those codes.

Atlas was conceived in 1993 as part of the Department of Energy's strategy to maintain the nuclear stockpile without the use of underground nuclear testing. The Atlas construction project began in 1995 with engineering design and component tests. Full-scale assembly began in November 1999 and construction was completed in August 2000.

Under the current plan, Atlas will conduct approximately 17 physics experiments for the science-based Stockpile Stewardship Program at Los Alamos before being disassembled and moved to the Nevada Test Site next year.

After being reassembled, certified and prepared for continuous operation at the Nevada site, Atlas will continue its mission supporting stockpile stewardship as a tri-lab (Lawrence Livermore, Sandia and Los Alamos national laboratories) resource and as a state-of-the-art research facility providing experimental opportunities to investigators from many laboratories and academic institutions.



Members of the team, lead by Bucky Cochrane, left, and Peter Turchi, right, both of P-22, meet the morning of the test for a final review of Atlas operational and safety procedures. Photo by LeRoy N. Sanchez



NEWSMAKERS



Thomas Meyer

Thomas Meyer, associate director for strategic research, has been named the Senior Executive Team champion for Asian Pacific Islander issues and initiatives. During the past year, the Laboratory has

made significant progress in addressing issues of concern to Lab API colleagues. Through the efforts of the API steering group, the Asian American Diversity Working Group, the Office of Equal Opportunity (OEO) and the Diversity Office (DVO), as well as contributions from dozens of individual employees, the Lab has developed an Affirmative Development Plan. Meyer will use the plan to assure that the initiatives the Laboratory has set in place continue to be supported and remain on course. Meyer replaces Steve Younger as SET Champion for API issues and initiatives.

Mick Trujillo, who has led the Office of Equal Opportunity (OEO) for the past eight years, will join the

University of California's Northern New Mexico office on a change-of-station assignment to work on Northern New Mexico initiatives. Amy Sahota, OEO deputy director, has been named as the acting OEO director.



Gary Resnick

Gary Resnick has been named manager of the Lab's Biological Threat Reduction Program. The program aims to reduce the possible threat of biological agents from terrorist groups or Third World countries. He will work with the Laboratory's technical division leaders to develop and implement plans to respond to current and emerging national biological threat issues. Resnick also will be responsible for collaborative efforts to meet the needs and goals of agencies such as the Department of Defense, the Federal Emergency Management Agency and intelligence and law enforcement communities in the technology areas relevant to biological

threat reduction. Resnick had been a senior leader within the Defense Threat Reduction Agency and was the executive manager of the Department of Defense's Chemical and Biological Defense Program. Resnick has a doctorate in microbiology from the University of Rhode Island.

Brigadier Gen. Ronald Haeckel recently was appointed the principal deputy administrator for Defense Programs, National Nuclear Security Administration. Haeckel is responsible for helping to ensure a secure and reliable stockpile of nuclear weapons and associated materials, capabilities and technologies in a safe, environmentally sound and cost-effective manner. Haeckel most recently held the position of vice director of Plans, United States Space Command, Peterson Air Force Base, Colo. The directorate is the focal point for operational requirements, concepts, policy, doctrine, strategy and force development, critical infrastructure protection and political-military activities.



Students receive scholarships at Laboratory Foundation banquet

Sarahmaria Gomez, right, a recently graduated Santa Fe High School senior, receives her \$1,000 Los Alamos Employees Scholarship Fund scholarship from Al Sattelberger, Chemistry (C) Division director and president of the Laboratory Foundation board of directors, at a luncheon held recently in Santa Fe. The luncheon was part of a day of workshops the Laboratory Foundation hosted for nonprofit organizations, educational institutions and the public interested in learning more about the Laboratory and working with the foundation. Gomez was one of 38 graduating seniors and undergraduate students who received scholarships this year through the Los Alamos Employees Scholarship Fund. Photo by LeRoy N. Sanchez

Key finding

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community, and the conventional thought was that all telomeres are created alike, said Goodwin. Our research shows that this is not the case. There are two different processes for protecting telomeres, and they have distinct genetic requirements.

DOE NEWS

Computer model to predict global climate change

A new computer model to predict global climate change will be created by research teams led by Los Alamos and Oak Ridge national laboratories to provide a scientific basis for evaluating policy options. The Department of Energy's new Scientific Discovery through Advanced Computing Program awarded \$20 million over five years to the project, which also involves Argonne, Lawrence Livermore and Pacific Northwest national laboratories, NASA and the National Center for Atmospheric Research.

Project will help create new generation of simulation codes

The Scientific Discovery Through Advanced Computing Program recently announced 51 projects, in addition to the Los Alamos-Oak Ridge climate-change project. Officials say the projects will help create a new generation of simulation codes that will take advantage of computers capable of doing trillions of calculations per second. The program will provide a total \$57 million in first-year funding to the projects, which involve 13 DOE laboratories and more than 50 colleges, universities and companies. Among the other fields expected to benefit from the efforts are fusion energy, high-performance computing and chemical sciences.

The difference in telomeres apparently lies in the way chromosomes are replicated, Bailey and Goodwin found. When chromosomes duplicate themselves, their DNA double helices separate into two strands and then rebuild their DNA structure on each half strand. Because DNA polymerases—the protein catalysts that make the new DNA strands—proceed in only one direction, the two new telomeres replicated from the original parent telomere are produced by two different mechanisms.

In one case, the telomere's double helix terminates in a blunt end. In the other case, the telomere ends with a minute chemical overhang. This overhang is important because it allows the telomere to loop back on itself—forming a so-called t-loop—to complete its end cap.

The first process is known as leading-strand DNA synthesis; the second is known as lagging-strand DNA synthesis.

