Challenge to Traditional Theories

Sandians Explain Oddities of Volcanoes' Behavior

Volcanoes. Sometimes they blow. Sometimes they flow. And sometimes they blow, then flow.

For decades, scientists have tried to understand why some volcanoes with high silica content erupt explosively and others just ooze lava. Over the past few years, Sandians in Geosciences Dept. 6230 have found a fresh answer to that puzzle. Their studies are now casting new light on how magma (underground molten rock) flows to the earth's surface.

Studies of samples taken from within and around a volcano, along with lab and theoretical work, have led John Eichelberger (DMTS, 6233) and Charles Carrigan (6231) to improve on earlier theories about the inconsistent behavior of high-silica volcanoes. Their work has been supported by chemical studies done by Hank Westrich and Harlan Stockman (both 6233).

It's not just that different volcanoes behave differently. The same volcano — some of those in the Cascade Range of the Pacific Northwest are examples

Krakatoa discharged almost five cubic miles of magmatic debris into the air.

— can explode one time and release lava relatively peacefully the next. During the quieter eruptions, lava may either spread out in a flow or build up into a volcanic dome.

Mount St. Helens, for instance, erupted explosively for nine hours in May 1980, blowing the mountain's summit off and throwing a tenth of a cubic mile of ash into the air. Eruptions after that, however, built a lava dome more than 1000 feet high.

Other memorable — and destructive — eruptions have included the A.D. 79 burial of Pompeii by Vesuvius, and the 1883 explosion of the volcanic island of Krakatoa, which discharged almost five cubic miles of magmatic debris into the air.

Data From Underground

Much of the data supporting John and Charles's theory came from the Continental Scientific Drilling Program. This basic-research program is partly funded by DOE because results could bear on applications such as geothermal energy, waste isolation, and ore formation. Sandia provides technical and scientific support.

John and Charles say magma acts like a sponge that can leak gas as it rises to the earth's surface. Past explanations have concentrated solely on the chem-

" . . . the last part of the [magma's] ascent is the key to determining whether a volcano flows or explodes."

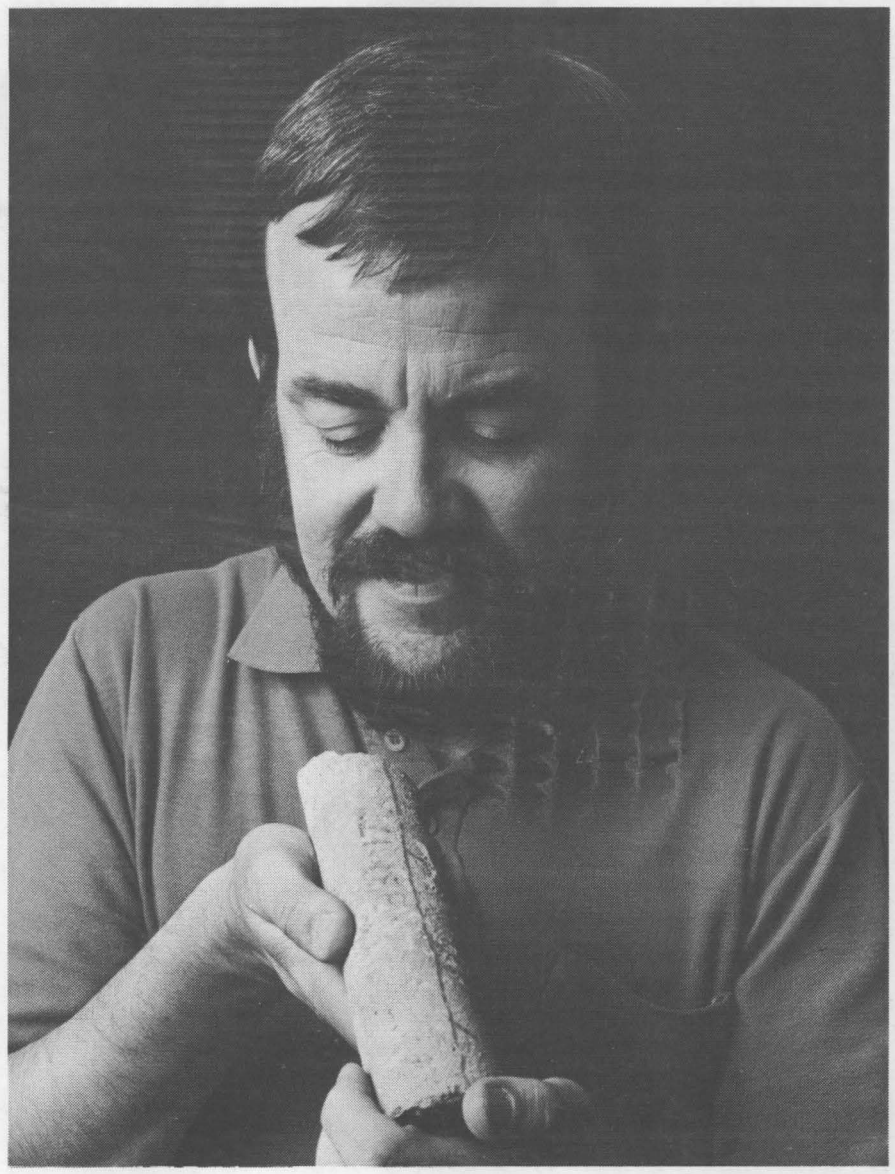
istry of the magma deep in the chamber. The Sandia studies bring together expertise in both the chemistry and the physics of volcanoes.

As a result, says John, the Sandians have focused attention on a neglected part of volcanic processes. "What happens in the last kilometer of the magma's ascent is important but has been ignored. Traditionally, people have thought about visible eruptions and what they leave on the surface, or about the deep magma chambers, but not what happens in between.

"It turns out, though, that the last part of the ascent is the key to determining whether a volcano flows or explodes. It's also important in the processes that concentrate metals into ores and heat groundwater to form hydrothermal systems, such as geysers and hot springs."

The older, conventional explanation was that while magma was in its underground chamber, before eruption, it was stratified. High in the chamber, say the textbooks, is "wet" magma, containing large amounts

(Continued on Page Nine)



CORE SAMPLE from Obsidian Dome volcano undergoes scrutiny of Charles Carrigan (6231). The core comes from near the contact between surrounding granite and an intruding magma similar to that forming the dome. Charles and John Eichelberger (DMTS, 6233) have introduced new theories about volcanoes.

LAB NEWS

VOL. 41, NO. 11 SANDIA NATIONAL LABORATORIES JUNE 2, 1989

Building a Nest Egg the Painless Way

AT&T Savings Plans: Significant Part of Benefits Package

Today's pop quiz: Where can you get — legally — an extremely high, "up-front," initial rate of return (50 percent or more) on your money?

If you're a Sandian with more than one year of service, and you're enrolled in one of the AT&T Savings Plans, you know the answer: That's the contribution that Sandia makes (called the "company match") on your basic contribution to the savings plan.

The basic employee contribution is a minimum of 2 percent of base salary and maximum of 6 percent in the Savings Plan for Salaried Employees (SPSE). It's a minimum of $5 and maximum of $40 weekly — depending on the wage band and allotment table — in the Savings and Security Plan (SSP) for non-salaried employees.

"The Labs' contribution to the savings plan is a form of deferred compensation that can really build up over the years," says Charles Mika, manager of Benefits Dept. 3540, who says that Sandia's matching contribution to the savings plans will be approximately $12 million in FY89.

"The contribution is part of our focus on maintaining what we think now is a competitive benefits package — competitive in the sense that we can attract and retain a strong staff," Charles notes. "You might call it our investment in the future. Clearances are expensive; employee training is expensive. It follows, then, that once productive people are on roll, we want to keep them here. Our low annual turnover rate — between two and three percent, not counting retirements — indicates the investment is paying off."

Substantial Retirement Income

"In fact," Charles continues, "we estimate that plan savings — including employee and company contributions — could easily provide between 10 and

" . . . a form of deferred compensation that can really build up over the years."

30 percent of a retiree's income, depending on number of years in the plan, amount allotted each paycheck, investment options selected and their earnings, and in-service withdrawals, if any."

Employees have nonforfeitable rights to the company contribution and earnings thereon after they complete five years of vested service, or reach age 65, or terminate because of retirement, disability, layoff, or death — whichever date is earliest. (Employee contributions and associated earnings are never forfeitable.)

After one year of service, salaried employees be-

(Continued on Page Eight)

This & That

Did We Make It? -- I hope most of you are reading this on Friday, June 2. If so, we got the paper out on time. This is our first issue using a new computer-based, desktop publishing system that should give us more flexibility and more design options. We're trying to ease into the system a step at a time. If we stay sane for the next few months, we'll soon be doing complete page makeup on the new system.

It's a classic case of old dogs trying to learn new tricks. We just hope our first trick isn't "roll over and play dead."

The folks who are helping us learn the new system tell us all we need is confidence. But the message that came up on the computer screen last week, "The application [name of computer program] has unexpectedly quit," doesn't do much to build confidence.

* * *

Special Applause -- goes to the scores of Sandians who helped the KAFB Fire Department fight a serious fire in Coyote Canyon last Wednesday. Chuck Wells (7818) credits Dept. 7530 employees with being among the first to the scene, where they radioed for heavy equipment and personnel support. Capt. Pat O'Neill (3535) took Security's Mobile Command post to the scene, where he was met by Dr. Tom Templeton (3320) and staff with a Sandia ambulance. Meantime, Robert Zamora (7818-3) and Jim Davis (3423-1) were sending staff and support equipment -- including earthmovers and water tankers -- to the scene. Crisis manager Bob Peurifoy (7000) closed the Emergency Operations Center at 6 p.m., but security personnel stayed on-scene all night, providing access control services, as well as communications support for the Forest Service.

* * *

Magnificent Flying Machine -- Ken Young (5217) flies an open-cockpit biplane that he built "from scratch" during an 11-year period (see story in this issue). I saw it and watched him fly it several weeks ago. It's beautiful, obviously crafted with pride and attention to detail.

* * *

Maybe System Operators Need Redesigning -- Sharp-eyed LAB NEWS writer Charles Shirley was recently reading a technical book as research for an article. Everything was fine through page 148, but the next four pages were bound upside down and in reverse order. The book: Designing Intelligent Systems.

* * *

Something to Think About -- Laws and regulations require most of us to wear vehicle safety belts, but not all of us comply all the time. A statistic issued during New Mexico's recent "Buckle Up Week" caught my eye: The State Highway and Transportation Department says 85 percent of the individuals killed last year in New Mexico crashes were not wearing safety belts.

* * *

Now I Know -- why some folks are publicity-shy. Sandia sends announcements of employee promotions to the local newspapers. Since an announcement about my appointment was published several weeks ago, I've had three congratulatory notes from outside the Labs -- from my dentist, from an investment firm (talk about being on the wrong trail!), and from an alcohol and drug treatment center. That last one puzzled me at first, but the longer I'm at this job, the more sense it makes. •LP

LAB NEWS

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Recent Patents To Sandians

Karlan Boultinghouse (5213), Lee Schoeneman (5217), and Bert Tise (2335): Method for Laser-Based Two Dimensional Navigation System in a Structured Environment.

