



THIS GROUP IS ENJOYING an informal session of a sign language class. Judy Tripp (7522), second from left, taught the group so that they could communicate with Bob Miera (7632), left. The others are (l to r) Veronica Chavez-Soto (7265), Mike Michnovicz (7632), Mary Valenzuela (7632), Tom Schultheis (7613), and JoAnn Romero (7651). John Brane (7632) was not available for the picture. (John is now teaching sign language to others who work with Bob.) See Page Five.

Part of the Story

Sandia Wins National Award

Sandia has been selected by the President's Committee on Employment of the Handicapped as Large Employer of the Year. This national award, given to a firm with more than 200 employees, was accepted for Sandia by Ray Powell (3000) and Bob Garcia (3500) at a banquet in Washington D.C.

Sandia employs more than 500 people who are handicapped, disabled, or Vietnam Era Veterans. Many changes have been made to the physical structures at Sandia to accommodate these employees. Overall administration and monitoring of the program is handled by Bob Garcia's organization, mainly by Rose Gonzales (3511), the Handicapped Program Coordinator. Sandia's Medical, Environmental Health, Safety,

and Plant Engineering organizations provide guidance and assistance, and assure that there are adequate provisions for specialized support and first aid measures to assist handicapped individuals in emergency situations.

Since the mid-70's, Sandia has aggressively sought handicapped employees and has provided for their access and safety. These provisions include modifications to

existing buildings to eliminate architectural barriers for the physically handicapped — ramps, walkways, curb cuts, railings, restroom modifications, and adequate size doors for wheelchair access to various buildings and restrooms. New buildings are designed with handicapped facilities. Reserved parking spaces inside the Tech Area

(Continued on Page Five)



LAB NEWS

VOL. 36 NO. 11
SANDIA NATIONAL LABORATORIES
MAY 25, 1984

Hybrid Microcircuits

Sandia Improves Techniques

About 125 unique thick film hybrid microcircuit designs are currently being used in almost two dozen major Labs projects, thanks to Sandia-developed technological advances that permit increased design flexibility and reliability at lower cost. In fact, BKC (Bendix Kansas City) is expected to manufacture and deliver more than 13,000 individual hybrid microcircuits to the Labs during 1984.

Widespread use of hybrids at Sandia has not always been the case, however. In fact, when these miniature electronic assemblies (which contain many individually packaged transistors, diodes, capacitors, and integrated circuits all on a ceramic substrate) were developed in the late 60s, many researchers — including some Sandians — thought they were just a passing fad. "Surely individual pieces of silicon would soon be able to accommodate circuits of any imaginable complexity," the reasoning went.

But that has not been the case, says Dick Knutson (2122), the Distinguished Member of Technical Staff who has participated in hybrid microcircuit development at Sandia since activities began.

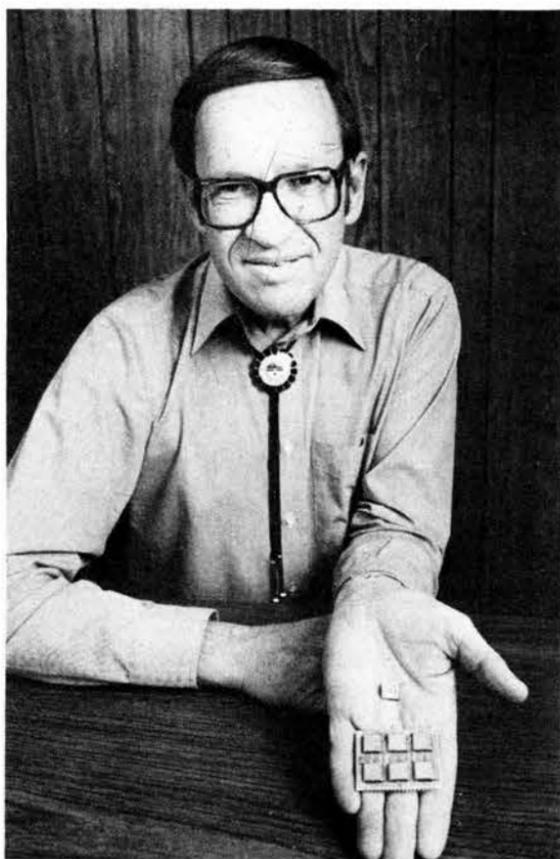
"In fact," Dick says, "hybrid microcircuits are probably more popular now than ever."

That popularity has several causes. As Dick points out, "even though individual silicon chips are becoming more complex and capable of performing many functions, there always seems to be a need for a little something extra in the system — one more RAM [random access memory] or ROM [read only memory], for instance — that makes a hybrid necessary."

Also, because designers want to put so many components on one silicon chip, the chips themselves are becoming large from a microelectronics standpoint — up to a quarter inch on a side. "That's just about as large as they should get, or the miniaturization advantages that they provide vanish," Dick says. "Consequently, systems must contain multiple chips on hybrids. Finally, systems that operate at high voltages, several thousand volts, say, must use hybrids."

During much of the past decade, Sandia's use of hybrid microcircuits was essentially limited to radars and coded electronic

(Continued on Page Four)



HANDFUL OF HYBRID MICROCIRCUITS — Dick Knutson (2122, DMTS) holds two typical thick film devices. The smaller one is a sub-hybrid packaged in a leadless chip carrier (LCC); the larger is a multilayer network on which several LCCs have been attached. Sandia's thick film technology has evolved rapidly in the last few years.

Antojitos

Some Construction Criticism A couple of issues back, we warned Sandians against crossing the streets during construction. An escort lieutenant (who requested anonymity) sent us this letter, which makes the same point--but more effectively:

Some Sandians are just more dedicated than others.

Consider the secretary who, to complete her mission for her boss, crossed over a rope of warning flags, climbed under the trough of a truck dumping concrete, jumped over a ditch almost three feet wide, then rushed up some steps and over the metal barricade at the top. She risked life and limb to save perhaps 100 feet of walking. Hope her boss was impressed.

A few blocks away, another employee crossed a road being prepared for paving. He is a brave and devout man. His route took him over the rope of flags--each one printed DANGER--KEEP OUT--and directly into the path of a front-end loader. Its wheels were taller than he is; therefore his display of faith in the ability of the huge machine to stop before mangling him was truly inspiring. He never looked to gauge the distance, he didn't flinch at the squeal of brakes; in fact, he gave a good impression of not even being aware of the danger he was in. So brave!

Other Sandians who apparently are willing to give more of themselves than anyone is asking can be found at any of the construction sites. They are willing to give up their valuable time just to help the workers with advice. Some are even willing to risk injury by going into hard-hat areas to check the progress of the work or to demand precise explanations of what is going on.

The total disregard for personal safety by these people really impresses the contractors who witness it. No kidding. More than once when they see these acts of sacrifice and bravery, I've heard one say, "I don't believe it. I just don't believe it."

I can see even now the chapter title in the book that some contractor is writing--"Idiots I Have Known at Sandia." ●BH

* * *

$E = mc^2$.

Very good, Albert, but next time do your homework.

Congratulations

Bill (2113) and Charla Richard, a son, Jonathan David, April 16.

Sympathy

To Bill Geck (3153) on the death of his mother-in-law in Albuquerque, May 12.

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Cultural Awareness Colloquium

Speaker to Discuss New Mexico Women

Throughout its long tri-cultural history, New Mexico has produced women in every generation who have influenced the events that shape us as a state.

In a Cultural Awareness Colloquium set for 10:30 on June 7 in Bldg. 815 (outside the area), Nancy Benson will discuss the role of women in the state's Native American, Spanish, Mexican, and Territorial periods. Says Yolanda Padilla-Vigil (3511), host for the presentation, "She will focus on specific contributions by notable women of all cultural groups to education, politics, medicine, science, and the arts in New Mexico."

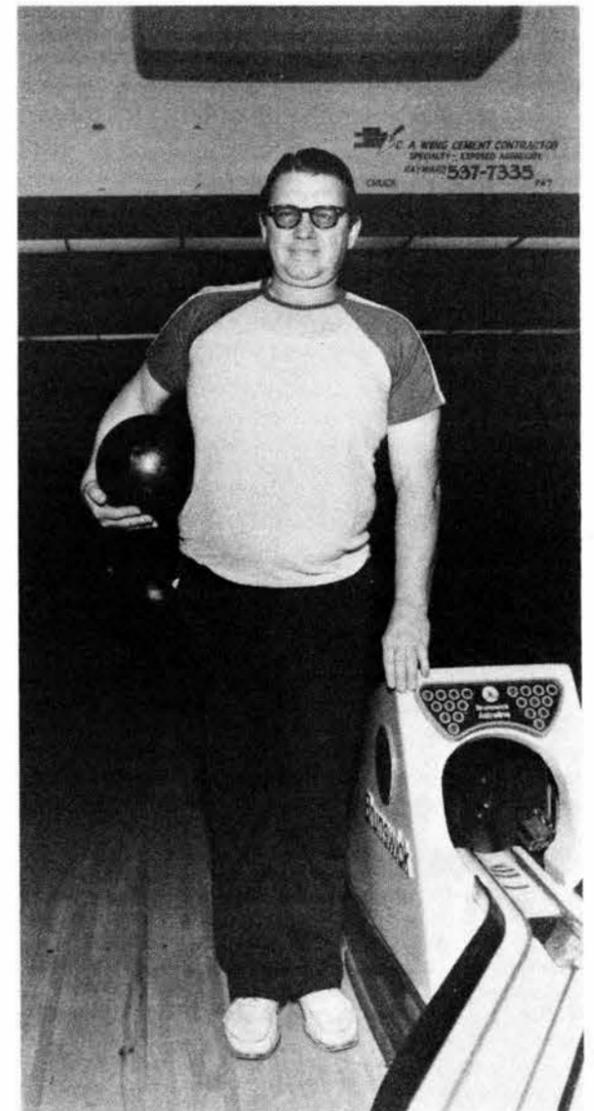
Complementing the colloquium is a display featuring notable New Mexico women; the display will hang in the lobby of Bldg. 802.

Livermore Fun & Games

Sandia Mixed Bowling League has completed its 1983-84 season at the Amador Valley Lanes in Dublin. First place champions are the Tigers with Roger Baroody (8410) as captain. Team members are Kit Marino (8414), Bill Little (retired), Helen Little, Mary O'Shea (8424), and Dick Houser (8412).

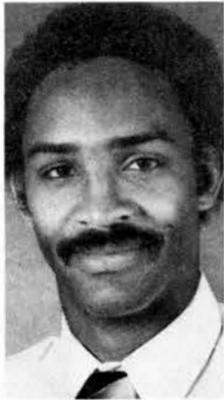
Second place team is the Fighting Bobcats with Bob Chan (8466) as captain. Other members are Bob Strout (8461), Bob Miller (8131), Eva Leong (8264), Wayne Chrisman (8347), Gary Simpson (8466), and Patty Hong.