Bailey, Goodwin and their colleagues found that chromosome fusion occurred only at sites on the chromosomes where telomeres had been formed by the leading-strand process.

The research indicates that both altered proteins induced in the cells used for study play a role in capping the ends of telomeres formed by leading-strand DNA synthesis, but are not required to cap telomeres replicated by lagging-strand synthesis.

Bailey and Goodwin's research is significant because it has shown the existence of two types of telomeres and also gives insight into the roles of two proteins in normal cell function.

Random Acts of Kindness Week: Nov. 11-17



Kindness Pass it on

Help make our world a kinder and more caring place—perform random acts of kindness. What are random acts of kindness? They are the simple things we can do for no special reason to brighten someone's day.

Here are a few ideas to get your started:

- ¥ Help a neighbor plant a garden.
- ¥ Select some people in your life who you feel need a special lift and send them a gift—such as flowers, tickets to a special event, a gift certificate to their favorite restaurant.
- ¥ Write a note to the supervisor of an employee who has helped you.
- ¥ Stop for a person waiting to cross the street.
- ¥ Pick up litter.
- ¥ Transport someone who can't drive.
- ¥ Adopt a stray animal.
- ¥ Hold the door of the elevator, subway or bus for someone rushing to catch it.
- ¥ Let someone merge into traffic during rush hour.
- ¥ Provide flowers for a senior center, nursing home, hospital or shut-ins.
- ¥ Call loved ones to say "I love you" or to tell them what you appreciate about them.
- ¥ Smile and say thank you to the bus driver or toll collector.
- ¥ Make an anonymous donation to a local charity.
- ¥ Offer to baby-sit for a mother with young children to give her some time to herself.
- ¥ In the winter, scrape the ice and snow off the car next to yours.
- ¥ Include a note or joke in your child's lunchbox.
- ¥ Practice kindness at work to create a more caring work environment.

Being kind brings out the best in all of us and helps make our communities better places to live and work. Take time to be kind.

Source: *The Random Acts of Kindness Foundation, Denver, Colo.*
<http://www.actsofkindness.org>

ReefNews: Bringing the reefs to students

by Shelley Thompson

Jonathan Dowell, once terrified of swimming, now dives deep into the oceans and brings their coral reefs to shore for students of all ages.

Dowell and his colleagues across the United States have founded a nonprofit organization, ReefNews, that is dedicated to teaching students about the oceans and their shores by producing educational materials, including CD-ROMs, a Web site and a newsletter.

According to Dowell, who works in Weapon Design Technologies (NIS-9), the main mission of ReefNews is to get children excited about science. The CDs we've created present very colorful images. The images we show students are so different from almost anything they've seen before. Most elementary kids don't have access to coral reefs, and aquariums don't do the life in them justice. Many species can't survive in captivity.

The reefs are full of life: crabs chasing food, schools of fish darting back and forth and sea turtles swimming. You can sit in the Jemez all day and never see a coyote, but if you sit in a coral reef for 10 minutes, it is like being in downtown Albuquerque—there is life everywhere, said Dowell.

How did someone who was paranoid of water get started in all of this?

Dowell responds, "When I married my wife, Tessa [of Business Support Services (BUS-8)], she asked me to learn to swim so that we could snorkel together."

In February 1995, Dowell began taking swimming lessons. At first, I would stand waist deep in the shallow end and hyperventilate. But four months later, after swimming nearly everyday, Dowell not only had learned to swim but was certified for scuba diving.

When Dowell made his first dive, he went to the anchor line and started going down. When he got to 55 feet he said,



Jonathan Dowell of Weapon Design Technologies (NIS-9) carries an underwater camera to photograph some of the three million species of reef creatures. Photo by Tessa Dowell; Copyright (c) 2001, ReefNews(R) Inc.

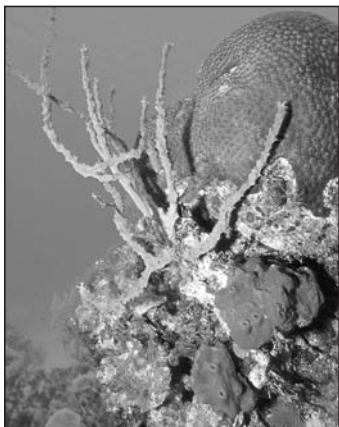
No farther, this is far enough. Then, I let go of the anchor line and opened my eyes. I saw a coral reef, and from that moment on I haven't had the leisure or time to be afraid of the water because of all the amazing things I was seeing.

Dowell was hooked. He and Tessa began taking trips. They brought back many colorful photos of reef life. After seeing the pictures, a friend asked if he would be interested in doing a newsletter. That was all I needed to get started. We started a corporation, got funding and contributions and got the material turned into educational material, said Dowell.

This year ReefNews has distributed its newest educational CD-ROM, *Bimini: Jewel of the Gulf Stream*, to 550 elementary school libraries across New Mexico. The *Bimini* CD gives information about the island, its people and the reefs that surround it. A *Grand Turk* CD, distributed last year, describes the island and its reefs.

Grants for this organization come from Los Alamos National Bank, Los Alamos Medical Center and the Los Alamos National Laboratory Foundation.

The ReefNews Web site can be visited online at <http://www.reefnews.com>.



Left: Coral heads like this Star Coral near Cayman Brac, in the Caribbean, are the building blocks for tropical reefs. The branches are a colony of animals called a Rope Sponge. Right: Tessa Dowell of Business Support Services (BUS-8) examines a 100-year-old Barrel Sponge for tiny oceanic creatures such as Blennies and Gobies at a reef near Cayman Brac. Photo by Jonathan

Dowell; Copyright (c) 2001, ReefNews(R) Inc.

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