Roger Chaffin (dec.), Ralph Dawson (DMTS, 1144), Ian Fritz (1143), Gordon Osbourn (1145), and Tom Zipperian (1141): Field-Effect Transistor Having a Superlattice Channel and High Carrier Velocities at High Applied Fields.

David Norwood (7411): Process for Obtaining Multiple Sheet Resistances for Thin Film Hybrid Microcircuit Resistors.

Taz Bramlettt and Jay Keller (both 8364): Acoustically Enhanced Heat Exchange and Drying Apparatus.

Harry Hardee (6231), Richard Hills (former Sandian), and Richard Striker (ret.): Down Hole Periodic Seismic Generator.

Russ Humphreys (1261): High Voltage Supply for Neutron Tubes in Well Logging Applications.

Agustin Ochoa (former Sandian): Random Access Memory Immune to Single Event Upset Using a T-Resistor.

feedback

Q. Sandia's current radwaste policy is causing operational problems and wasting resources. Because the Labs' radwaste dump was closed, all such waste must be stored. Since a portion of the waste consists of short-lived radionuclides, wouldn't it be cost-effective to simply resurvey the waste now being stored and dispose of waste that has decayed sufficiently, possibly in the KAFB landfill? Such a policy might result in less radwaste generated, less money spent on ultimate disposal, and less storage space required.

A. Originally, Sandia's radioactive-waste landfill was scheduled to be closed after a new Radioactive Waste Management Facility (RWMF), designed to prepare wastes for off-site disposal, had been constructed. Unfortunately, because of an unforeseen policy change, the landfill was closed shortly before construction on the RWMF began. The RWMF is scheduled to start operation in October 1989. The radioactive waste will be packaged, stored, and shipped for disposal to licensed facilities.

The concept of resurveying wastes to identify those whose radionuclides have sufficiently decayed to allow for sanitary landfill burial is very attractive for the reasons you cite. Both the Nuclear Regulatory Commission and DOE are developing policies for disposal of such materials as "Below Regulatory Concern" wastes. However, until NRC approves and DOE adopts such policies, Sandia cannot dispose of any radioactive wastes — regardless of the decay that has occurred — except at licensed radioactive-waste disposal facilities.

The Environment, Safety, and Health Directorate (3200) is working to get approval to reopen the radioactive-waste landfill until the RWMF becomes operational; this would alleviate storage problems. Because any reopening would be only temporary, and the disposal of mixed hazardous and radioactive waste would still be prohibited, ES&H encourages minimizing radioactive-waste generation. Future off-site disposal costs will be much higher than past on-site disposal costs.

Nestor Ortiz — 3200

Q. About the time that efforts to reduce air pollution in Albuquerque were highlighted by the "Don't Drive One in Five" carpooling campaign last winter, Sandia torched off 8000 gallons of jet fuel to test TRUPACT. And this was done on a no-burn day. What does that say about the Labs and good community citizenship?

A. Sandia supports the goals of preventing and abating air pollution to protect Sandians and all area residents. Consistent with these goals, Sandia assesses the impacts of its various emissions and obtains applicable air-quality-control permits. Under provisions of New Mexico state law, Bernalillo County and the City of Albuquerque — through their joint Air Quality Control Board — have sole authority to issue such permits.

Sandia's assessments, including appropriate air-pollution-control measures, are sent to DOE for approval. If DOE approves, it submits the assessments — and any permit applications — to the city for its review, approval, and permit action.

On Jan. 30, 1989, a TRUPACT II pool fire test was conducted to demonstrate compliance with hypothetical thermal accident conditions defined in US Nuclear Regulatory Commission regulations. Test conditions complied with an Open Burning Permit issued by the city's Air Pollution Control Division (APCD).

As required by such permits, Sandia notifies the APCD before tests and honors postponement requests if poor ambient air quality conditions exist. Tests such as the TRUPACT test are conducted only if the wind direction is away from Albuquerque.

Nestor Ortiz — 3200

Engineering Design Directorate Wins Challenge

Ron Detry's Engineering Design Directorate "ran away" with the 6th annual Directorate Challenge race last month, retaining its grip on the trophy, with 153 of the total 264 participants.

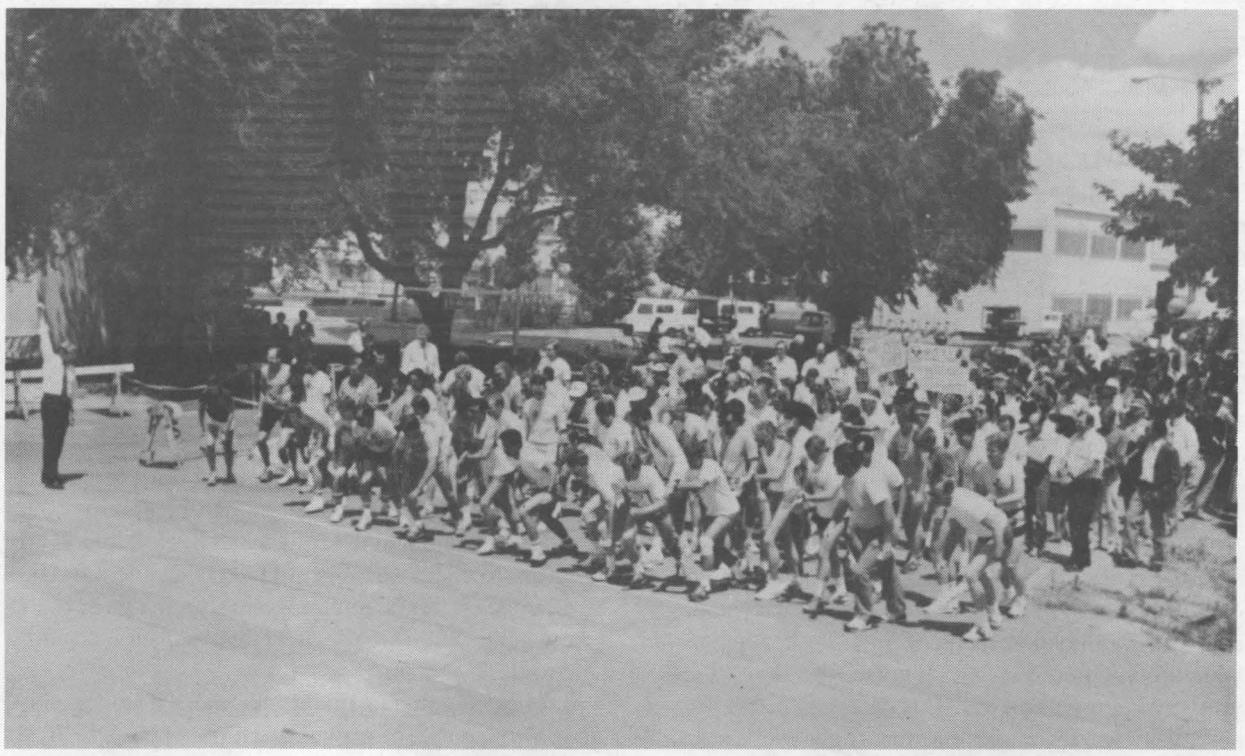
Jim Reitz (8451-1) was first-place male finisher for the sixth consecutive time. Carol Caldwell (8514) was first among female runners. Second-place finishers were Vic Kaliakin (8241) and Leah Williams (8342). Glenn Kubiak (8343) and Karen Sheaffer (8235) weren't far behind in third.

One of the prizes in the Best Costume/Decoration category went to Don Putz's Div. 8286, which created a real first for the Directorate Challenge — a float, complete with music, balloons, and costumed riders.

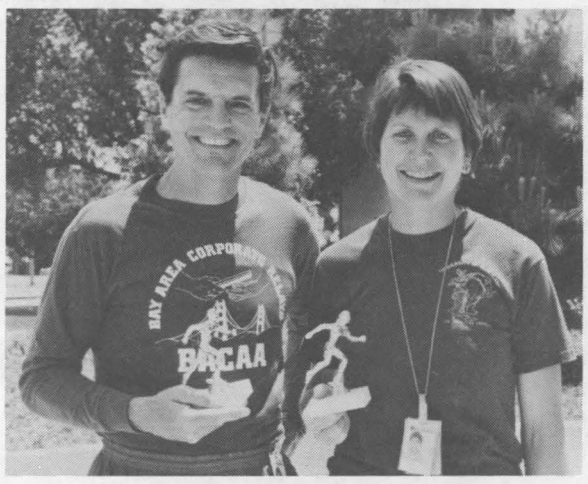
Prizes were also given to Pete Dean's singing "Mouseketeers" from Div. 8235, who boldly claimed theirs is no "Mickey Mouse operation!" Also capturing a prize was the team of Bob Pilkey, Jay Petersen, and Nick Wittmayer (all 8285), who enter the race each year in some innovative way — this time as Oakland A's baseball players in full uniforms.

Honorable mention went to Jerry Wackerly's Div. 8524 Library crew, who disguised themselves with funny noses, wigs, and hats and called themselves the "Sandia Library Book Patrol."

The good-time event was organized by Barry Bolden (8161) and Dan Dawson (8243).

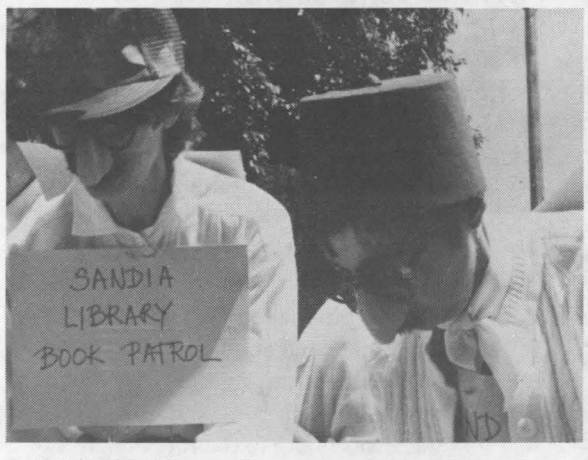


AND THEY'RE OFF! — John Crawford (8000) fires the gun to send the pack on its way in the 6th annual Directorate Challenge in Livermore last month.

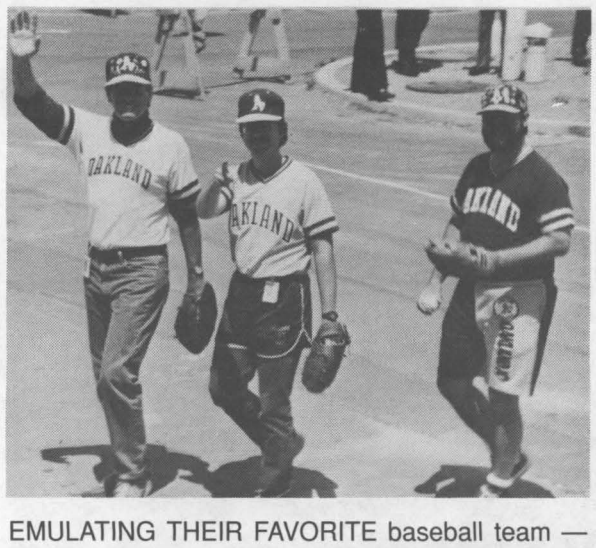


FIRST-PLACE FINISHERS Jim Reitz (8451-1) and Carol Caldwell (8514) are all smiles as they pose with their trophies.

SINGING AND LOUDLY PROCLAIMING that Computer Div. 8236 "is no Mickey Mouse organization," Pete Dean's crew adjust their ears.