Individual awards included High Scratch Series to Patty Hong with 634 and Don Knaple (8273) with a 760; High Scratch Game, Eva Leong with a 236 and Ed Christensen (8444) with a 266; High Handicap Series, Kit Marino with a 700 series and Jerry Creager (Wells Fargo guard) with a 720; High Handicap Game, Laura Phair (Wells Fargo guard) with a 298 and Roger Baroody 289.



JUST LIKE A HOLE-IN-ONE — Bowler Don Knaple (8273) reached the pin-acle of success on April 5 by throwing a perfect game — 300 points — at the Amador Lanes in Dublin where he is a part of the Sandia Mixed Handicap League. Four weeks before that he had thrown nine straight strikes, but got a split in the 10th frame. The 196 average bowler has enjoyed bowling for 25 years, but he kept hoping for that perfect game. Now Don will be able to display a diamond ring to be presented him by the American Bowling Congress — proof of the "big game that didn't get away."

Supervisory Appointments

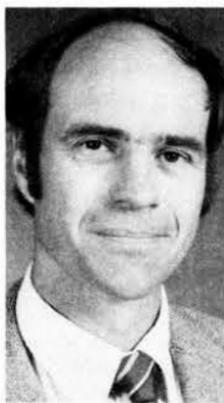


JOHNNY ELLISON to supervisor of Material Movement Section 8262-1, effective May 1.

He first came to Sandia as a summer hire in 1973 and started full time in December 1977. His first assignment was in Plant Engineering as an ESA where he was a draftsman. More recently he has worked as a project engineer in the same group.

His education includes an AA degree from Delta Community College in Stockton with a major in engineering technology.

Johnny and his wife Early live in Stockton and have a 2½ year old son. He is a member of the National Guard and serves as a detachment commander of the 118th Maintenance Unit in Vallejo. Johnny is also active in the Association of Black Military Officers. His recreational interests include playing basketball, football, and baseball.



CHUCK HARTWIG to supervisor of Experimental Thermal/Fluid Mechanics Division 8124, effective May 11.

He began his career at Sandia Livermore in 1971, working with instrumentation design and optical spectroscopies, principally Raman, in what has now become the diagnostic research division. Between 1979 and 1983, Chuck had responsibilities for science coordination and component design in the advanced components division. Since January, he has been the science coordinator in the systems engineering division and responsible for engineering research on directed energy weapons concepts.

Chuck earned a bachelor's in EE from Stanford, where he was a General Motors national scholar. At the University of Southern California he received master's and PhD degrees in physics and EE.

He and his wife Rin are Livermore residents and have a son 14 and a daughter 11. Chuck's interests include local politics, racquetball, and coaching American Little League. He is also a member of the Del Valle Fine Arts Committee and the Board of Friends of the Library.



ED ENGLISH to supervisor of Computer-Aided Engineering Division 8274, effective May 11.

He joined Sandia Livermore in 1964, first assigned to the W68 program as a mechanical engineer in the project engineering group. After four years he moved to the advanced development group for



A GROUP OF 19 DOE engineering interns from the Albuquerque Operations Office visited Sandia Livermore recently for briefings and a tour. They heard about weapons R & D, solar, combustion research, CAD/CAM, and the computing center operation. Here, Rich Palmer (8354) shows the interns a coal combustion experiment in which simultaneous temperature and size particle measurements are being made on individual coal particles in order to understand the mechanisms of coal combustion. Host for the day at Sandia was Bob Gallagher (8201).



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the roll control test vehicle. Next he worked in Phase I and II of advanced concepts, and following that on the nosetip recovery vehicle. In 1976 he joined the solar department and in 1977 was the first engineer from Sandia to be assigned to the DOE office for Solar One. His most recent assignment has been in the Vineyard Development Group.

Ed's schooling includes bachelor and master's degrees in ME from the University of Idaho.

He and his wife Cindy (8201) reside in Livermore and have two teenage daughters, one at home and one in Sacramento. Their outside interests cover many civic and cultural activities including the annual arts festival, water skiing and boating on the Delta, snow skiing, and solar home projects. Ed is also involved in the Livermore-Pleasanton Elks Lodge and the Jaycees.



MIKE PENDLEY to supervisor of Computer Operations Division 8236, effective May 11.

He came to Sandia Livermore in 1974 as a lab technician in the physical research division. After three years he moved to the Tritium Research Lab to work on a mini-computer and

also the building's monitoring computer. Next Mike joined the computer systems division working on data communication problems and terminal installations. In July 1982 he became a Member of Technical Staff and began doing systems programming on the VAX computer.

Mike earned his bachelor's degree in math and computer science at Cal State

Hayward in 1980, then received a master's in computer science at UC Davis in June 1982. He was in Sandia's University Part-Time program.

A resident of Tracy for nine years, he and his wife Deborah moved back to Livermore earlier this year. They have a two-month old son. Mike is a science fiction buff, enjoys racquetball, and spends a lot of free time working with two Apple computers at home. He is also active in the LLLRA Apple Computer Club.

Sympathy

To Louise Taylor (8236) on the death of her father in San Leandro, May 1.

To Dan Folk (8343) on the death of his father in Salem, Ore., April 30.

Congratulations

Ron (8263) and Judy (8422) Hafner, a son, Christopher Paul, May 12.

Retiring



Bill Guntrum (8412)

New Techniques Lead to Improved Microcircuits

switches. These circuits were made using thin, rather than thick, film technology. Although this technology is still used today

"We now prefer to use a specialized thick film technology for most hybrid microcircuits," Dick says.

Basic thick film circuitry differs from thin film processing not so much in physical thickness of the circuits deposited on the substrate as in the way deposition occurs. Silk screen printing is used to apply various conductor, resistor, and dielectric layers; these steps are followed by firing in a high-temperature furnace. "We're talking about a very robust circuit," says Dick. "It is this simplicity that makes the technology so useful and gives it a number of advantages over thin film work."

Sandia currently uses thick film hybrid microcircuits for complex weapon-related devices such as firing sets, accelerometer

controls, programmers, integrated oscillators, signal generators, and gyro electronics. Non-weapon applications at the Labs include the electronics required for flashblindness protection goggles telemetry systems, 3-D mapping systems, and even an implantable, artificial pancreas.

Sandia's thick film technology has evolved rapidly during recent years. It's a unique marriage between, on the one hand, the relatively standard thick film procedures and, on the other hand, special design and processing steps that enhance high reliability and miniaturization.

Sandia now routinely uses multi-layer thick film hybrids; the substrate receives several alternating conductor and insulating layers. This method permits circuit densities much greater than those possible with the more conventional single layer.

Another improvement is to use leadless chip carriers (LCCs). These are miniature, hermetically sealed packages that house silicon devices. They get their name because they do not have the traditional protruding, prong-like metal leads. Instead, they use space-saving metal pads (called solder lands) that actually wrap around the edge of the LCC so it can be soldered to the substrate. These permit many more packaged devices to fit on a substrate of a given size than was possible with metal leads.

LCCs can also be completely tested and preconditioned before being attached to the substrate. Preconditioning, or burning-in (typically, the application of high temperature and/or voltage), is important because it helps weed out components that are destined to fail prematurely. Statistics

show that a small percentage of chips fail prematurely for unknown reasons. By identifying and removing defective ICs (integrated circuits), transistors, etc., before they are committed to a circuit, manufacturers can expect a dramatic increase in reliability.

Sandia also is routinely putting LCCs on both sides of a substrate, a way to improve volumetric efficiency even further.

Computer-aided design (CAD) also helps to reduce costs and improve reliability of Sandia's hybrids. Dick explains: "Complex hybrid microcircuits, which in the past may have required six weeks to design, can now be designed in half the time with interactive CAD techniques. On the horizon are even more sophisticated layout systems that should again cut in half the time required for such design tasks."

Widespread adoption of CAD techniques is vital to improved reliability and reduced costs. For instance, with CAD it's easy to perform extensive computer simulations and checks at all stages of design and development. These minimize errors in hybrid logic and operation, and ensure testability of the final device.

Most of these Sandia-developed improvements interest the many companies that design and manufacture miniature electronic assemblies for commercial applications. "Although the commercial sector has not yet begun to use LCCs, for example, on a large scale, certain segments of private industry could go that way, particularly when extreme reliability and miniaturization are necessary," Dick says. Complex electronic systems designed for medical, automotive, and industrial applications fit into this category.

Some Key Terms

Understanding The Foregoing

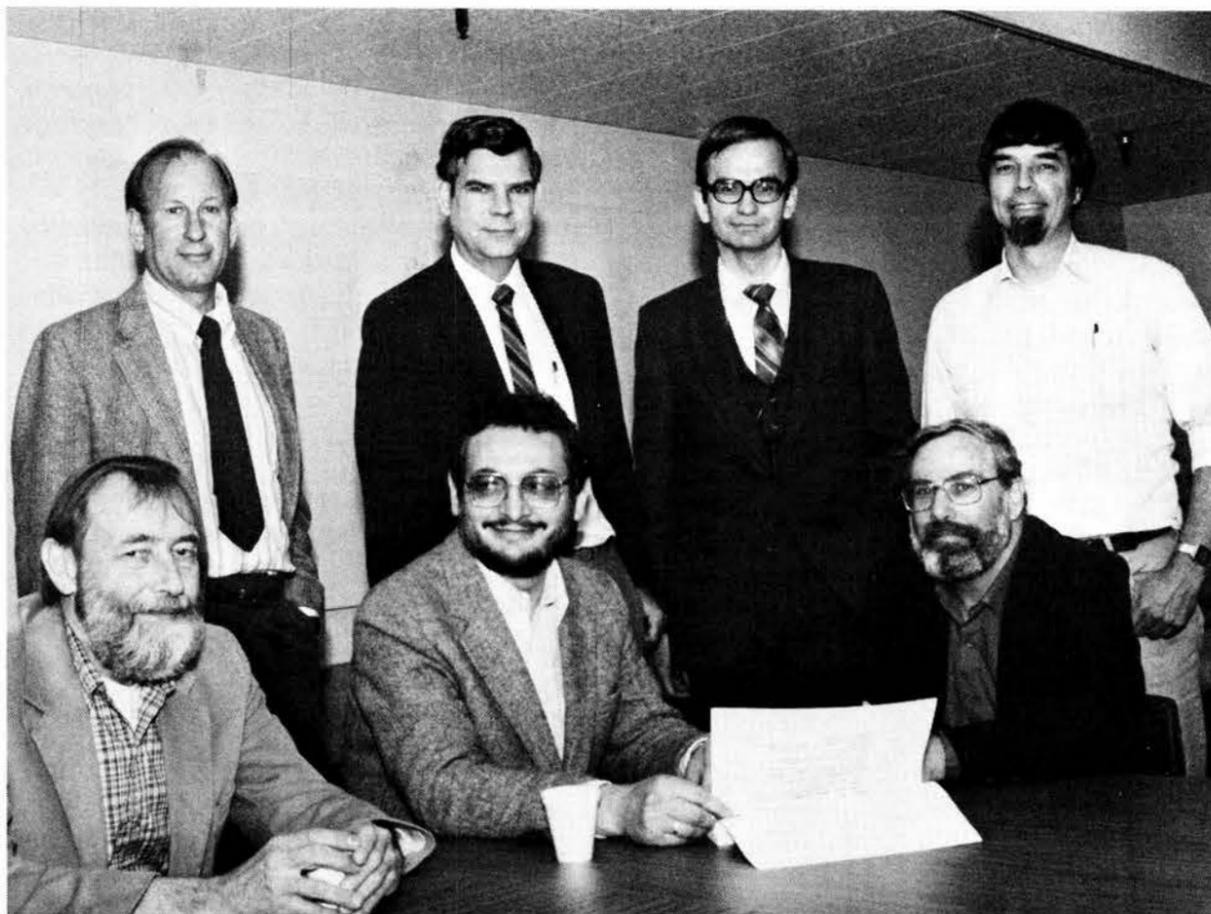
The world of microelectronics has its own high-tech glossary that is used daily by scientists working in the field. However, to many others, a discussion between two integrated circuit experts can sound like another language. These are some terms that are basic to an understanding of the microelectronics world:

Integrated Circuit (IC): A piece of material (usually silicon), typically called a chip, containing a combination of many individual transistors and diodes and their interconnections, and designed to perform a specific function.

Hybrid Microcircuit: Miniature electronic assemblies that contain many individual transistors, diodes, capacitors, resistors or ICs all on a single ceramic (alumina) substrate. Hybrids may be designed to perform a variety of functions.

Thin film processing: A hybrid microcircuit fabrication technique that utilizes vacuum deposition of metals and chemical processes to define conductors and resistors on a substrate. These steps must be finished before transistors, diodes, and ICs can be attached to the substrate. Special soldering techniques are also typically required to complete the circuit.

Thick film processing: A hybrid microcircuit fabrication technique that uses a form of conventional silk screen printing to apply conductor, resistor, and dielectric layers to a substrate. After screening and drying, an inked ceramic substrate is fired in a high-temperature furnace. Individual devices can then be attached.



A TECHNICAL COMMITTEE recently reviewed a joint Sandia/LBL conceptual design of a small, technology-oriented, synchrotron light source. Some of the meeting participants are (from left, seated): Ed Rowe of the Synchrotron Research Center at the University of Wisconsin; Claudio Pellegrini of the National Synchrotron Light Source at Brookhaven National Laboratory; and committee chairman Herman Winick of the Stanford Synchrotron Radiation Laboratory. Standing (from left) are Walter Bauer (8340), Klaus Berkner of Lawrence Berkeley Laboratory, John Vitko (8348), and Phil Morton of the Stanford Linear Accelerator.

Continued from Page One

Sandia Wins National Award

are available. Laminar flow "clean" benches are furnished for those with respiratory handicaps. Flashing lights alert employees with hearing impairments of fire alarms. Vision impaired employees have pop-up buttons on their telephones (instead of flashing lights), and the use of an electronic visual aid that greatly magnifies printed material. A vehicle was modified to use hand controls instead of foot controls, and several evacuation chairs for safely transporting wheelchair-confined persons out of, say, a burning multistory building, have been purchased.

As part of the Handicapped program, Frank Gallegos (formerly 3533, now 3523) initiated a contract with the Career Services for the Handicapped to provide SNLA with temporary clerical help. This contract has helped handicapped persons to gain experience and has allowed Sandia to evaluate them as future employees. Career Services for the Handicapped nominated Sandia for the Presidential award.



"THE PRESIDENT OF THE UNITED STATES Cites with Pleasure Sandia National Laboratories, Albuquerque, New Mexico, for Distinguished Service in Encouraging and Promoting the Employment of the Handicapped." Bob Garcia (3500) and Ray Powell (3000) presented the award, which they had accepted for Sandia in Washington, D.C., to President Dacey.

More on National Award

The Other Part of the Story

Management decisions leading to structural changes and work environment modifications certainly contributed to Sandia's receiving the Employer of the Year award.

But many large companies undoubtedly have similar programs. Let's look — as the President's Committee on Employment of the Handicapped must have looked — at the actions of some people in direct contact every working day with these handicapped employees.

Specifically, let's look at Tom Schultheis and the people in his former division — Equipment Engineering and Maintenance and Machine Plotting 7634 (the division has been broken up; Tom is now supervisor of 7613, and most of the people involved in this story now work for Mike Michnovicz in Division 7632).

Bob Miera, assigned to work for Tom, is deaf. Tom and his crew — Mary Valenzuela, John Brane (both 7632), Veronica Chavez-Soto (now 7265), and JoAnn Romero (now 7651) — worked with Bob Miera (now 7632), and they wanted to communicate with him.

How do you communicate with a deaf person? You learn sign language. And that's exactly what the group did. Judy Tripp (7522) taught them sign language. And now that Bob works for Mike Michnovicz, Mike and his Reprographics people who work with Bob are learning sign language; John Brane is their instructor.

Tom, with the approval of his management, provided a computer terminal for Bob's home and one in the office so that Bob could talk to his wife. The crew installed flashing lights in the restroom, so

that Bob would know when a fire drill was called.

One of Bob's responsibilities was to set up films in a dark room on Gerber plotters. When he finished, he often went on to another duty, never knowing exactly when the computer was finished and it was time to set up more film. Tom equipped Bob with a pager device to carry on his belt that works like this: when the computer finishes job 1, it sends a signal that dials a transmitter. A receiver intercepts the signal and transmits it to the device on Bob's belt. The pager begins to vibrate, and Bob knows that it's time to return to the darkroom. Bob can be anywhere in the Tech Area and receive the signal.

Bob was invited by the School for the Deaf in Santa Fe to participate in a Career Day lecture series. His job was to interest the deaf students in technical type jobs. Again, Tom and his crew came to his aid. With the help of Motion Picture-Video Services Division 3153 — Liz Scott-Patterson directing — they produced a videotape about Bob and his work that he could show the students. JoAnn Romero wrote the script, John Brane narrated, and Judy Tripp, in an inset in each frame, translated what John said into sign language. Remember, these people, with the exception of Liz, were complete amateurs, but they did a terrific job. Comments from viewers of the film read like rave reviews.

With employee involvement like this, it's no wonder Sandia was recognized nationally for its efforts to support handicapped workers. •NT

Here is a current volunteer opportunity for employees, retirees, and family members. If you are interested, call Karen Shane (4-3268).

SPECIAL OLYMPICS is a nationwide program of sports training and athletic competition for mentally retarded children and adults. State meets (including swim, track, gymnastics, and soccer) will be held in Albuquerque today through Sunday. Volunteers are needed for half-day stints to help with everything from registration to awards, including escorting entrants.

GET 'EM WHEN THEY'RE YOUNG



In a 1953 study, H.C. Lehman, Ohio University, examined histories of science to determine the age of various scientists when their most outstanding discoveries were made. He concluded that, although productivity persists into old age, scientists do their highest quality work before the age of 40.

Lehman's study has been challenged by a number of researchers. Harriet Zuckerman and Robert K. Merton, Columbia University, suggest that scientists make their most important contributions at a young age in fields that are highly codified. In such fields, it takes less time for students to master the discipline's theoretical framework, since this framework takes the form of fairly condensed, interrelated laws, rather than voluminous factual material. And Stephen Cole, State University of New York, notes that Lehman failed to consider that science has been growing exponentially for the past few centuries. The reason for the disproportionate number of contributions from young people is that this growth has meant science has been disproportionately populated by young scientists. Another variation on this theme is Derek J. de Solla Price's oft-quoted statement, "80 to 90 percent of all the scientists that have ever lived are alive now." (Eugene Garfield in *Current Contents*)

Mystery Surrounds New RR/Pipeline Company

Activities in Area IV have taken an unexpected turn as discovery of vast quantities of oil underlying the PBFA-II construction site has shifted the direction of pulsed power research and may alter the nature of Sandia's mission.

Observers recently have speculated on the significance of railroad tank cars shuttling to and from the rail line near Area IV. The mystery of that activity was compounded when cars began to appear bearing the markings of the PBFA-II Railroad. Not even the shrewdest guesser, however, has hit upon the real reason, as LAB NEWS has discovered in another in its series of hard-hitting investigative reports.

A highly reliable source has disclosed that geological studies, required by safety regulations, had first suggested and have now confirmed the presence of a large sea of oil under Area IV near Tijeras Arroyo, enough to make Pulsed Power Sciences Directorate 1200, or even Sandia itself, a net exporter of petroleum.

The Directorate moved quickly to capitalize on the development. The first step was to establish the PBFA-II Railroad and Pipeline Company. Acquisition of existing rail lines was readily accomplished. Laying of the initial pipeline, however, appeared for a time to be stalled by environmental concerns.

But massive, round-the-clock technical analysis demonstrated that the proposed failsafe construction technique — yellow tape on all pipeline joints — made spills virtually impossible. Then, in an engineering coup unprecedented even at Sandia, the pipeline was redesigned so as to pass rigidly across a drainage ditch rather than flopping limply down one bank and back up the other.



The redesign removed the final environmental objection by providing an unobstructed route for seasonal jackrabbit and tumbleweed migrations. Biologists had warned that jackrabbits would refuse to cross the pipeline because of its resemblance to an enormous snake. And the Texas Tumbleweed Preservation and Adoration Society had threatened lawsuits if the pipeline restricted the movement natural to the species.

Sandia officials have not yet revealed the financial or structural impact of the oil discovery. A spokesman for the newly formed OPED (Organization of Petroleum Exporting Directorates) is, however, quoted as saying, "Fusion! Who needs it? We're going to make a bundle before we pump the Tijeras Reservoir dry." While declining to comment on further plans, the spokesman advised, "If you lose your Sandia organization chart, don't bother to order a new one just yet."

Some knowledgeable industry watchers surmise that the new company may at-

tempt to wrest control of Sandia from AT&T and channel the Labs' vaunted resources toward tertiary and, beyond that, quaternary oil recovery techniques in order to drain the last drop of oil from the new reservoir.