SNEAKING UP on library book hoarders, these members of the "Sandia Library Book Patrol" — Darlene Loll (left) and Mavis Flower (both 8524), try to look unobtrusive in their disguises.



EMULATING THEIR FAVORITE baseball team — the Oakland A's — (from left) Bob Pilkey, Jay Petersen, and Nick Wittmayer (all 8285) lobbed a baseball all along the course.

SANDIA LIVERMORE NEWS
VOL. 41, NO. 11 SANDIA NATIONAL LABORATORIES JUNE 2, 1989

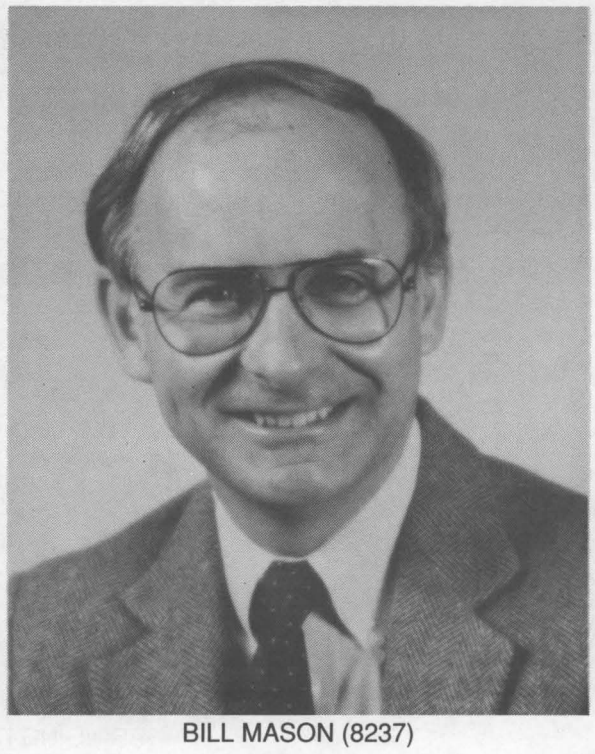
Supervisory Appointment

BILL MASON to supervisor of Data Processing and Scientific Visualization Div. 8237, effective May 1.

In 1980, Bill joined Sandia's Applied Mechanics Department at Livermore, where he's worked on software development and performed stress and thermal analyses for a variety of weapon programs. Before joining the Labs, he was a project leader in the Methods Development Group at Lawrence Livermore National Laboratory for four years. Before that, he was a mechanical engineering professor at the University of Utah for seven years. Bill also taught finite-element courses part-time at UC Berkeley while working at LLNL and Sandia.

He received a BS, an MS, and a PhD — all in civil engineering — from the University of California at Davis.

His outside interests are scuba diving, running, skiing, and personal computing. Bill lives in Lodi and has two daughters.



BILL MASON (8237)

Bit by Bit — It Became a Beautiful Biplane

There are lots of ways to attract attention, but few that beat flying an open-cockpit biplane, says Ken Young, a civil/structural engineer in International Safeguards Div. 5217. Ken should know — he's the proud owner of a beautiful Marquart MA-5 Charger that he built himself.

"More than once I've flown it into small airports where no one was in sight, and before I got it parked, people appeared almost out of nowhere," he says. "There's just something about a biplane that arouses people's curiosity."

Ken bought plans for the two-seater in July 1976 (month of the US bicentennial). The maiden flight was 11 years later — in August 1987.

Ken says speeding down the runway, nearing take-off speed for that first flight gave him a whole new perspective on the word "anxiety." "The engine is loud, but I think the sound of my heart beating may have drowned out the engine noise," he says. "I tell you, my heart was up in my throat.

"But once I was airborne, that flight was like taking a giant, fast-acting aspirin tablet — it made all the pain and frustration of those 11 years go away immediately," says Ken. "Building it was fun, but it was also time-consuming and, at times, frustrating." He figures it took him about 4000 hours to build, including shopping for the parts.

The 150-hp gas engine is a standard, off-the-shelf Lycoming aviation motor. Ken bought it and all the other components individually, as he needed them. There was no kit involved.

Why build an open-cockpit biplane when you could build another type with an enclosed cockpit for maybe just a little more money? Ken is quick to answer: "Very simply, I've always liked biplanes. It's mostly just nostalgia. This is real flying."

'True Test of a Marriage'

Building a plane from scratch takes lots of parts, patience, and persistence, Ken says, but the main "ingredient" is an understanding spouse, especially when you build it the way he did — at home.

"For years, I had parts scattered all over the garage and throughout the house — including wing spans laid out on the kitchen floor," he says. "Now that's a true test of a marriage."

Engineering is Ken's profession, but he's not a bad amateur psychologist. He named the plane for his wife, Carol, a teacher at Albuquerque's Van Buren Middle School. The "Miss Carol" lettering stands out clearly on the plane's tail section.

Ken keeps the plane at the small Alexander Airport west of Belen, N.M. He flies mostly on weekends, but also takes it to air shows and fly-ins all around the country.

He's already flown it to events in California, Arizona, and Oklahoma. Last summer, he and his son, Donald (a Continental Airlines mechanic), took it all the way to Oshkosh, Wis., to the Experimental Aircraft Association's annual fly-in. It's the largest air show in the world for privately owned planes, according to Ken.

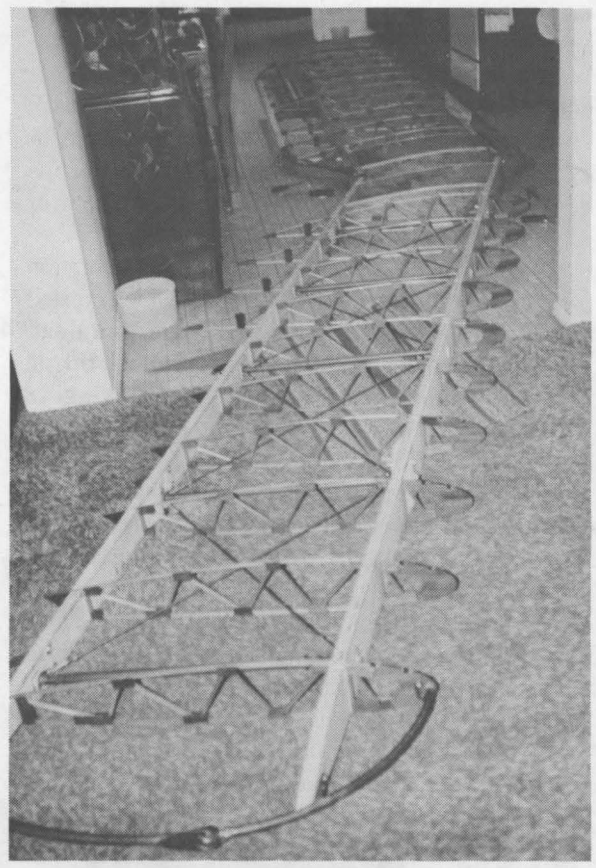
They're going again this summer. "That fly-in is the 'Woodstock' of private aviation," he says. "You can see hundreds of planes — no two the same — everything from ultra-lights to warbirds."

Gets Special Attention

He says flying an open-cockpit biplane not only attracts attention, it also gets him some special attention. "On the way to Oshkosh last summer, we stopped at Chariton, Iowa, for fuel and an overnight rest. I asked the local FBO [fixed base operator] if he had hangar space available. At first, he said no, but then took another look at my plane and said, 'You shouldn't leave that beautiful airplane outside — I'll move my Piper outside and give you my hangar spot.'

"After we got 'Miss Carol' in the hangar, I asked him if there was a motel nearby. 'Nope, the only motel is on the other side of town,' he said.

"So I asked him about a taxi," Ken continues. "The town didn't have taxi service. So I asked if he could possibly take us to the motel. 'I've got a better idea,' he said. 'Just take my pickup to the motel, bring it back in the morning, and leave the keys in it. You'll probably be gone before I get here.'



BUILDING A PLANE AT HOME is a good way to test a marriage, Ken says. This 1984 photo shows why. The 24-foot-long wing skeleton rests on the Youngs' kitchen and den floors while Ken waits for additional parts.

"He wouldn't take a penny — not for the hangar space, not for the use of his truck, not even gas money for his truck," says Ken. Not surprisingly, he plans to stop there again this summer. "I'd fly out of my way to buy gas from that fellow now," he says.

Ken's plane is capable of aerobatic maneuvers, but he's pretty cautious. "I've done a few rolls and loops, shut the engine off during flight and restarted

(Continued on Next Page)

KEN GETS READY to "head for sky." He'll soon be heading for several summer fly-ins, including his second at Oshkosh, Wis., largest show in the world for privately owned planes.

Flight Fascination Since 'Forties

Ken Young's fascination with flying began back in the '40s, when he was growing up in Pennsylvania. "I built a lot of models when I was a kid, and my friends and I used to go down to the local airport — actually nothing more than a grass field — just to watch the planes," he says.

"One day, this guy asked me if I wanted to go for a ride. I said 'sure,' even though I was shaking a little. He plopped me in the back of his old AT-6 Army trainer and cranked it up. That old plane was shaking and rattling more than I was, but I wasn't about to back out.

"I thought I was going to die for sure. We, of course, made it fine, and I was 'hooked' for life. I've been 'getting high' ever since — the legal way — with that adrenaline that flows every time I head for sky."

BRINGING IT IN — Ken lands the Charger at Belen's Alexander Airport, his home base.

Herb Sutherland Named ASME Fellow

Herb Sutherland (DMTS, 6225) has been elected a Fellow of the American Society of Mechanical Engineers (ASME).

He is the eleventh Sandian to be so honored by ASME, which designates as Fellows only about one percent of its members who demonstrate "exceptional engineering attainments and contributions to the engineering profession."

He was nominated by Tony Chen (1523), who himself was elected a Fellow of the Society last year.

"I feel very privileged," says Herb. "Sandia has given me the opportunity to work on a broad spectrum of problems. I've been able to work with really talented people — whatever I've achieved is largely the result of exceptional research teams working together."

Herb joined Sandia in 1970 after receiving his PhD in engineering mechanics from the University of Texas at Austin.

As an MTS in the Solid Dynamics Department until 1978, he developed constitutive equations that describe wave propagation characteristics of polymers, explosives, ceramics, concrete, and composite materials. Examining both acoustic and finite amplitude waves, he developed an acoustics laboratory to perform low amplitude wave propagation experiments.

Table-Sized Crucibles of Concrete

As a member of another research team studying the safety of nuclear power reactors, Herb helped investigate the interaction of molten-core materials and hot sodium with concrete. The team developed a unique test facility that could test the reaction of table-sized crucibles of concrete to contact with hot sodium or to other molten metals. In some of the experiments, liquid sodium — 600 pounds of it — was heated in a large steel vessel and then dropped into the concrete crucible.

As a visiting scientist in the summer of 1979 at the Kernforschungszentrum Karlsruhe (KfK) — West Germany's central laboratory for nuclear reactor research — he adapted Sandia's acoustic penetration-rate measurement technique to the KfK's own melt/concrete interaction experiments.

Whirling Coal Mine

In 1978, he began work in the GeoEnergy Technology Department and helped develop testing and analysis techniques for a better understanding of land subsidence, dam failures, and other related mining and civil engineering problems.