Others favor the converse — that Sandia would buy out the new company in order to assure a supply of petroleum vital to its Motor Pool operation.

Although passers-by see vigorous activity at the loading point near Area IV, no one at the site would comment on rumors concerning the ultimate destination of the oil. Some industry analysts guess commercial markets, while others assert that Sandia's contractual restrictions make the US Strategic Petroleum Reserve, a project with which Sandia has been associated in the past, a logical destination.

The OPED spokesman said only that markets must remain secret for now "to avoid widespread economic disruption."

The OPED spokesman said only that markets must remain secret for now "to avoid widespread economic disruption."

The OPED spokesman said only that markets must remain secret for now "to avoid widespread economic disruption."



My grandfather, Chauncey Rader, was a World War I gunnery instructor at Ellington Field in Texas City (near Galveston) from 1914-18. His job was to teach recruits in the "Air Service" to fire and reload Gatling guns and other machine guns aboard planes and on the ground. The Jennys they trained in were two-passenger planes with a gunner to protect the rear and a pilot whose gun covered the skies ahead of the plane. — Kevin Babb (7535)

Editor's Note: Antique plane expert Bill Laskar (ret) adds that the Curtiss JN-4, or Jenny, was used primarily as a trainer. Pilots were shipped directly overseas after basic training and were expected to fly fighters, reconnaissance planes, whatever was available. The Jenny was noted for a landing gear design that was too near its center of gravity. Pilots had to make a perfect



landing — and get the tail down fast — to avoid a nose-over. If the landing wasn't perfect, the pilot could gun the engine (an OX-5 liquid-cooled Vee engine noted for its cantankerousness) and speed up enough that the elevator could work but perhaps end up taking off again and going into a stall. Or he could give up and do a nose-over, a popular choice, as these photos indicate. Jennys had no brakes, but they did have a tail skid that slowed them down by dragging into the grass runways. On the other hand, the skids did not swivel; the combination made for treacherous ground handling. The use of the word "crate" to refer to a plane came from this era: Jennys arrived in crates that were kept to gather up the pieces. After the War, brand-new Jennys were common; still crated and with a motor, they cost less than \$1000. They were popular barnstormers' airplanes through the 1920s.

This One's Straight

Oil Delivery Method Saves \$180,000

With a portable pump and 2100 feet of hose, the PBFA-II project is saving \$180,000.

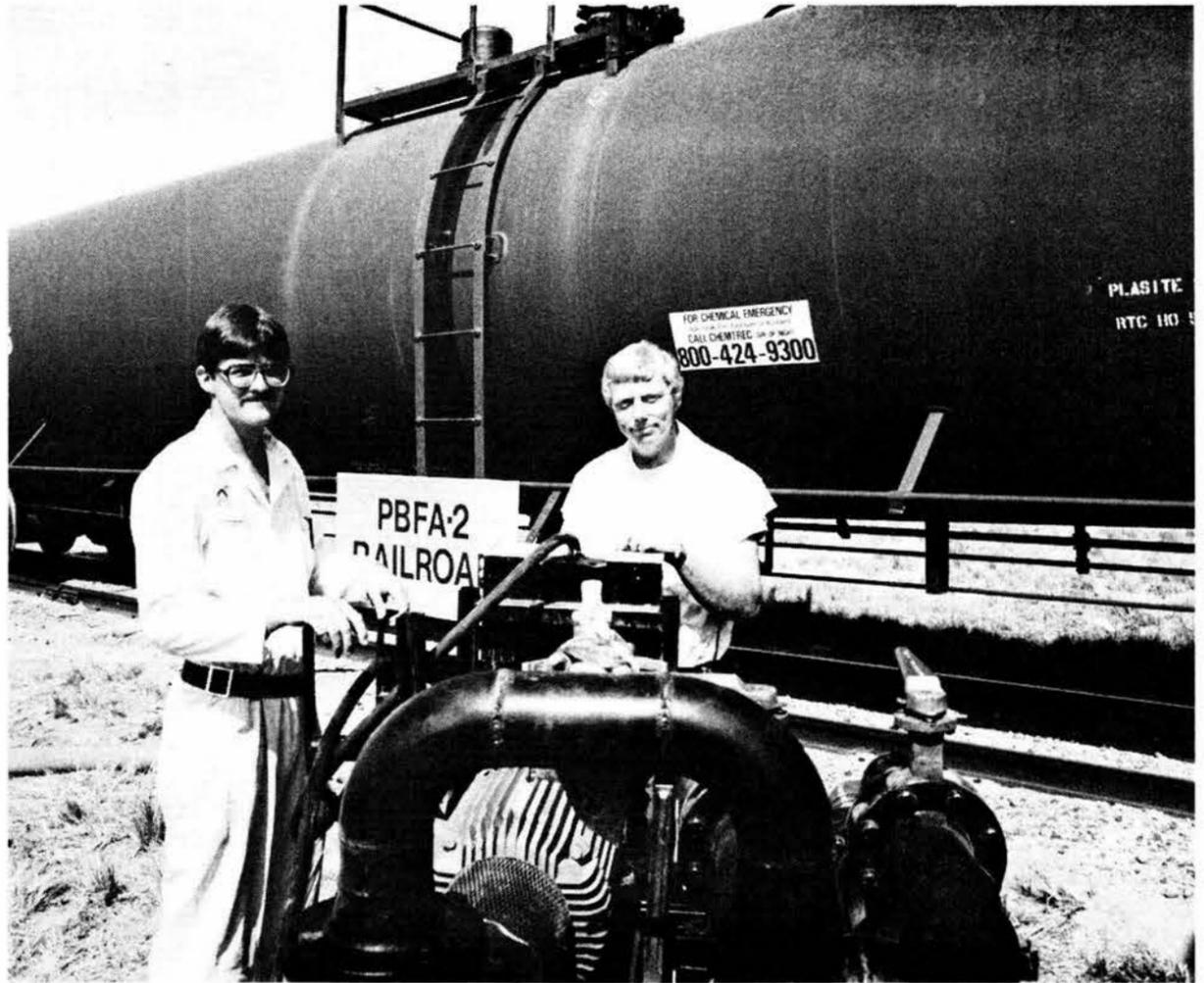
Duane Burgeson (1251) conceived and Bob Clevenger (K-Tech) implemented the technique to move 500,000 gallons of transformer oil for PBFA-II from 22 railroad tank cars to storage tanks in Area IV. A method new to Sandia, delivery of large amounts of oil by rail costs much less than by the tractor-trailer rigs used to deliver the oil for PBFA-I.

The technique involves an electrically powered pump, a portable generator, and enough 60-foot sections of four-inch hose to reach from the rail line to the oil storage tanks in Area IV. With this equipment, it takes less than two hours to empty a typical 23,000-gallon tank car.

"Bringing the oil in by rail shows that we've learned from our experience with PBFA-I," says project manager Gerry Barr (1201). "As we build PBFA-II, we're making improvements wherever we can."

The transformer oil (a mineral oil with a viscosity halfway between SAE 10 and kerosene) will eventually fill the spaces between components in the outer ring of a large particle accelerator, where it will serve as an electrical insulator.

During the late 1980s, researchers in Pulsed Power Sciences Directorate 1200 will use the accelerator, PBFA-II, to perform experiments leading toward controlled nuclear fusion.



TANKCAR-TO-HOSE-TO-TANK system is saving money for the PBFA-II project. Richard Cleary and Bob Clevenger (both K-Tech contractors assigned to Div. 1254) man the pump and make the

connections. It takes less than two hours to empty a 23,000 gallon tankcar. The project needs 500,000 gallons of the lightweight oil to serve as electrical insulator for PBFA-II.

Retiring



Nell Norton (3155)



Myrtle Patterson (3152)



Jack Marceau (2114)



Bill Clements (2335)



Doris Mortenson (5219)



Ray Burbank (3723)



George Revels (7471)



Curtis Bates (5313)



Art Roth (7261)



Bill Sundt (7222)



Jim Robinson (3612)



Bob Knight (7472)



Orlando Sanchez (3612)

Tracking the Causes of Cancer

Editor's Note: This article is reprinted, with permission, from EXXON USA (Third Quarter 1983) at the suggestion of Sandia Medical.

Dr. John Higginson has a feel for cancer statistics around the world, and their implications, that few of his scientific colleagues can match. As a researcher in South Africa and the University of Kansas Medical Center, and as founding director of the World Health Organization's International Agency for Research on Cancer in Lyons, France, he has specialized for more than three decades in cancer epidemiology — the search for causes of the disease.

EXXON USA: *How do you conduct an epidemiological study of cancer?*

HIGGINSON: Epidemiology and epidemiological studies of cancer go back a long way. One of the first observations was that humans living in different parts of the world showed widely different frequencies of various cancers. For example, in Africa, there's a lot of cancer of the liver. In Iceland and Latin America, there's a great deal of cancer of the stomach and cervix. In North America and Europe, in contrast, cancers of the large intestine and the breast were found to be very frequent. Furthermore, lung cancer started to increase rapidly in the postwar period in the latter areas and only much later in Japan and Africa. Those were the first observations — the differences between communities.

In a second type of study, epidemiologists looked at cancer in migrant peoples. Take for example migrants from a country such as Japan, where there is a lot of cancer of the stomach and very little cancer of the breast and prostate. When Japanese come to North America, their incidence of stomach cancer goes down and that of breast and prostate cancer starts going up after a couple of generations. This indicates that the incidence of these cancers is dependent on differences in environmental factors between the U.S. and Japan and not on racial factors.

Another important approach employs analytical studies on people who have certain habits, work in specific occupations, or show undue frequencies of a specific type of cancer. For example, a group of people with a specific cancer is examined and compared to another group without cancer, and a large number of variables are examined. If the group with the cancer shows much more of a specific exposure, such as smoking tobacco, you suspect the exposure is a possible cause. In another approach, you begin with a large group of healthy people, establish the characteristics of each individual (diet, behavior, and so on), and follow the group for many years. As time goes along, we can see if cancer develops more frequently in a group with one characteristic than in another. There are some obvious rules to avoid confusing the issues. You don't compare men and women or old and young people without correcting for such biases as, for example, the fact that

men smoke more than women. It is a skilled job, but a lot of it is common sense.

If you are interested in looking at the effects of industrialization, you can compare an industrial community with a nonindustrial community; that should tell you whether industrialization and everything associated with an industrial life adds to the risk of cancer. If you're looking at the effect of cigarettes, which is a common environmental factor, you can look at two possibilities. Say that non-smoking female farmers or male farmers provide your basic background risk, and then add on top of that the effects of smoking. You're looking for the additive effect. You'll find that the frequency of lung cancer in non-smokers is 5 per 100,000 and in smokers, 50 per 100,000. If the two groups are similar except for smoking habits, it is then reasonable to assume that 45 lung cancers out of 50, or 90 percent, may be associated with smoking, and therefore that proportion of cancer would not have occurred if people did not smoke. Similar results may be obtained by using other analytical techniques.