One of those techniques used Sandia's 25-ft. centrifuge to simulate the subsidence caused by mining operations. Scale models were mounted on the centrifuge and accelerated at speeds up to 155 revolutions per minute, creating structural loads and subsidence in the models comparable to those observed in actual mining operations.

Using these techniques, the team predicted roof falls for an underground coal gasification experiment in Washington state. In the experiment, coal was to be converted to a combustible gas by burning the coal in place — hundreds of feet below ground. The team's analysis predicted that 30 feet of material above the underground site would fall into the combustion chamber.

The test burn was carried out — and 32 feet fell in.

Since 1985, Herb has worked in Wind Energy Div. 6225, where he is project leader for developing analytical techniques to determine the fatigue life of wind turbine components.

He has published more than 85 technical papers in various engineering fields and was named Distinguished Member of Technical Staff earlier this year.

Herb — along with EVP Orval Jones (20), who was named a Fellow last month (LAB NEWS, May 5, 1989) — received his certificate at an awards ceremony during the 27th ASME Symposium hosted by UNM on May 24-25. •

HERB SUTHERLAND (DMTS, 6225), recently inducted as a Fellow of ASME, is currently project leader for developing analytical techniques to determine the fatigue life of wind-turbine components. Behind him is Sandia's five-metre-diameter vertical-axis wind turbine.

Take Note

Sandia's Women's Program (in Dept. 3510) is sponsoring a Cultural Awareness Colloquium June 8, 10 to 11 a.m., at the Technology Transfer Center (Bldg. 825) featuring NASA astronaut Linda Godwyn. She joined NASA in 1980, and in 1986 became an astronaut qualified for assignment as a mission specialist on future space shuttle flights. For colloquium information, call Debbie Eaton (3510) on 4-9482.

* * *

A meeting of New Mexico's Science and Technology Commercialization Commission will be held June 5 at the Coronado Club, Eldorado Rm., at 8:30 a.m. The agenda includes reviews of the quarterly reports for the New Mexico Research and Development Institute (NMRDI) and Centers of Technical Excellence. The Commission will also hear presentations on several new initiatives funded by the state legislature. The Commission advises the governor and the Dept. of Economic Development and Tourism about science and technology issues and projects around the state. The meeting is open to the public. Contact Commission member Bill Snyder (6500) on 4-8203 for information.

* * *

The 34th Annual National Meeting of the Health Physics Society will be held in Albuquerque June 25-29 at the Convention Center. Sessions and short courses cover topics such as Three-Mile Island, emergency planning and monitoring, dosimetry, waste management, environmental radiation, radon, medical health physics, the Waste Isolation Pilot Plant, and other health-physics subjects. Sandians involved in organizing this national event include Gloria Millard (3202), Bill O'Neal (6415), Dan Thompson, Al Stanley (both 3213), George Tucker, Ted Simmons (both 3212), and Mel Merritt (ret.). The sessions and courses are open to nonmembers. Contact Gloria Millard on 4-5659 for programs and registration information.

* * *

Santa Fe Spirit, a musical extravaganza of Santa Fe's history from the time of the Anasazi Indians through the opening of the Santa Fe Trail, begins its premiere season in Santa Fe June 5 at the James A. Little Theatre (1060 Cerrillos Rd, near St. Francis Blvd.). The full-scale musical will be presented from June 5 through Sept. 10, with four weekly performances — Monday, Tuesday, and Friday at 8 p.m. and Sunday matinees at 3 p.m. Tickets are $15 per person, with special rates available for groups of 10 or more. For information, call 1-982-6213.

* * *

A new book, How to Drug-Proof Kids: A Parent's Guide to Early Prevention, written by local teacher Jodi Freeman, offers parents a guide to help their children set their own standards about drugs. The book is available through the South Highway 14 Village Project in the LAB NEWS office in Bldg. 814. Cost is $10.

(Continued from Preceding Page)

it, but I don't get too fancy. I don't have aerobatic training, so I keep it pretty simple," he says.

'I Heard . . . and I Remember'

Carol goes up with him occasionally, and Ken is especially cautious then to keep the plane level and the ride smooth. "She told me if I ever looped or rolled the plane with her in it — that she wouldn't say a thing or protest while we're in the air — but, once we're back on the ground, she'd immediately get an axe and chop the plane into small pieces. I heard that, and I remember it well," he says.

ELEVEN YEARS of work and waiting is a long time, but Ken Young (5217) says he knew it was all worth it the first time he had his MA–5 Charger airborne.

The Charger weighs only 1450 pounds, without fuel. It's built from steel tubing and spruce wood covered with Dacron, followed by 13 coats of Butyrate dope.

It's a "tail dragger" — third wheel under the tail. The passenger seat is directly in front of the pilot seat. That combination definitely makes landings more "exciting" — especially when it's windy, Ken says. During the final moments of a landing, his only view of the runway is out the side of the lane.

The plane cruises at about 125 mph, lands and takes off at about 55 mph, and — with the larger fuel tanks that Ken added this spring — can safely go about three hours between fuel stops.

"I seldom fly it that long between stops though, even on long trips," he says. "You get pretty windbeaten in the open cockpit, there's no room to move around, and — most important — there's no 'necessary facility' in it. Two hours is about tops for me."

'Triple-R' Navigation

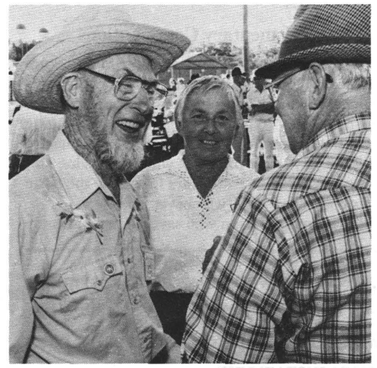
He uses the "Triple-R" navigation method to get wherever he's going. "It's strictly a VFR [visual flight rules] plane. I use maps to follow roads, railways, and rivers.

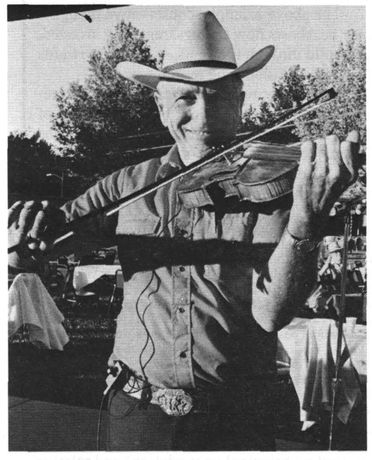
"If I can't see blue skies, I don't fly," he says. "I've flown near my home airport a time or two at night, but I generally fly only during the day, when the weather is clear. I want to live to fly another day."

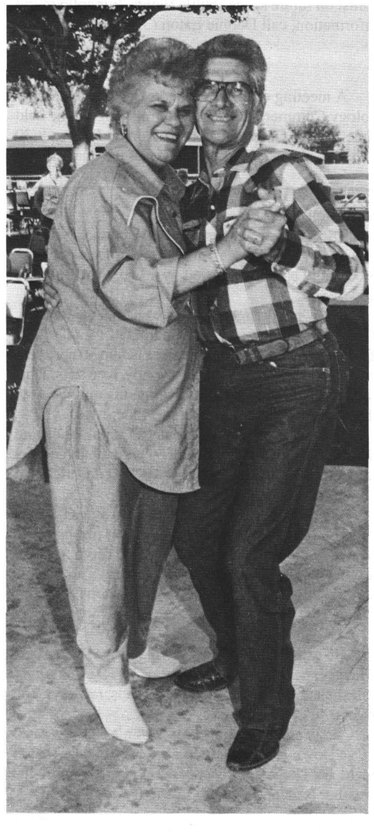
•LP

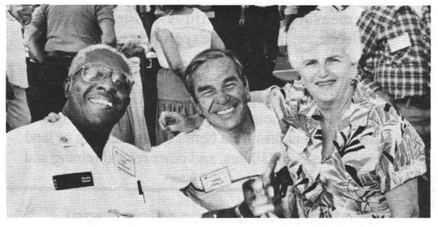
Retiree Revelry — 1700 Strong

**Sandia retirees, spouses,
and their hosts and hostesses
gathered at the Coronado Club patio May 25
for that rip-roaring rite of spring, the annual Retiree Picnic.
From the looks of these pictures, a good time was had by all.**









(Continued from Page One)

Savings Plans

come eligible for the SPSE, and non-salaried employees may join the SSP. Contributions can be designated as after-tax (401a) or pre-tax (401k), or can be allocated to both. Tax implications: A participant in 401a has taxes withheld on gross salary and the savings allocation deducted afterwards; a participant in 401k has his or her savings contribution deducted before taxes are withheld (and gross salary minus savings allocation is taxable).

Supplementary Contributions

Additional supplementary contributions (not matched by company contributions) may be made if desired. The basic and supplemental contributions may not exceed 16 percent of annual wages. During 1989, investments to the SPSE 401k are limited to $7627 or 16 percent of salary, whichever is less; investments to the SSP 401k are limited to the basic contribution or $7627, whichever is less.

Therefore, a person who saves at the maximum

. . . a person who saves at the maximum — or close to it — may be salting away between 18 and 20 percent of his or her base salary every month . . .

— or close to it — may be salting away between 18 and 20 percent of his or her base salary every month (counting the company contribution) — a not insignificant amount.

Currently, the SPSE contains six investment funds, and the SSP contains four. (Those numbers will change to five and three, respectively, at the end of 1989, with the elimination of the Diversified Telephone Portfolio; see "Demise of the DTP.") The funds (first four listed included in both plans, last two included only in the SPSE):

- **AT&T Shares** — AT&T common stock
- **Guaranteed Interest Fund (GIF)** — multiple interest contracts (estimated rate for 1989: 8.9 percent for SPSE, 8.8 percent for SSP)
- **Diversified Telephone Portfolio (DTP)** — common stock of eight telecommunications companies, including AT&T (not an investment option)
- **South Africa Restricted Fund** — stocks similar to Diversified Equity Portfolio, but void of 137 companies (that have direct investments or employees in South Africa) on Investor Responsibility Research list
- **Diversified Equity Portfolio (DEP)** — common or capital stocks; bonds, notes, debentures, or preferred stocks that are convertible into common or capital stocks, warrants, and other types of equity investments
- **Government Obligations (GO)** — marketable fixed-income securities, short-term securities (such as commercial paper and bank deposits)

What kind of performance records have been achieved by the various funds? During the last five plan years (CY84 through CY88), the average annual rate of return — principal appreciation plus earnings — (SSP in parentheses) for AT&T was 16.2 percent (16.1); GIF, 11.1 percent (10.8); DTP, 21.7 percent (same); DEP, 12.9 percent; and GO, 9.8 percent. There's no five-year average for the South Africa Restricted Fund, since it's been available only since January 1988. The return for the DTP reflects both realized and unrealized appreciation factors; realized earnings are invested in the AT&T stock fund. Individual participants' rates of return probably vary from the above, because they contribute monthly and may make withdrawals along the way.

SPSE employee contributions can be invested entirely in any one fund, equally in any two funds, or equally in any three funds; SSP employee contributions can be entirely in one fund, or equally in two. Fund balances may be transferred elsewhere twice

BENEFITS MANAGER Charles Mika (3540): "The savings plans . . . are a significant part of Sandia's benefits package for employees — part of that 'hidden paycheck' that goes far beyond the dollars shown on pay stubs."

during a plan year (calendar year); six months must elapse between transfers. Other restrictions: Transfers from GO to GIF are permitted only on Dec. 31 of a plan year; transfers from GIF directly to GO are not permitted. SSP fund balances attributable to company contributions and associated earnings are not transferable.