EXXON USA: *What do these studies teach us about other such factors as inheritance, age, or lifestyle as causes of cancer?*

HIGGINSON: First, cancer is *multifactorial*. That means that a lot of factors are involved in transforming a cell into a tumor. So when you ask how much is due to any cause, you are really asking, "If this cause were removed, what proportion of that cancer would disappear?" And that's how I'm going to answer it.

Using this approach, researchers have concluded that smoking is basically responsible for 35 to 40 percent of all cancers in men in the U.S. Another 2 to 5 percent are related to sunlight, and 5 to 10 percent probably due to drinking alcohol. Now that leaves, in the U.S., a group of about 50

"If you are . . . looking at the effects of industrialization, you can compare an industrial community with a nonindustrial community; that should tell you whether industrialization and everything associated with an industrial life adds to the risk of cancer."

percent of cancers that you can't really explain in men and 70 percent in women. We now have circumstantial data suggesting that many cancers in males are not the consequence of smoking, alcohol, or sunlight, but of diet and behavior. The migrant studies have indicated that inheritance does not have a predominant effect on most cancer, although in certain cancers, it may be very important in modifying individual susceptibility: for example, a pigmented skin protects against sunlight. Also, cancers occur more frequently in old age, which may relate to the fact that older people have been exposed to cancer-producing substances for a longer period.

EXXON USA: *The association between lifestyle and cancer came out of your original work 30 years ago. Can you explain how you made the connection?*

HIGGINSON: [We compared the frequency of various cancers found in Africans with those found in natives of western Europe and North America.] These comparisons led us to the conclusion that 70 to 80 percent of cancers in humans were related to the environment. Further, since many could not be explained by obvious exposures to carcinogens, it seemed probable that diet and behavioral habits were involved — a viewpoint which has continually been supported by a great deal of experimental work.

EXXON USA: *That word environment has caused a great deal of controversy. Can you explain what you meant by it and how it has been misinterpreted?*

HIGGINSON: In Africa, the factors in the environment considered by us as possible causes of cancer included such things as tribal customs, marital customs, sexual customs, economic status, dietary habits, use of tobacco, and use of native drugs. We referred to these in our paper, published in 1960, as "mode of life," which we considered as part of the general environment. The problem is that the original paper was widely quoted but never read.

In the latter half of the 1960s, following the publication of Rachel Carson's *Silent Spring*, people started saying, "Aha! Eighty percent of cancers are environmental." They assumed that such cancers had a chemical origin since Carson referred basically to the "chemical environment." Accordingly, the word that we had used in a wide sense tended to be used in a very limited sense as referring only to the chemical environment. This was, of course, the period in which there was widespread use of pesticides and considerable worry about their dangers. So in the public mind, *environment* became synonymous with chemicals. It has taken considerable time for further studies to reemphasize the major impact that cultural and lifestyle factors have on cancer, especially the predominant role of cigarettes.

EXXON USA: *You are not saying, are you, that specific industrial chemicals do not increase the risk of cancer?*

HIGGINSON: Oh, no. There is no question that there are occupational cancers. The history of chemical carcinogenesis started in 1775 with the demonstration of cancer among chimney sweeps. Today we know about 40 chemicals or processes that have been associated with human cancer either definitively or with reasonably strong evidence. Many of these cancers, such as bladder cancer in the dye industry, were recognized by observant doctors who saw an unusually high number of cases of a specific cancer in a particular workplace setting. The exposures were high, the carcinogens strong.

(Continued on Next Page)

“Cancer is multifactorial. That means that a lot of factors are involved in transforming a cell into a tumor . . . you are really asking, ‘If this cause were removed, what proportion of that cancer would disappear?’ ”

EXXON USA: *How does the situation differ today?*

The problem today is that, whereas there have been vast improvements in control of occupational cancer due to unnecessary high exposures to strong carcinogens, there remains concern as to the effect of such chemicals in the general environment, where people are exposed at very low levels. There are many uncertainties about what is the real degree of risk to humans of many such ambient exposures. Furthermore, many people today do not understand the difference between high and low exposures and real and potential risks. All occupational cancers together constitute a problem that is quite small compared to the problems that stem from cigarette smoking. When you are trying to identify a lung hazard in a workplace, it's often almost impossible to separate it from the overwhelming impact of cigarettes. It would be much easier to identify the influence of occupation on cancer if people wouldn't smoke. There is another problem today that wasn't appreciated in the past: namely, that there exists a large burden of occupation-related cancer which is not due only to direct exposures to workplace carcinogens.

EXXON USA: *What complicates the situation?*

HIGGINSON: A major factor in explaining cancer differences among occupations is related to socioeconomic class. Although this has been known for over one hundred years, its magnitude has been forgotten. About five years ago, British researchers came to the conclusion that roughly 88 percent of the differences between occupations were related to this lifestyle factor and only about 12 percent related to direct exposure. Unfortunately, our data in the U.S. are very weak in this area. But there are studies from Boston published a few months ago showing the same phenomenon. Among workers in chemical factories you see a clear difference between the salaried and the hourly-wage workers. Higher economic groups have more breast cancer but show less stomach and lung cancer than do lower economic groups, even though they are all living in the same kind of general milieu.

EXXON USA: *What are the implications of this type of finding?*

HIGGINSON: My suspicion is that much of the problem of occupational cancer will increasingly be related to sociological and lifestyle factors. Take a very simple situation. If you look at a number of occupations, you'll find wide variations in the popularity of cigarette-smoking in different occupations. Smoking is very common among construction and foundry



BOB LINDSEY (7474-2)

Supervisory Appointments

BOB LINDSEY to supervisor of Electronic Fabrication Section A 7474-2, effective April 20.

Bob has worked in the radar design group since coming to the Labs 28 years ago. For the past 15 years, he has worked in radar fuzes design.

Bob earned his associate degree in EE from Valparaiso Technical Institute. He served in the Army with the Army Security Agency Branch from 1949-52. Bob is a ham radio operator and enjoys photography and church activities. He and his wife Barbara have six children, with one still at home, and three grandchildren. They live in the NE heights.

workers, but rarer among teachers, saleswomen, and managers. The lung cancer rates track quite clearly with the proportion of smokers in these occupations. However, many other lifestyle factors will be more difficult to analyze and control.

EXXON USA: *What can an individual do to reduce his or her risk of becoming a cancer victim?*

HIGGINSON: You can stop smoking and cut out, or at least moderate, your use of alcoholic beverages. That will guarantee a reduction in the likelihood that you will get lung and other tobacco-related cancers. Excess alcohol is related to an increase in cancer of the liver and the esophagus. You can use a strong sun-screen lotion when you expect to expose yourself to the sun for any length of time. In terms of diet, only two things stand out consistently: A high-fiber

“In the public mind, environment became synonymous with chemicals. It has taken considerable time for further studies to reemphasize the major impact that cultural and lifestyle factors have on cancer, especially the predominant role of cigarettes.”

diet is less associated with carcinoma of the colon than a low-fiber diet. Also, there is no doubt that undernutrition is associated with a lower risk of cancer in all animal models so far studied, that is, diets low in calories, fat, and carbohydrates. It is not improbable that similar effects might occur in man. On



MIKE MURPHY (2362)

MIKE MURPHY to supervisor of Fire Set Division II 2362, effective May 1.

Following his graduation from NMSU with a BS in EE, Mike joined Sandia in January 1968. The following year, he became a member of the One-Year-On-Campus program and attended Stanford University where he received his MS in EE. He returned to Sandia and worked with a telemetry development group for a few months, then transferred to the reliability department. Since 1971, Mike has worked with the radar department.

He enjoys backpacking, rock climbing, playing the violin, and restoring violins. Mike has one daughter and lives in the North Valley.

the other hand, we don't know whether or not such a diet must be initiated in childhood or will be effective only if embraced in later life. My suspicion is that cutting down calories is a good thing, but that it may have to start early in life for it to have much effect. In terms of behavioral patterns, there is evidence that late pregnancy increases the possibility of cancer of the breast, so would-be mothers shouldn't wait too long. On the other hand, promiscuity seems to be related to carcinoma of the cervix. As to the beneficial effect of exercise on cancer, we don't know yet. But we are assuming that avoidance of obesity is a good thing.

EXXON USA: *Do you see any evidence for more positive anticancer measures in the future?*

HIGGINSON: A better educated population will have less chance of cancer. Many people are smoking less, so there's a matter of choice. From a scientific viewpoint, there is evidence that down the line there will be pills that may protect against certain cancers. For example, it looks as if some contraceptive pills protect against ovarian and endometrial cancers. Another approach will be through diet and possible cancer-inhibiting factors in diet as suggested by some epidemiological studies, for example, of vitamin A. But it is too early to say.

EXXON USA: *Are you telling us that people can reduce risk of cancer through their choice in lifestyles?*

HIGGINSON: Yes. They can choose a lifestyle that certainly will reduce the likelihood of cancer. And the earlier they begin that lifestyle, the better.

Unusual Vacation

Bob Garcia Takes Photographic Safari

For three weeks in March, Bob Garcia (3500) and his wife Ana (and retired Sandian Bob Roberts and his wife Eloise) were members of a group touring Kenya on a photographic safari.

Seven people and their guide traveled 1500 miles by mini-bus to see and photograph wild animals in the national game reserves in Kenya. The area they covered was about the size of the state of New Mexico.

"I consider the trip to be the vacation of a lifetime," Bob Garcia says. "I wanted to photograph the animals; I saw lots of them, and I would return for a chance to see them again. The trip has made me more supportive of wild life preservation. I admire the stability of the Kenyan government and its efforts to save the animals from extinction."

Bob Garcia learned as much Swahili as he could, and during trips in the van, he and his co-travelers practiced the language. "The natives seemed to appreciate the fact that we were learning the language. They invariably corrected our pronunciation, even going so far as to reach up and shape our lips in order to create the right 'moo' sound. They corrected the spelling on our list of Swahili words, and then — in their perfect British-accent English — complimented us on our use of Swahili."

Other impressions: "The animals vying for space at the water holes; the wildebeests starting their migration before the rains come — miles of them strung out over the plains; Lake Nakuru Park and its thousands of flamingos and pelicans; Mount Kilimanjaro; the leopard that had just killed a wart hog and, with the carcass in its



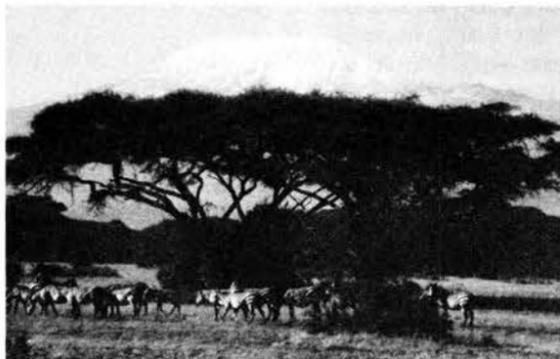
MALE LION AND GIRAFFES in Amboseli Park in the Masai area. The pattern of the trip began here — morning "game run," (excursions into the surrounding areas to spot their photographic quarry), back to the lodge for lunch, rest or swim, then out for late afternoon game run.

mouth, climbed 30 feet up into a tree to protect its kill from the hyenas waiting patiently below; the Masai people and their love of bartering; the comfort of the lodges; and the wonderful food, especially the fruit."

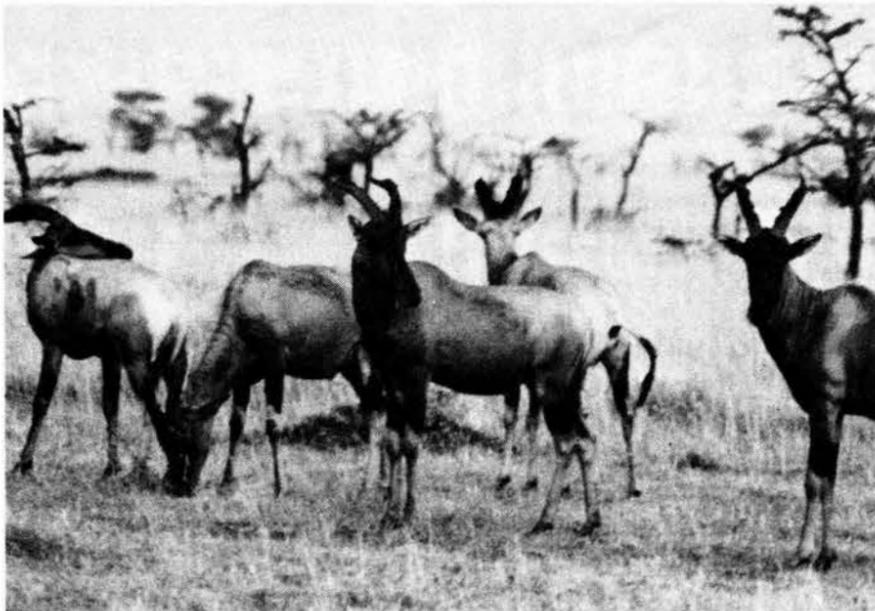
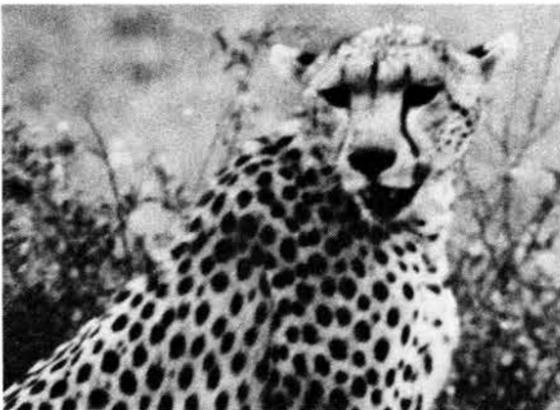
Logistics — The trip was offered by a travel agency with a local representative. The tour included round-trip plane fare (Albuquerque to New York City, to Rome for a day, and on to Nairobi), hotel and lodge accommodations, and meals for \$5400/couple.



PRIDE OF LIONS in Tsavo National Park, the largest animal sanctuary (covers 8000 sq. miles) in Kenya.



KILIMANJARO (19,340 feet)



CHEETAH AND TOPI at Masai Mara Game Reserve in the northern part of the Sarengeti Plains.



BOB GARCIA (right) gave a Sandia Labs cap to this Masai Chief. He had to use every word in his limited Swahili vocabulary to convince the chief that he and Bob Roberts (left) did not want to buy these Masai spears.

Take Note

Sam Thompson (6444) and Mim John (8125) are Sandia's coordinators for the 6th Biennial CUBE Symposium to be held at Los Alamos National Lab Oct. 10-12. The purpose of the CUBE Symposium is to exchange information on computer hardware and software developments and applications among engineers at LANL, LLNL, SNLL, and SNLA. The deadline for the call for papers for the symposium is June 4.

Contact the coordinator for more information.

* * *

The Easter Seal Society of NM is accepting entries for the 1984 Christmas Card Collector's Series. Three paintings that feature attractive southwestern themes will be selected. An individual artist or art owner can enter work to be considered for this year's series. Entries must be received by 5 p.m., June 18; a \$10 tax deductible entry fee is required. Selections will be made on June 19; providers of art being considered need not be present to win. For further information contact the Easter Seal Society of NM, 4805 Menaul NE, Albuquerque, 87110, or call 888-3811.

* * *

The Albuquerque Rose Society will hold its 35th Annual Rose Show June 2 and 3 at the Albuquerque Garden Center, 10120 Lomas NE. Entries will be accepted on June 2 from 8 to 10:30 a.m. Members of the Albuquerque Rose Society will be available to assist new exhibitors. An educational display and free hand-outs will address the growing of roses and the best roses to grow in this area. Rosarians will be present during the show to answer questions. The show schedule and entry tags are available at the Garden Center. For more information call 296-6020 weekdays from 9:30 a.m. to 2 p.m. Admission is free.

* * *

The Second Symposium on Space Nuclear Power Systems, sponsored by the Chemical & Nuclear Engineering Department at UNM, will be held in Albuquerque on Jan. 14-16, 1985, at the Hilton Inn. A call for papers has been announced by Professor Mohamed S. El-Genk, technical chairman of the symposium; abstracts must be received by July 1. The purpose of the symposium is to provide a national forum for the discussion, sharing of information, and transfer of technology among the planners and potential users of space systems. For more information call Patricia Quinn, Administrative Chairwoman, 277-4600, or Prof. El-Genk, 277-5442.

* * *

Diane Schafer, daughter of David (7541) and Ginny Schafer, has been notified of her selection for the United States Presidential Scholars Program — one of 141 students chosen. Diane, a graduating senior from Eldorado High School, plans to attend the University of Texas at Austin and will major in mechanical engineering.

In June, the scholars are invited to Washington, D.C., as guests of the Commission on Presidential Scholars, where they are honored by their elected representa-

tives and others. During the five-day National Recognition Week, scholars meet with senators, congressional representatives, Supreme Court justices, educators, authors, musicians, scientists, and other accomplished persons. They visit the memorials and museums of the nation's capital. The week culminates with the presentation of the Presidential Scholar medallion commemorating their designation as Scholars by the President of the United States.

* * *

"Pueblo Deco: Art Deco Architecture in the Southwest" will be on exhibit at the Albuquerque Museum through Aug. 1. The exhibit contains over 50 color and black and white photographs of Pueblo Deco buildings commonly seen in the Southwest during the 1920s and 1930s. Pueblo Deco is a blending of modern industrial Art Deco style with forms derived from traditional Native American and Hispanic art. The style commonly features elaborate ornamentation in the form of brightly colored terra-cotta decorations, bands of opalescent glass, and cast or carved concrete figures.

Pueblo Deco is a traveling exhibition, originated by the Albuquerque Museum, and guest curated by Albuquerque photographer Carla Breeze and Marcus Wiffen, professor emeritus of architecture at Arizona State University. Included as examples of the style are the whimsical KiMo Theater in Albuquerque with its terra-cotta Pueblo Indian war shields and cow skulls and the City-County building in Phoenix with its cast stone phoenix birds, Hispanic rosettes, and Navajo zigzag patterns. The exhibit hangs in the west hallway of the Museum.

* * *

Yvonne Riley (3155) will be honored June 20 in Mobile, Ala., at the Junior Miss Pageant, as one of the top five local chairmen of Junior Miss in the nation. Yvonne has served as chairman of the Los Lunas Junior Miss, Inc., for the past 16 years. Yvonne and her helpers raise money for scholarships for winners in the local pageant through advertising, donations, and ticket sales. In addition, they help the girls entering the contest with practice sessions and counseling. Junior Miss is primarily a scholastic event for senior high school girls. They are judged on scholastic scores, personal interviews, youth fitness, poise and appearance, and talent.

* * *

Summer day camping for boys and girls at the YWCA Blue Triangle Camp in Tijeras Canyon begins its 43rd season on May 29. Register now at either of the YWCA centers, Downtown and Northeast, 247-8841 and 293-7400, for all or any of the six two-week camping sessions. The cost is \$80 per session (plus a once only \$5 annual registration fee for those not already YWCA members). Buses pick up campers and return them to the city daily. These Outdoor Adventure sessions are open to children in kindergarten through seventh grade; some overnights are included.

High Adventure Camp, July 23-Aug. 3, is for children 12 years and older, and includes advanced camping skills and extended hiking. Call the YWCA centers for more information.

* * *

Retiring this month and not shown in LAB NEWS photos are Gladio Baca (3435), Bob Crouse (7261), Gene Miller (7633), Carl Zickert (7254), and John Formes (3622).



NASA ASTRONAUT Lt. Col. Charles Bolden, Jr. (center), of the Marine Corps was the featured speaker at the second annual scholarship awards banquet sponsored by the Albuquerque chapter of the National Technical Association. The awards went to 25 minority sixth through twelfth grade students from Albuquerque who have demonstrated an ability to excel scholastically in math and science. Aim of the banquet was to encourage such youth to consider careers in those fields. Sandia co-sponsored the event along with the four-year-old local NTA chapter; it has 25 members, 20 of them Sandians. Russ Curtis (3412; left) headed the logistics committee for the banquet, and Jim Lucas (1832) is the chapter president. The NTA was founded in Chicago in 1926 to encourage minority participation in the mainstream of America's engineering and architecture professions. NTA is still guided by this goal, but its horizons have expanded; today, developing and maintaining youth motivation programs in science and math receive considerable effort.

Take Note

The YWCA offers "Summer Venture" that combines work in graphic arts and crafts with theatre solo and group performances, singing, games, and sports in a two-week program for boys and girls, ages 5 through 12. The first of six two-week sessions begins May 29; register at either YWCA center, 247-8841 or 293-7400. Each session is \$80.

Summer Venture will be held at the Yucca Annex, Sandia High School, from 8:30 a.m. to 5 p.m. weekdays. When youngsters need to be left off early or picked up late, additional care will be provided for a small fee.