Option choices depend on "individual risk tolerance," Charles says: "The amount of risk people are willing to take depends on their understanding of capital markets, their investment horizon, and their desired rate of return. A person who's looking forward to many years in the plan is likely to invest in riskier options with potential for greater rewards over the long haul — in terms of both principal and earnings growth.

"On the other hand, someone who does not want near-term volatility of principal, but a good income stream, may choose less-risky options — one would be the GIF — that virtually guarantee safety of principal (but no principal appreciation) and relatively high rates of income."

Demise of the DTP

SPSE and SSP participants who have funds in the Diversified Telephone Portfolio (DTP) have a decision to make sometime this year. Last December, AT&T announced that the DTP would be eliminated, effective Dec. 31, 1989.

Between now and the end of the year, plan participants with investment balances in the DTP may elect to transfer those balances to one — or more— of the other funds by notifying the Transaction Processing Center. After June 30, it's a "free move" and does not count as one of the two fund transfers allowed each plan year; neither is it subject to the "wait-six-months-before-you-transfer-again" limitation.

SPSE participants can transfer, without restriction, DTP funds as late as Dec. 31, 1989. SSP participants can transfer, without restriction, only DTP amounts attributable to their contributions; DTP amounts in the SSP attributable to company contributions and associated earnings invested in the AT&T portion of the DTP will automatically be transferred to the AT&T shares fund.

If savings plan participants don't make a transfer election by Dec. 31, DTP fund balances will be transferred to another investment option determined by the AT&T Savings Plan Committee. Those who have DTP fund balances will receive information later this year on the default transfer of the funds — and where they will be placed.

The Power of Tax-Deferred Savings

Contributions to a pre-tax (401k) savings plan decrease taxes paid during one's working years and — when added to the company contribution and earnings over a period of years — could mean a healthy annual payment after retirement if an installment option is chosen.*

An Eye-Opening Example

Consider the following example, provided by Charles Mika (3540). A savings plan participant with an annual salary of $25,000 saves 12 percent (including the company match) of his or her salary — a total annual contribution of $3000 — for 20 years. For simplicity's sake, we'll say the salary remains unchanged during those years — making this a very conservative example.

Assuming 9 percent annual earnings, the participant's accumulated amount will be $159,200 at the end of 20 years, according to Charles. If that total amount is paid over 20 annual installments — and a 9-percent future annual return on the undistributed balance is assumed — the cumulative amount paid over 20 years would be $407,000, or an average annual payment of $20,350.

The above example, conservative though it may be, shows how savings, regularly invested, can build through the years — and the rewards that could result during retirement.

Prospective retirees can learn more about retirement distribution options by attending one of Dept. 3540's periodic seminars, conducted by Joe Rivera (3543). Either Joe or retirement counselor Dave Medina (also 3543) can provide information on time and place of future meetings.

* Savings plan distribution options for retirees include either a lump-sum distribution, deferral — which means leaving the accumulation in the savings plan for distribution at a later date — or installment payments. If the latter option is chosen, payments are made in annual installments for a period, chosen by the retiree, of from 2 to 20 years — not to exceed life expectancy; the installment payment the first year is determined by dividing the total amount of money in the participant's account by the number of years chosen. The payment amount for each subsequent year is determined by dividing the remaining amount in the account — including earnings, if any — by the number of years left.

Contributions: Where They're Going

Where are plan participants choosing to invest their money? During the most recent plan year (1988), balances in the SPSE (for all participants, not just Sandians) on Dec. 31 were as follows: GIF, 35 percent; AT&T, 28 percent; DEP, 14 percent; DTP, 13 percent; and GO, 10 percent. (Percentages are rounded. The South Africa Restricted Fund is not listed, because its funds represent only 1/10 of 1 percent of the total.)

SSP balances on Dec. 31: AT&T, 51 percent; GIF, 28 percent; and DTP, 21 percent. The large AT&T balance is due, in part, to the fact that all company contributions to the SSP are directed to the AT&T stock fund.

As of the end of plan year 1988, 87 percent of Sandia employees eligible for the SPSE were participating, as were 73 percent of those eligible for SSP. Sandia's participation rate in both plans is above the overall AT&T average, according to Charles.

Why isn't everybody taking advantage of the high company match on a basic savings plan contribution? "Probably a couple of reasons," speculates Charles. "Some people just can't save — they require a paycheck that's as large as possible to spend for immediate needs or wants. Others don't want to lock up their money for an extended period or to be concerned about tax implications on withdrawal, so they choose

(Continued on Next Page)

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Volcanoes

of gas. This goes up first, foams, and explodes. Lower in the chamber is "dry" magma. This rises later and flows out as bubble-free obsidian.

But drilling in the 600-year-old Obsidian Dome volcano in California's Long Valley revealed problems with that explanation. Three drill holes disclosed a magma "pipe" within a broader vent funnel that contained broken rocks and other debris from the volcano's initial explosion. The dome was formed by lava that flowed out of the vent for several weeks after the explosion.

Chemical studies by Hank Westrich and Harlan Stockman showed that the same type of magma caused both the explosion and the dome-building. So the explode-then-flow sequence was caused, not by a series of different magmas, but by changes in a single magma as it neared the earth's surface.

Magma that hardened in the pipe underground had a high content of trapped gas bubbles and water. The material in the dome, however, contained much less water and no bubbles — having lost both through the "sponge" effect as the magma passed through the porous vent-funnel debris to the surface. (For more explanation of the process, see "Theory Explains How Volcanoes Can First Explode, Then Flow Gently.")

Sandia studies suggest that different kinds of magmas rise simultaneously and become layered as they flow.

Although some scientists had objected that it was impossible for a bubble-rich magma to lose all its bubbles in this way, Hank duplicated the process in the laboratory.

In continuing work, John and Charles backtracked along the magma's path, combining geology and fluid dynamics to present a new picture of how magma moves to the surface from a chamber miles beneath the earth. Once again, they are challenging the conventional view.

The underground passage from a magma chamber up to a volcano is like a pipe. When the volcano stops erupting, magma left in the pipe hardens, forming rock. The rock is sometimes "zoned": Rock formed by hardening of the most-viscous (thickest), silica-rich magma is in the core of the pipe. Rock formed from less-viscous, silica-poor magma surrounds the core.

NEXT VOLCANO-RESEARCH drilling project will be here, at the 1300-foot-diameter Novarupta lava dome in the Mount Katmai area of Alaska. The dome is the muffin-shaped area near the center of the photo.

Traditionally, geologists have said that the different kinds of magma rose separately to produce the zoning. But the Sandia studies suggest they rise simultaneously and become layered as they flow. It's like pumping two liquids of different viscosities through a pipe. For instance, Charles points out, one way of making crude oil flow more easily in a pipeline is by pumping water with it. The less-viscous water goes to the outside and flows along the pipe, so that less energy is required than for oil alone to be pumped.

The same princippe appears to cause different-viscosity magmas to separate as they go up the "pipe" from underground chamber to volcanic vent.

"Again," says John, "this result questions the traditional view of neatly layered magma chambers. If some of the regular zoning in igneous formations develops at a shallow depth during flow, then magma chambers may not be as well organized chemically as geologists have thought."

Charles likes the way work of this sort connects laboratory results with field observations. "It's rare to see the kinds of mechanical processes we observe in the lab in nature itself," he says. "The natural systems are usually much more complicated. But here we have a case where the observations in nature are very similar to those in the lab."

North to Alaska

Although the Obsidian Dome is certainly more complicated than a lab setup, it's still relatively simple as volcanoes go. That's why it was chosen as an early subject for drilling. The next step is logical but still ambitious: Drill at the volcanic vent formed by the largest eruption of this century — the 1912 eruption in the Mount Katmai region of Alaska. Not only is it large, it's still cooling.

Surface geophysical studies will begin there this summer to prepare for drilling.

"Surface exploration of this area a few years after the eruption helped form modern concepts of what happens in and around volcanoes," says John. "If the surface was that significant for the development of volcanology, we think it's reasonable to expect that drilling under the surface will give us results that are even more significant." ●CS/WKeener(3161)

(Continued from Preceding Page)

Savings Plans

other investment vehicles."

Eligible employees who are not currently participating in the savings plans, but would like to enroll, may do so by calling the plans' Transaction Processing Center (TPC) on its toll-free number (1-800-952-0077) to request information and an enrollment packet. (The TPC is a clearinghouse for all savings plan transactions, including allotment changes, fund transfers, and withdrawal requests by plan participants.)

Employees with less than a year of service normally receive (from the TPC) an enrollment packet and information on the savings plan about three months ahead of the time they will be eligible, according to Charles. If the packet isn't received about that time, he suggests calling the TPC to request one. If a newly eligible employee enrolls in advance, he or she can expect savings plan participation to become effective during the month after completion of one year of service.

"The savings plans are meant to provide a convenient way for employees to save on a long-term basis," concludes Charles. "They're a significant part of Sandia's benefits package for employees — part of that 'hidden paycheck' that goes far beyond the dollars shown on pay stubs." ●PW

Same Magma, Different Results

Theory Explains How Volcanoes Can First Explode, Then Flow Gently

Volcanoes formed by high-silica magma usually erupt explosively at first, then release lava less forcefully. The theory offered by John Eichelberger (DMTS, 6233) and Charles Carrigan (6231) accounts for the common pattern. Here's the theory in brief:

Magma deep underground contains dissolved gases (such as water and carbon dioxide) under high pressure because of the immense weight of the rock above. If the magma rises through dense, gas-tight rock, the gas remains at high pressure until the magma approaches the surface.

Gas pressure then blows the magma apart and creates a funnel-shaped opening at the surface. The funnel, hundreds of feet wide and deep, collects fall-back debris from the eruption. As more magma comes up, it has to pass through the porous rubble. That keeps pressure on the magma but lets the trapped gas leak out, relieving the explosive pressure. Thus, magma continues to come to the surface, but it doesn't have to blow — it can flow instead.

If the magma is passing through porous rock from the beginning, the volcano may never have an explosive phase.

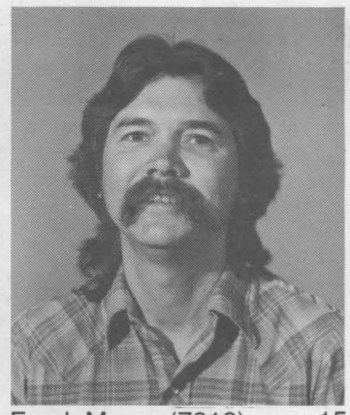
The "sponge" (see main story) figures into this model by explaining how large amounts of gas can be lost from the magma. John and Charles say that as bubbles grow during the magma's ascent, they gradually get big enough to touch each other and form an interconnecting network. The gas flows out of the magma's interior through the interconnected bubbles, much as water is squeezed from a sponge.

"To develop and support our ideas about volcanoes," says Charles, "we've brought together expertise in fluid mechanics, geology, geophysics, geochemistry, and rheology [the study of how materials deform and flow]. It's the kind of work that really uses Sandia's capabilities well."

MILEPOSTS
LAB NEWS

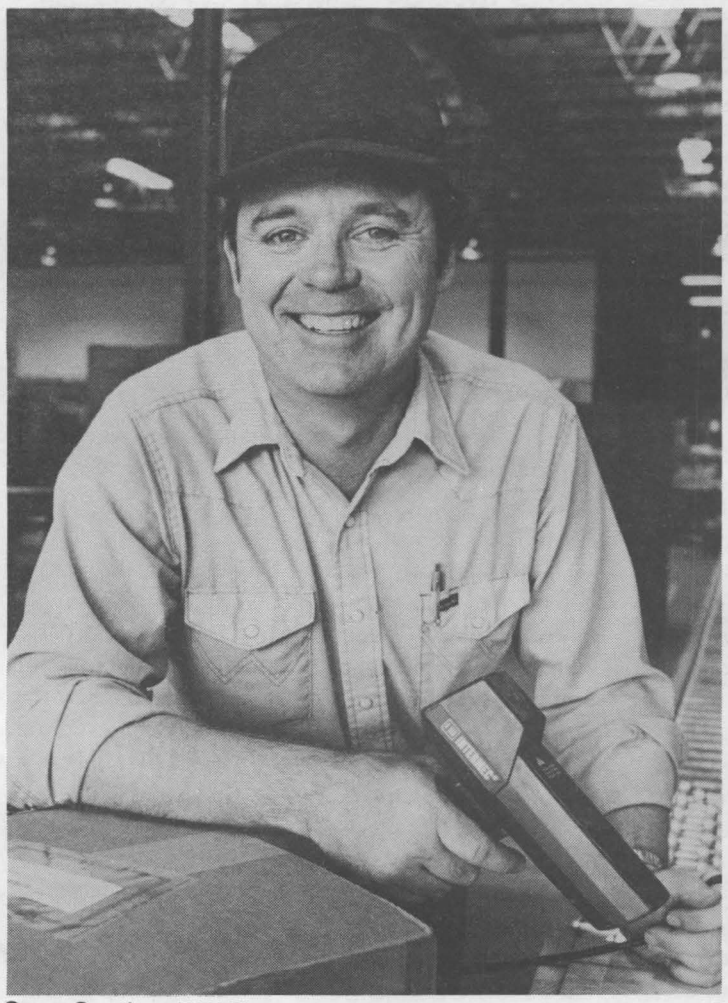
JUNE 1989

Ermenio Mata (3434) 25



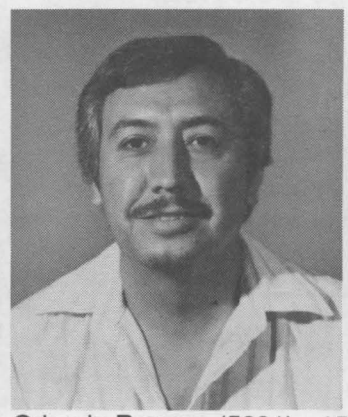
Frank Moore (7818) 15

Lorraine Curtis (2174) 15

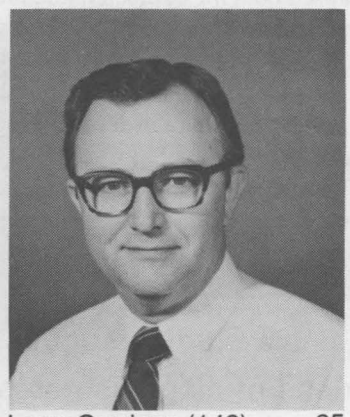


Sean Souther (3743) 15

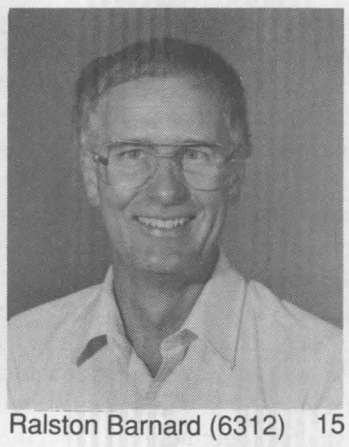
Jan Layne (2340) 15



Orlando Romero (5231) 15



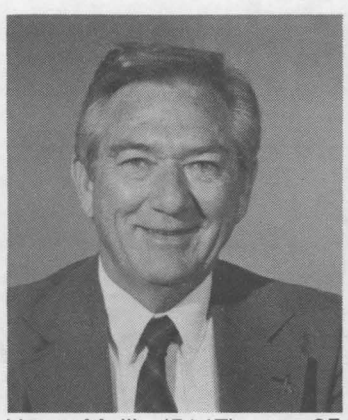
Larry Garrison (142) 25



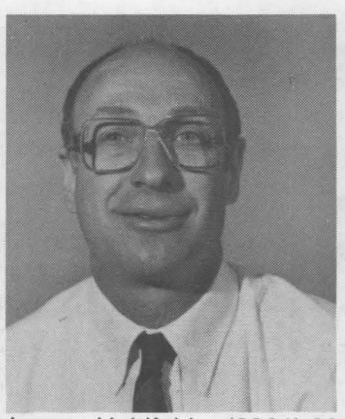
Ralston Barnard (6312) 15

Neita Tucker (155) 25

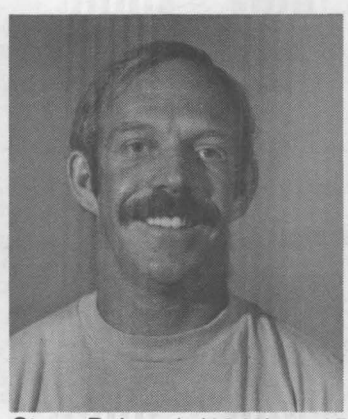
Ed Sanchez (7812) 25



Henry Mullin (5147) 25

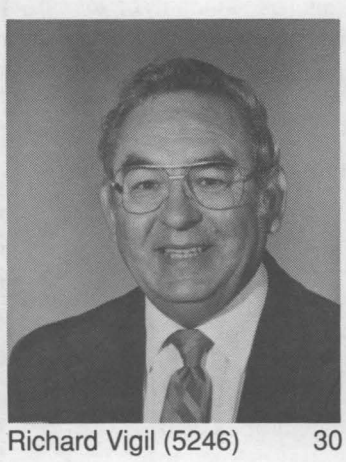


Jacque Hohlfelder (2321) 20

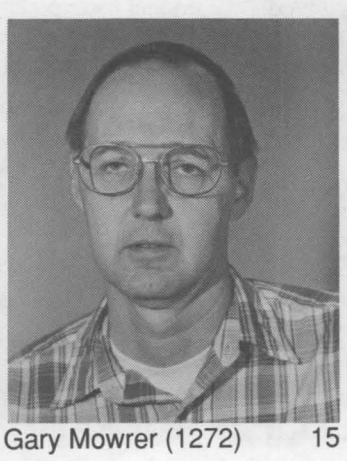


Steve Babcock (1243) 15

Helen Richardson (3533) 25



Richard Vigil (5246) 30



Gary Mowrer (1272) 15

Mike Ford (9121) 25

Welcome

Albuquerque
Daniel Ramirez (6447)
Amy Tapia (3411)
Talmage Thornton (2853)
Michael Wilson (6312)
Arizona
Laurence Brown (7471)
California
Steven Silva (2311)
Colorado
Raymond Byrne (5267)
New Mexico
John Heald (3154)
Margaret Turpin (154)
Texas
Michael Horry (2142)
Utah
Brady Davies (7174)

Sympathy

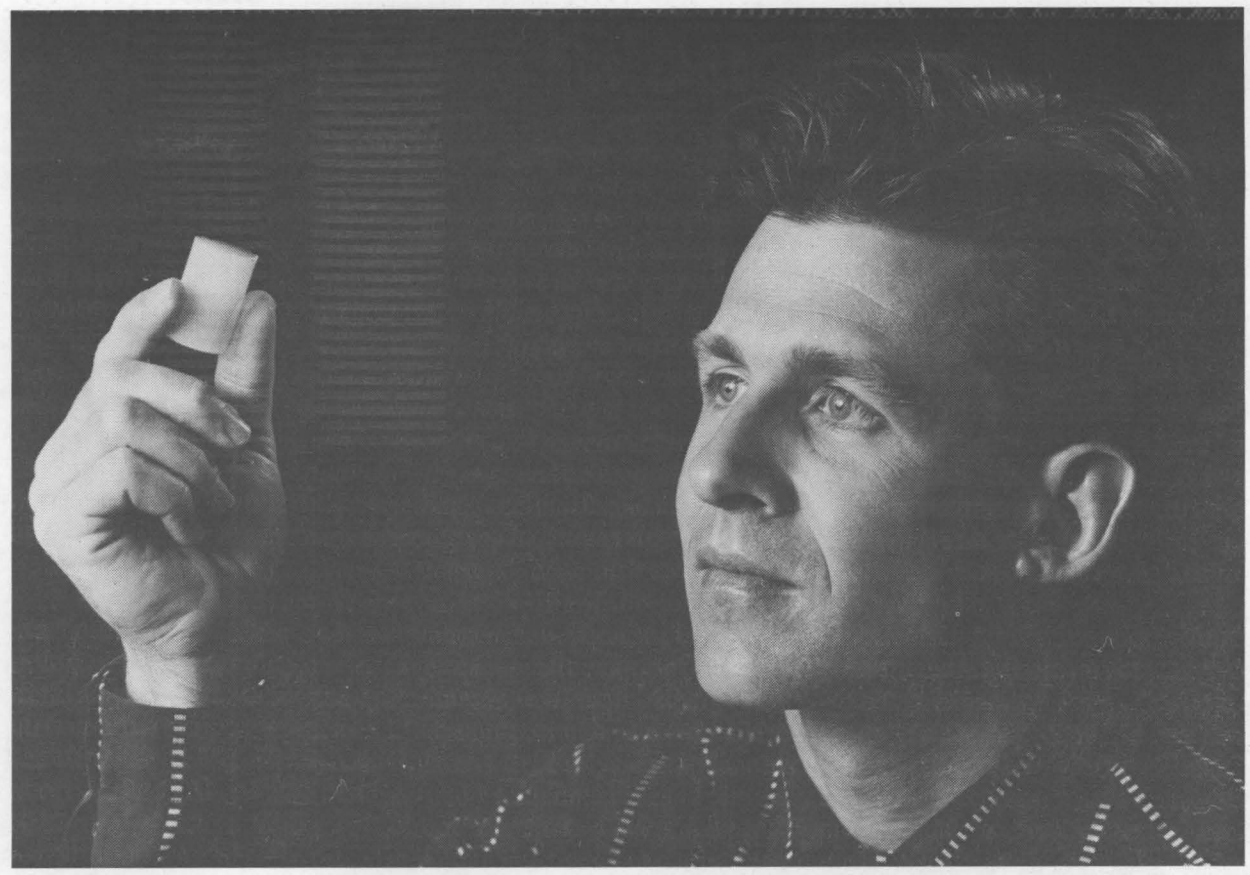
To Jeff Philbin (6453) on the death of his father in Nashville, Tenn., May 2.

To Linda Jaramillo (2632) on the death of her mother in Albuquerque, May 3.

To Alan Righter (2118) on the death of his mother in Albuquerque, May 6.

To Maria Chacon (7481) on the death of her mother in Glenwood, N.M., May 10.

To Dale Hill (5132) on the death of his father in Clinton, Okla., May 12.