An eight-week summer session of French lessons is offered by l'Ecole de l'Alliance Francaise d'Albuquerque, beginning June 4. Day or night classes are available and include all levels of conversational French and French for Travelers. Registration deadline is May 31; for more information, call Christiane Vigil, 294-5957.

The District Attorney's office, in conjunction with the YWCA, has begun open discussions of where to go for help for various problems arising from domestic violence. Every other Thursday afternoon from 4 to 5 p.m. (May 24, June 7, June 21, and so on) representatives from the D.A.'s office will be at the Downtown YWCA, 316 Fourth St. SW, to answer questions.

The program is geared to help victims understand their community resources, legal and supportive, and to help them know what choices and alternatives they have. Some concerns will pertain to issues involved in child custody or how child support might be decided. Technical questions about what restraining orders are and how they are used can be answered. Also included in the discussions are availability of emergency services, who qualifies for these services, and how to get in touch with the providers.

For additional information, contact the YWCA, 247-8841, or Hallie Love, Assistant District Attorney, 841-7200.

"A Celebration of Sharing," an inter-generational storyfest co-sponsored by the Big Brothers/Big Sisters Auxiliary and the Senior Action Committee of St. Luke's Lutheran Church, will be held June 3 from 1:30 to 4:30 p.m. on the grounds of the church, 9100 Menaul NE. Storytelling will include Spanish/American folktales, Black American, African and other folktales, Jewish humor and folktales, puppetry, mime, poetry, and music. Refreshments will be provided; admission is free.

In the last issue, the caption accompanying the photo of several Sandians involved in a health care cost containment conference omitted the name of George Paul (3613), vice-president of the Metal Trades Council, and gave the wrong affiliation for Felipe Rivera (3436) — he's president of the International Guards Union of America.

Several Sandians were among the 134 volunteers who helped raise \$678,000 in sup-

port of UNM's Presidential Scholarship Fund Drive recently. The fund provides scholarships designed to help the state retain its brightest and best high school students; the scholarships are awarded on the basis of outstanding scholarship and demonstrated leadership. Some 600 students will receive financial aid next year through the fund. Hank Willis (3100) was chairman of the scholarship fund drive; Jack Hueter (3521) was vice-chairman. Others were Bob Garcia (3500), Bill Hereford (5142), Charlie Hines (3154), Sam Johnson (3665), Howard Romme (143), Bob Statler (7133), and Craig Summers (3743).

The Marriage Enrichment Encounter group is again offering seminars to couples who wish to improve communication — with each other. According to Sal Alvarez (DOE), it's an inexpensive weekend in a cool mountain retreat, a good place for love to grow. Call him for more information — 821-6817.

Events Calendar

May 26 — "Country Gazette," bluegrass band from North Carolina, 8 p.m., KiMo.

May 26-27, June 2-3 — Pueblo Dances, 1 and 3 p.m., Indian Pueblo Cultural Center, 2401 12th St. NW.

May 26-27 — Santa Fe: End of Trail Jubilee — Celebration of the Santa Fe Trail. Trading booths, arts and crafts fair, exhibits, and entertainment, Santa Fe Plaza.

May 27-July 8 — "Chinese Ceramics: The Wong Collection"; Lecture by Natalie Robinson, 3 p.m., May 27, auditorium; show in West Gallery, Albuquerque Museum.

May 30 — "The New Shtetl Band and Svirka Performing Traditional Music of Eastern Europe," 8 p.m., KiMo.

May 30, June 1, 3, 5, 7, 9 — June Music Festival, Guarneri String Quartet, 8:15 p.m., Woodward Hall, UNM, 842-8565.



LYNN PETERS of Graphic Design Section 3155-4 received three first place awards last month from the New Mexico Press Women's 1984 Communication Contest. The awards were for design of promotional material for Sandia's 1983 ECP campaign, for design of a Development Testing Brochure, and for a Sandia ad series that ran on pages of the New Mexico Symphony Orchestra's 1983-84 programs.



PHOTOGRAPHERS of Section 3155-2 were honored recently at the 25th annual meeting and print exhibition of the Industrial Photographers of the Southwest. Elected president was Russ Smith (front) whose print of the PBFA-II facility took third in the job-related print judging. Odessa West (left) was elected secretary. Walt Dickenman (standing left) took second and third place in the off-the-job color category, and Don Papineau (right) was reelected to the board of directors. The organization was chartered 25 years ago by Mike Michnovicz (7632), Dick Hodges (ret.), Bill Jack Rogers, and Bob Crook (both LANL). It now has 70 members in a six-state region.



CONTRARY TO THE SIGN, L Street is open. So is 12th Street. And 10th Street is now allowing traffic. These are the first major completions in the current spate of street repaving. Contractor was KNC, Inc. "The KNC project superintendent, Nick Pipkin, did an excellent job of keeping the work on schedule," reports Wayne Burton (3631), Sandia's project engineer. Later this summer K Street south of Bldg. 891 will be rebuilt, and 14th Street west of Bldg. 887 will be widened and rebuilt. Currently under discussion is an enlarged paved parking lot south of Bldgs. 821-23. And if all goes as anticipated, paved parking for 1300 vehicles will be available east of the water tower after Christmas. Longer range plans call for a four-lane divided highway running east from the intersection of Wyoming and O Street to Eubank.

Partial Eclipse Wednesday Morning

At 9:52 a.m. MDT on May 30, Albuquerqueans will see about 55 percent of the sun's area covered when the moon eclipses the sun. It's an annular (ring) type of eclipse, in which the apparent size of the moon's disk will be slightly less than that of the sun's. "That means that at no time will the sun's disk be entirely blotted out for any ground-based observer," says Grover Hughes (5323), Sandia's resident skywatcher.

In Albuquerque the eclipse will begin at 8:45 a.m. and end at 11:10. "Even during maximum obscuration of the sun by the moon, I doubt that the sky will darken noticeably here," says Grover. "The landscape will probably dim a little — as it might on a slightly cloudy day — but the sky will remain deep blue and shadows will still be sharp. I'm assuming, of course, a typical Albuquerque-type sunny day."

The path of 100 percent annularity in the US is a narrow one — only three to four miles wide. It runs from the Louisiana Gulf

Coast, across Atlanta, near Greensboro (NC), across the Chesapeake Bay, and then across the Eastern Shore.

Annular eclipses are not nearly as exciting to most people as are total eclipses, the cause of darkness, the stuff of myth and Grade-B movies. Total eclipses occur when the apparent size of the moon is larger than that of the sun. When the moon's apparent size is smaller — as in the May 30 event — a dazzling ring, or annulus, of sunlight remains visible. Nevertheless, the moon's disk will be so close to the sun's in size that some things normally seen at a total eclipse — Baily's beads, flash spectrum, shadow bands — may be glimpsed, at least by observers in the path of total annularity. "May" because the size similarities make this one "such a rare breed of eclipse that knowing what to expect is difficult," says *Sky & Telescope*. (See the Nov. 83 issue for explanations of the various phenomena.)

Q. In regard to the upcoming pay options for biweekly paid employees: will employees have some input about deductions over which they have control? Or will "analysts" automatically make these adjustments?

Many of us bought 12 US bonds per year when we were monthly paid. Many of us, for convenience purposes only, buy 13 US bonds per year now (one bond every two pay periods). Surely we will have the option of buying 2 (1 for each 2 semimonthly pay periods) again when we return to being semimonthly paid.

Many of us adjusted our Credit Union deductions to be in round numbers per pay period under the biweekly pay system. Surely we will be able to decide for ourselves (rather than having "analysts" do it for us) how much will be deducted per pay period for the Credit Union before the return to semimonthly or weekly pay system.

Why not enclose the necessary withholding cards for these things in the packet when we are asked to make our selection of pay options in September?

A. The rules to be used for conversion of deductions from biweekly to semimonthly and weekly will be worked out and announced in time for employees to assess the impact before the start of the new payrolls. Employees will then have an opportunity, as they always do, to change their deductions if they wish. Where appropriate, we do plan to automatically convert as many deductions as possible, but every effort will be made to assure that the conversion is accurate and that the employee's intent is retained. Bonds and Credit Union deductions are two that very likely will require some decision from employees.

P. M. Stanford — 100

If the exigencies of your task that day allow you the freedom to be outside, do watch the eclipse. If you use some common sense, it is not hazardous. As *Sky & Telescope* points out, "The dangers of looking at the partially eclipsed sun have been so widely misunderstood that, at recent events, people hearing dire warnings on the radio have even fled indoors to keep from looking at sunlit ground!"

Common sense should tell us not to look directly at the sun — even for a short time — whether there's an eclipse or not — with or without the commonly used eyeshields (dark sunglasses, welding goggles, smoked glass, etc.). "When you look at the sun, your eye's lens focuses the intense light on the retina, the delicate layer of cells at the back of the eye that sends visual images to your brain," says Gary Montague, Safety Engineering Division II 3442.

"The retina doesn't feel any pain, so you don't even know it's being burned. But it can be. And absolutely nothing can be done about it — there's no treatment for a burned retina, and it leaves you with permanent blind spots in the very center of your vision."

Watch the Eclipse—Safely

Although the damage the sun can do to your eyes is no greater during a partial eclipse than at any other time, the fact that there's less total light entering the eye during an eclipse means there's less compulsion to blink, so the image may remain on the retina longer.

To enjoy the eclipse and at the same time protect your vision, project the sun's image through a small hole (1 mm, say) in a piece of paper;

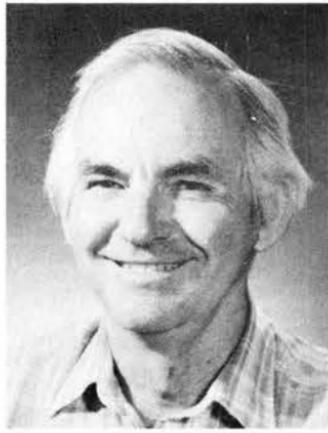
white cardboard is traditional, but an IBM card or a credit card on which your limit is overextended or even a LAB NEWS page will work as well. With your back to the sun, hold the paper so the sun shines through the hole and onto a flat surface — another sheet of paper, a sidewalk, a wall, etc. Adjust the image size and brightness by moving the paper farther from or closer to the flat surface. The image projected through the pinhole and onto the other surface is perfectly safe to look at.

For those few Sandians without immediate access to paper, Grover has a solution: "Make a loose fist and hold it in the sunlight so that the light passes through the 'tunnel' formed by your fingers. Constrict the 'tunnel' by tightening the fingers to form a kind of pinhole, then view the image by holding the palm of your other hand in the projected beam."