JEFF BRINKER (1846) will receive the Zachariasen Award in recognition of his work on the chemistry and structure of porous materials made by the sol-gel process, and their conversion to dense ceramics by low temperature heat treatments. Jeff holds a sample of aerogel, an extremely porous — more than 95 percent air — silicate material made by the sol-gel process. In this process, ceramics are formed in solution by polymerization of monomeric precursors in a manner similar to organic polymers. The Zachariasen Award is presented by the *Journal of Non-Crystalline Solids* to young scientists who have made significant contributions to the science of non-crystalline solids. Jeff has published more than 60 papers on sol-gel processing of ceramics and glasses and is currently completing a co-authored book, *Sol-Gel Science-Physics and Chemistry of Sol-Gel Processing*, to be published later this year. Jeff will receive the award and a $1000 check at an awards ceremony this month at Pennsylvania State University.

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Deadline: Friday noon before week of publication unless changed by holiday. Mail to Div. 3162.

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8½ by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per category per issue.
8. No more than two insertions of same "for sale" or "wanted" item.
9. No "For Rent" ads except for employees on temporary assignment.
10. No commercial ads.
11. For active and retired Sandians and DOE employees.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

KENMORE REFRIGERATOR, new, 17.7 cu. ft., w/ice-maker, white textured finish. Chavez, 298-1649.

TWO AIRLINE TICKETS, Albuquerque to Chicago, one-way, pick the date, $100/ea. Moss, 298-2643.

MAYTAG ELECTRIC DRYER, white, $150. Baker, 294-3334.

BABY CRIB, $100; umbrella-handle stroller, $15. Kelly, 293-2475.

BIRCH PLYWOOD, 3/4" x 4' x 8', $12; clear plastic, 1/4" x 4' x 8', $40; foam-rubber mattress, $8; 16" saw chains, $5/ea. Johnson, 884-2086.

LANDSCAPING ROCK, black lava, free, you haul. Anderson, 293-2490.

CAST-IRON DUTCH OVEN, $10; camel bells, $5; 2 embroidered Spanish prints. Krahling, 268-8126.

WINDSURFER, for beginner, Mistral Bermuda board w/6.0 O'Brien sail, complete, $200. Weber, 266-0141.

PLANE TICKET, Los Angeles to Albuquerque, on July 14, $50 OBO. Maish, 898-8027.

DISHWASHER, Sears Kenmore, on rollers, attaches to sink faucet, harvest gold, $50. Pasterczyk, 255-2066.

BABY WALKER, Greco Tot Wheels II, w/detachable play gym, $25. Barnette, 292-5186.

BABY CRIB, honey brown, $100; car seat, gray velour, $35. Sanchez, 836-0348.

SIX BAR STOOLS, Early American George Bent, $45/ea.; ping-pong table, $50. McCarty, 823-2926.

TWO WHEELCHAIRS, two walkers, forearm crutches, regular crutches, automobile hand controls, make offer; 9-drawer dresser, w/mirror, $5. Meissner, 268-7952.

FURNITURE: 4-piece Mediterranean sectional, includes couch, love seat, chair, corner table, lamp and hanging lamp, $150 OBO. Hughes, 883-8784.

TOSHIBA MICROWAVE OVEN, $50; octagonal table, glass top, $25. Brandt, 275-1059 leave message.

BOUNCING HORSE, plastic, spring type, metal base, $20. Patrick, 822-0703.

TENT TRAILER, '73 Jayco Jayfench, sleeps 6, icebox, stove, storage, boat rack, porta-potti, $1250 OBO. Curtis, 881-2440.

SOFA, cocoa brown, $200. Lovato, 836-3517.

SHELTIE CROSS PUPPIES, females, 8 weeks old, first shots given, $16 (cost of shots). Allen, 293-3043.

SPA, 5' x 7', 36" deep, w/circulating pump, air blower, heater, all controls, and cover, $1795. Schindwolf, 831-1940.

TRAVEL TRAILER, '79 Prowler, 23', self-contained, middle kitchen, back bedroom, sleeps 6, shower/tub, sink, refrigerator, 4-burner stove, oven, $5500. Benevides, 299-1034.

KITCHEN UTILITY CABINET, butcher-block top, $80; heavy-duty shelf unit, new, $20; two 2-tube fluorescent fixtures, $16. Myers, 294-7316.

TWIN BEDS, mahogany, 4-poster, $80; tilt-back chair and ottoman, $75; sofa bed, $50. Harrison, 255-7978.

CRIB AND MATTRESS, $30; baby swing, $10; car seat, $20. Bovard, 892-7676.

QUEEN-SIZE LA-Z-BOY SLEEPER SOFA, blue/rust/peach country miniflower print, $400; 2 blue-velvet wing-back chairs, $125/ea. Murray, 898-2795.

CUSTOM TOPPER SHELL, $600; carpet kit, $250; both for LWB truck. Benton, 877-2473.

CLOTHES LINE, in cylinder; 36" storm door; 4-lug rims; tires; double sink, gold color. Long, 294-4591.

RADIO-CONTROLLED OFF-ROAD RACE CAR, 1/10 scale, electric, electronic speed control, bearings, motors, batteries, radio, $260. Hannum, 296-2095.

STROLLEE CAR SEAT, w/cover, $25. Shrouf, 821-0765.

BLACK LANDSCAPING PLASTIC, 6-mil., 18' x 75', free. Kerschen, 821-2848.

OFF-WHITE COUCH, $125; Sofa-Block-style ashwood chairs, $125/pr. Tomek, 299-0471.

COMPUTER DESK, 23" x 41", assembled, $40; PC/terminal stand, on casters, 21" x 18", $25; desktop Universal printer stand, new, $15. Schubeck, 821-3133.

'57 MERCEDES 180/190 PARTS: drive-train-less engine, wheels, doors, seats, dash components, more, $500/all OBO. Penn, 883-4195.

KIDS' BACKPACKS, metal frame, ages 8-13, used once, $20/ea. or $35/2. Rosul, 281-4114.

TRANSPORTATION

'87 HONDA HURRICANE, 1.5K miles, $3900. Matthews, 869-2370.

LARSON BOWRIDER BOAT, 17.5', I/O, 170-hp Mercruiser, AM/FM stereo w/tape, trailer, cover; '86 Ford F250 Supercab, 4x4 diesel, w/camper. Davis, 294-6519.

SAILBOAT, 22' Southcoast, 5-hp , pop-top, red hull, extras, $4100. Schreiner, 281-3546.

'81 BUICK RIVIERA, loaded, white exterior, burgundy interior, 60K miles, available June 30, $6700. Hamilton, 294-5850.

'72 FORD 3/4-TON PICKUP, $2300. Randle, 1-867-4831.

'82 FORD 250 XLT PICKUP, Supercab, AT, 4-WD, AM/FM cassette, brush bar, running boards, 54K miles, $6400. Melvin, 298-6402.

'77 MIDAS MMH, 23', sleeps 6, generator, dual AC, TV antenna, 70K miles, $9650 OBO. Soto, 1-864-1452.

'82 DODGE 400, rebuilt engine and transmission (w/warranty), loaded, one owner, $2750. Garduño, 275-9914.

BMX BIKES: 20" Cycle Pro, blue, $55; 16" Diamondback, chrome, $25. Van Den Avyle, 898-6474.

'86 MOTO GUZZI LE MANS 1000, 13K miles, Dyna ignition, Accel coils, K & N filters, $3200 or make offer. Szklarz, 291-0037.

'52 HARLEY-DAVIDSON, pan-head engine, completely rebuilt, $3800 OBO. Payne, 299-5966.

'75 VOLVO 245, 23K miles on rebuilt engine, PB, PS, AT, AC, $1495. Tippy, 298-3758.

'79 TOYOTA PICKUP, 2-WD, 5-spd., short bed, camper shell, white, $2000. Bush, 281-3773.

'84 NISSAN 300ZX TURBO, 5-spd., AM/FM tape, AC, PS, PB, T-top, cruise, bra, louver, 31K miles, $8000. Kubiak, 265-6525.

'83 KAWASAKI 550LTD, 15K miles, $950. Orth, 293-3545.

'83 CHEV. MONTE CARLO, all options, including glass T-tops, V-8, $4500. Gentry, 298-3574.

'79 MUSTANG, 65K miles, $2475 OBO. McCrory, 296-1321 after 5.

TREK 760 RACING BICYCLE, Shimano 600 components, Concor saddle, Mavic rims, 52cm frame, $400; Dura Ace platform pedals w/straps, $35. Kelly, 281-9774.

HONDA THREE-WHEELERS: '85 ATC 250SX, $775; '84 ATC 200cc, Big Red, $625. Vigil, 296-3590.

GIRL'S 10-SPD. BICYCLE, 24" Nishiki, $90. Kelly, 298-2956.

'86 FORD F150XLT PICKUP, 5.8L gas, shell, 38K miles, loaded, blue & white, $8995. Tessler, 296-7587.

'84 HONDA AERO SCOOTER, 80cc, electric start, 90 mpg, $300 OBO. Bovard, 892-7676.

'70 ARROWGLASS TRI-HULL BOAT, 17', 155-hp Evinrude motor, w/trailer, $3000. Haynes, 877-1557.

'77 CHEV. BLAZER 4x4, AT, 8-cyl., PS, PB, AC, tilt, $3100; '86 Toyota 4x4, 5-spd., AM/FM cassette w/4 speakers, Leer camper shell, $7700. Kisner, 292-3995.

'80 CHEV. CITATION, 4-dr. hatchback, AT, AC, PS, PB, AM/FM, 64K miles, $1075. Marrs, 821-5144.

CHEV. 1/2-TON PICKUP, SWB, 5L, 4-spd., PS, PB, AC, dual tanks, one owner, 37K miles, all records. Kureczko, 281-8206.

BOY'S BICYCLE, Sears Free Spirit, 24", 10-spd., $40. Lobitz, 821-1509.

'80 CHEV. SUBURBAN, 4-WD, brown/tan, $4850. Nichols, 821-8213.

'85 HONDA 150 ELITE SCOOTER, red, 6.7K miles, $500 OBO. Homer, 836-5043.

REAL ESTATE

3-BDR. HOME, Cherry Hills, mountain views, 2 baths, 2-car garage, great-room w/kiva FP, open May 27 & 28, $127,900. Ater, 822-9697.

2-BDR. MOBILE HOME, '81 Wayside, 2 baths, upgraded, landscaping, skirting, deck, NE Heights park, $11,600. Rightley, 822-0383.

4.6 ACRES, 5.5 miles north of Taos, $16,500 value, will sell at best offer or carry paper. Lassiter, 299-1492.

3-BDR. HOME, NE, 1-3/4 baths, 2-car garage, great room, fruit trees, 1800 sq. ft., no qualifying 9.5%, $91,000. Martin, 292-6313.

PASSIVE-SOLAR ADOBE HOUSE, 1700 sq. ft., on 1 acre, nearing completion, buy now, choose finish details later. Servis, 865-7629.

5-20 ACRES, Sedillo Hills, off I-40, bank/owner REC financing, $10,000/acre. Troncoso, 897-1167.

SPLIT-LEVEL MOBILE HOME, 14' x 72', solar water, free-standing FP, assume loan, 6-year balance, $242.63/month. Pettitt, 899-0729.

2.5 ACRES, Edgewood, 3/4-mile off old 66, electricity, phone, water, septic tank in place, $23,750. Anderson, 281-1786.

17 ACRES EAST-MOUNTAIN PROPERTY, off SR222, negotiable terms, $26,000. Kelton, 281-8224.

WANTED

GAS DRYER; maxi-van-type motor home. Baker, 294-3334.

HOUSESITTER, June 15 through 19, South Valley home, prefer 24-hour sitter. Sena, 873-1665.

HOUSEMATE, male, share 3-bdr. furnished home, garage, cable, includes all utilities, full-house privileges, $350/mo. Ahr, 881-2721.

HOST FAMILIES for French students, Aug. 2-23. Macha, 298-6583.

BIKE, 16" girl's or boy's. Lovato, 836-3517.

ACTIVITY GYM, Little Tikes. Nielson, 294-2643.

WRITER AND ARTIST (one each), to assist in editing original technical material targeting the automotive "shadetree" mechanic, retiree or other. Silverman, 298-1308.

USED SLIDE PROJECTOR; used dog run or large-size outdoor cage for pets. Thomas, 268-1532.

WHITE, LONG-HAIRED MALE KITTEN. Olecksiew, 345-5012.

Pizza on the Patio — And Other Fancy Stuff

VARIETY NIGHT ON THE PATIO tomorrow night (June 3) starts at 5 p.m. with a buffet featuring all sorts of kid-pleasin' food — pizza, hamburgers, hot dogs, french fries — and a salad bar too (probably for the grownups). Top off the meal with a magnificent concoction from the "create-your-own-sundae bar" for just $1.50. Afterward, the entertainment includes a magic show (at 6), and some hilarious cartoons. Free popcorn and balloons too.

PEEL SOME SHRIMP ($8.45) or munch some juicy New York steak ($8.95) this evening during Friday night C-Club festivities. Then head for the dance floor, where Spinning Wheel plays variety music from 8 p.m. to midnight.

IF YOU LIKE TO DINE CASUALLY, head for the patio on Friday nights. The patio bar and grill — featuring such goodies as margaritas (pitchers, yet) and shrimp by the plateful — opens for business at 5 p.m. A DJ plays the "don't worry, be happy" music, and you can swim to your heart's content until 8 p.m.

A BARBECUE BLAST next Friday night (June 9) headlines BBQ chicken/ribs/beef at $6.95 a plate. Work it all off afterward by shuffling around to the country-western tunes of Trio Grande from 8 p.m. to midnight.

THOSE WILY T-BIRD CARD SHARKS get together again for another round of fun and games on Thursday, June 15, starting at 10 a.m. Here's a deal that can't be beat: free goodies, convivial conversation, and master-technician card players.

BINGO NIGHTS — June 8 and 15 — promise all sorts of fabulous prizes for some lucky winners. Card sales start at 5:30 p.m. both nights, and the early-bird game kicks off at 6:45. This month marks the first birthday of C-Club Bingo Nights and, in honor of the occasion, a drawing for an anniversary clock will be held at the last bingo session of the month (June 29). Meantime, when you play bingo anytime in June, you'll receive a drawing card to make you eligible for a chance on the clock.

CORONADO AQUATIC CLUB swimmers launch the 1989 season with a meet at the C-Club against Four Hills on June 10, starting at 8 a.m. Three days later (June 13), they'll host the YMCA club at 5:30 p.m. The kids welcome your support; come out and cheer them on to victory both days.

GET IN ON THE FUN every Wednesday night in June at Family Swim Nights. The pool is open until 8 p.m., and there's a low-cost buffet available to feed your hungry tribe. Entertainment includes cartoons on the big-screen TV. Regular admission rates: free for pool pass holders, $2/person for Club members, and $3/guests.

Events Calendar

June 2-11 — "A Walk in the Woods," New Mexico Repertory Theatre production of a drama by Lee Blessing about US/USSR relations and the arms race; 8 p.m. Tues.-Sat., 2 p.m. Sat. & Sun.; KiMo Theatre, 243-4500.

June 2-July 16 — Exhibit, "Carthage: A Mosaic of Ancient Tunisia," organized and sponsored by the American Museum of Natural History (New York City), featuring mosaics, sculpture, and recently discovered artifacts; 9 a.m.-5 p.m. Tues.-Sun. (special museum hours), Albuquerque Museum, 242-4600.

June 3 — Concert I, June Music Festival, featuring the Guarneri Quartet performing works by Mozart, Janacek, and Schubert; 8:15 p.m., Woodward Hall (UNM), 881-0844.

June 3-4 — "Fashions in Flowers," exhibit featuring contemporary trends in horticulture, floral art, table settings, and clothing; 2-6 p.m. Sat., 10 a.m.-4 p.m. Sun.; Albuquerque Garden Center (10120 Lomas NE), free, 296-6020.

June 4 — Concert II, June Music Festival, featuring the Guarneri Quartet performing works by Beethoven, Berg, and Grieg; 8:15 p.m., Woodward Hall (UNM), 881-0844.

June 4-July 30 — "A Double Birthday: Baseball and Photography," exhibit celebrating the 1839 coinciding inventions of baseball and photography, local photographer Paul Jeremias documents the Albuquerque Dukes as they begin the season, UNM Centennial event; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues. evening, 1-4 p.m. Sun.; west gallery, UNM Art Museum, 277-4001.

June 4-Sept. 17 — "Art Since 1945," exhibit featuring paintings, sculpture, and prints from the permanent collection, highlighting later twentieth-century art (realism, geometric abstraction, and expressionism); 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues. evening, 1-4 p.m. Sun.; upper gallery, UNM Art Museum, 277-4001.

June 6 — Concert III, June Music Festival, featuring clarinetist Harold Wright (Boston Symphony) performing works by Beethoven, Brahms, and Debussy; 8:15 p.m., Woodward Hall (UNM), 881-0844.

June 9 — Concert IV, June Music Festival, featuring pianist Lee Lueisi, performing works by Mozart, Shostakovich, and Schumann; 8:15 p.m., Woodward Hall (UNM), 881-0844.

June 9-10 — "Dance for Life," 24-hour dancethon benefiting St. Jude Children's Hospital; 6 p.m., St. Pius X High School, 846-0906.

June 10 — Pianist Leon Bates performs with the Chamber Orchestra of Albuquerque, featuring "Piano Concerto No. 23 in A Major" by Mozart, George Gershwin's original piano version of "Rhapsody in Blue," "Six Marches" by Carl Philipp Emanuel Bach, and Tchaikovsky's "Suite No. 4 in G Major (Mozartiana)"; 8:15 p.m., St. John's United Methodist Church (2626 Arizona NE), 881-0844.

June 11 — Concert V, June Music Festival, featuring the Guarneri Quartet and pianist Lee Lueisi performing works by Haydn, Franck, and Brahms; 8:15 p.m., Woodward Hall (UNM), 881-0844.

June 16 — Soweto (South Africa) Commemoration, featuring live entertainment by "Zimbabwe"; 7 p.m., South Broadway Cultural Center, free, 848-1320.

Take Note

The Albuquerque Chapter of Professional Secretaries International recently elected officers for 1989-1990. Sandians elected: Carol Kaemper (21-1), president; Mary Scott (9200), vice-president; and Connie Lou Soto (1553), recording secretary. The chapter meets the second Tuesday evening of each month at the Holiday Inn Midtown. Each meeting has a speaker, a short business session, social period, and dinner. All secretaries are invited to attend. Call Carol Kaemper on 4-7546 for information.

Take Note

The 9th Annual Omatsuri, a Japanese Festival sponsored by the New Mexico Japanese-American Citizens League, is June 25, 10 a.m.-5 p.m., at Minato Square (10721 Montgomery Blvd. NE, just west of Juan Tabo). The festival includes music, dancing, martial arts demonstrations, food, arts and crafts, and exhibits. Sandians involved in the festival include Stephen Casalnuovo (2532), Davis Begay (7813), Wade Ishimoto (5210), Jacqueline Morimoto (21-1), Ray Sakamoto (7481), and Randolph Shibata (3714).

Sandia Colloquium

Jack Feinberg (Associate Professor of Physics, University of Southern California) will talk about "Applications of Photorefractive Nonlinear Optics" June 9, 9:30 a.m., at the Technology Transfer Center (Bldg. 825). Contact host Del Owyyung (1160) on 4-5481 for information.

A 27-sq.-ft. bizcochito (the N.M. state cookie) will tempt Sesame Street's Cookie Monster when he appears at KNME-Channel 5's Open House Sunday, June 4. Free tickets, (pick them up at KNME and Wendy's Hamburgers) are available for 11 a.m. to 1 p.m., 1 p.m. to 3 p.m., and 3 to 5 p.m. Prizes to be given away include Sesame Street T-shirts, pencils, posters, and other items; refreshments will be served. For information, call KNME on 277-2121.

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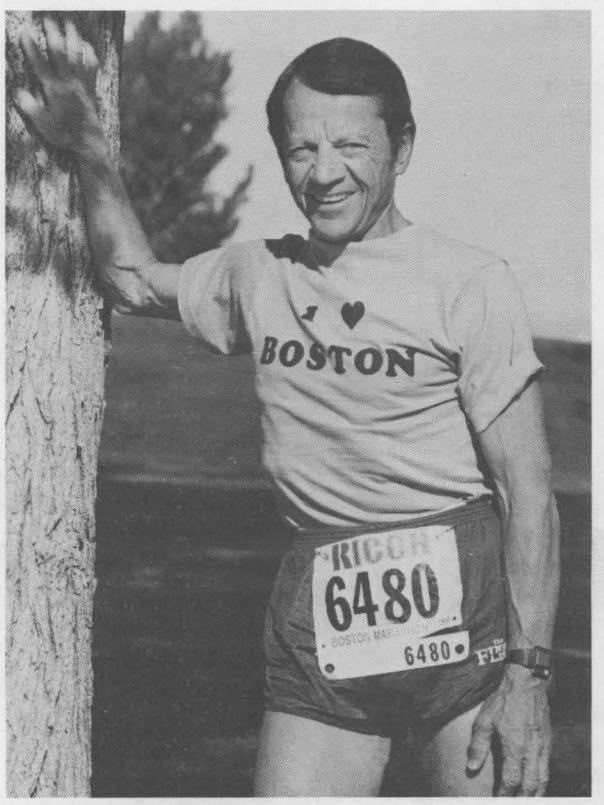
Approximately 700 Special Olympics Athletes will gather June 5 through 10 for the 1989 New Mexico Summer Special Olympics Games at Milne Stadium, Los Altos Park, and UNM's Johnson Field. Volunteers are needed to be officials, chaperones, huggers, office help, and to help with refreshments. Special Olympics is the world's largest program of sports training for mentally retarded children and adults. For information, call 883-5525.



FINISHING 4689th in this year's Boston Marathon (April 17) doesn't sound too impressive — until you consider that it was done by this 69-year-old Sandian, Larry Johnson (DMTS, 5147), who obviously disguises himself as a 50-year-old man. He has run lots of marathons, but this was his first time at the "big one." Larry says there were about 8000 official runners (with assigned numbers) and about 3000 more unofficial runners, which means he beat a whole bunch of folks. He finished the 26 miles and 385 yards in 4 hours, 12 minutes. Larry jokes that he wore the "I Love Boston" T-shirt during the race so the locals might be more inclined to help him in case he collapsed.