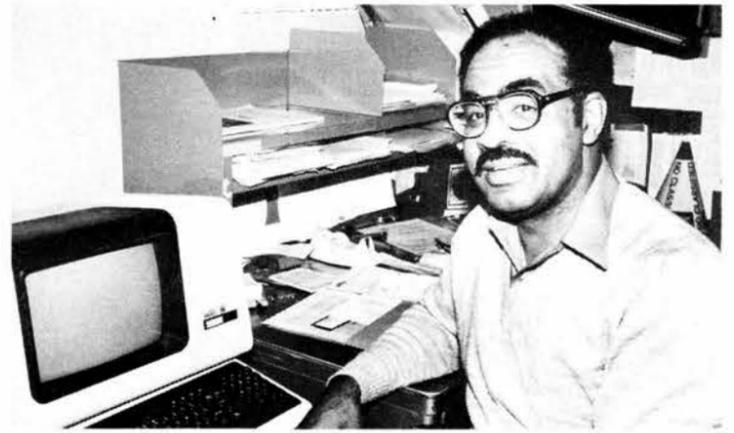
MILEPOSTS

LAB NEWS

MAY 1984



John Zimmerman (5172) 30



Jim Johnson (7125)

25



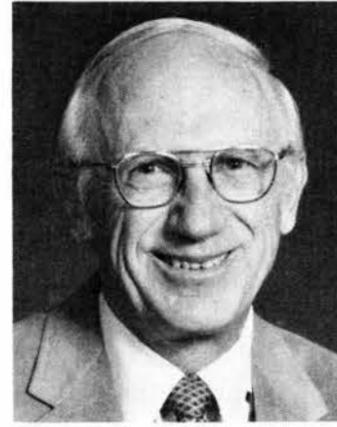
Rosie Jennings (7655)

15



Carol Verity (8426)

15



Von Madsen (8444)

25



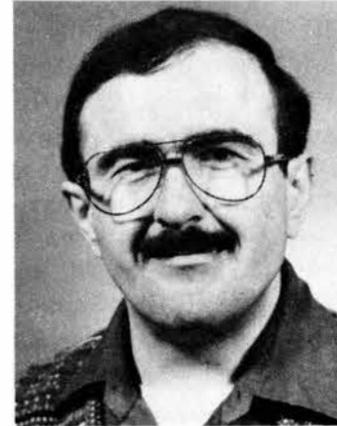
Mabel Hurley (3152)

10



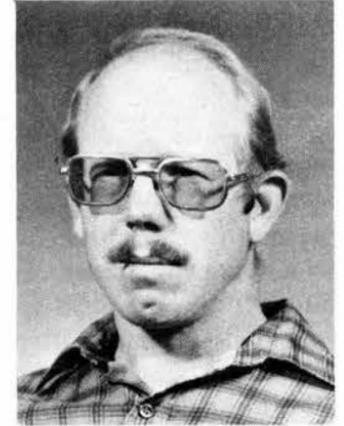
Bob Noble (8466)

30



Robert Miera (7632)

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Lucien Rice (2561)

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Mike Ford (6313)

20



John Dolce (8257)

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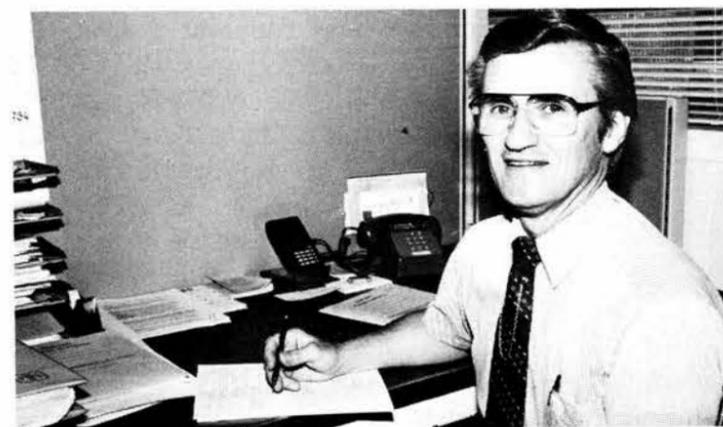
Arny Andrade (8466)

25



Ben Conklin (6452)

25



Geroge Perkins (132)

25



Bob Green (8362)

15



Bob Buxton (7252)

25



Howard Romme (143)

25

NEVER, OF COURSE, IN THE U.S.



Am I the only person whose spirits sank on reading that a Wolverhampton woman has designed a bicycle which is power-assisted? It has a battery-driven motor which fits over the rear wheel and is under the control of a twist grip on the handlebar.

The most depressing thing about it is that the bicycle, fitted with the motor, may be ridden by anyone over the age of 14 and no driving license or road tax or the wearing of a crash helmet is required. It is aimed, say reports, particularly at women riders and young

people. I have a different opinion about the likely targets.

The bicycle is capable of a top speed of 22 kilometres per hour. That is a fair speed for someone entirely unprotected to bash into an object or somebody else who also may be entirely unprotected. I have noticed not one whit of improvement in the behaviour of cyclists since I first began to see them as potential dangers whose arrogance is all too frequently on show. They are still riding among pedestrians, still travelling the wrong way in one-way streets and still apparently convinced that a car can stop from any speed in a dis-

tance of one metre. Power-assisted, they will be more frightening than ever, though at least they will make a noise, perhaps helping somebody on foot to dodge into a doorway.

I have seen propaganda films on television, adjuring motorists to watch their manoeuvres in case a cyclist gets injured. As far as I could determine, the dangerous manoeuvres and idiotic behaviour in these films come from the cyclists. Yes, there are seemingly insane, ill-mannered and boorish car drivers, and more of them. But their existence does not prove that there are no cyclists with similar characteristics. (New Scientist, March 15, 1984)

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RULES

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2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and DOE employees.
6. No commercial ads, please.
7. No more than two insertions of same ad.
8. Include name and organization.
9. Housing listed here for sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

BOOTS: Hondaline motorcycle, sz. 10, \$60; Western, sz. 8A, \$40; firescreen, black & brass w/2 andirons, \$50; bathroom cabinet, 5' w/formica top, sink & hardware, \$75. Crawford, 881-3812.

CEDAR fencing: 6' x 4", rounded points, some square posts & 2 x 4 risers. Collins, 292-0495.

SCUBA gear: Agua Master dbl. hose regulator, twin 38 & 44 cu. ft. tanks, belt & misc., all \$100; Singer Slant-O-Matic sewing machine, Queen Ann cabinet w/stool, \$225. Straub, 298-9270 after 5.

STARCRAFT tent-trailer, sleeps 6, lt. wt., many options, \$1900 OBO. Robles, 298-2456.

UNI-SYN flow meter for multiple carbs, \$20. Olsson, 821-8348.

QUEEN size bed, mattress, box springs & frame. Swahlan, 294-2126.

PORTABLE B & W 5" TV, operates on DC AC D batteries, never used—still in orig. container, \$53. Klecotka, 821-1466.

KEESHOND puppies. Finley, 281-2826.

COMPUTER printer, 110 CPS 5 x 7 dot matrix, w/manual, \$100. Lanes, 281-2369.

GARAGE sale: June 1-2, 1913 Kriss Pl. NE; bumper pool table, 1/4 size violin, portapot, toys, ski & tennis equip., women's clothing, etc. Wright, 296-7670.

EIGHT bathroom light fixtures, TP holder, towel bar, bathroom counter top w/2 sinks, toilet seat, etc., \$125 OBO. Johnston, 294-4575.

GE washer & dryer, \$100; GE refrig., \$250; twin bed, \$60; FP screen, \$75; sofa & loveseat, \$75; coffee table, \$25; 2 table lamps, \$35. Subramanian, 821-1705.

FLEXSTEEL sleeper sofa, \$50; 2 matching table lamps, \$25 ea.; child's saddle, \$75. James, 344-7854.

H-14 Heath computer serial printer & RS-232 cable, \$175; metal workbench, storage area, doors, wheels, brake locks, \$95. Whitehurst, 299-8265 after 5.

PALAMINO gelding, gentle, trained, manners. Crass, 281-3889.

CRAFTSMAN 20" Eager-1 solid state lawn mower. \$100; heat/sun lamp & base, \$15. DeLollis, 299-5384.

SET mag wheels w/tires, fit Dart, Duster, etc., \$200. Anderson, 292-5676.

CAMPER shell, SWB, lighted, 74" x 80" x 25 1/2" ht., \$160. Cordova, 268-6496 after 5.

PRINTER, Heathkit H-14, 165 cps, \$130. Mendel, 265-3840.

BELL helmets, size 7 & 7 1/4, \$25. Prior, 296-2930.

LAWN mower, elec., Sears, 3hp, twin blades, 18" cut, grass catcher, \$160; Coleman camp heater, used once, \$40. Kwak, 294-2524.

DINETTE table w/leaf, matte wood-grain formica, 6 high-back chairs, avocado vinyl, \$110; oriental rug, 6' x 9'. Belgian-made, brown/black on sand, \$150. Meyer, 292-8431.

RUGER pistol, 22 cal., extra magazine, \$125; Charter Arms revolver, 44 spec. cal., extra grips, \$135. Parks, 884-7475.

BEDROOM furniture: dressers, headboards, night stands (no mattresses), Williams, 298-8972.

DINETTE set: 36" x 60" table & 4 chairs, \$75; girl's bicycle, 20" Schwinn Spyder, \$65. Miyoshi, 821-9118.

KITCHENAID dishwasher racks, for KD series, \$25 for lower, \$15 for upper. Sherwood, 299-8146.

FREE Calico cat, 1 yr. old, spayed & declawed. Forsythe, 298-7395.

TAPPAN gas stove top, \$40; GE port. dishwasher, \$35; ice box, \$10; cabinets, 24w x 64L x 37h, \$50. Benton, 877-2473.

AKC Cocker Spaniel puppies, 1 red & 3 buff males, \$150 ea. Sharp, 243-1498.

PIMENTAL Guitars, rosewood, twins for \$2400 or one for \$1200. Luther, 293-4462.

HUNDREDS of books, records, misc.; huge TV antenna, couch, recliner, beds, tables, aquariums, bird cage, more; make reasonable offers. Blackledge, 294-6030.

FREEZER, "Carrier," upright, 14 cu. ft., \$75. Madden, 296-1082.

DOGS, free: Beagle, 2 yrs. old; 1/2 Beagle, 3 mos.; 1/2 Collie pups weaned in 4 weeks. Williams, 1-864-3617.

ELECTRONIC ORGAN, Univox, portable, 88 keys, \$950. Armijo, 344-7521.

PECAN dining table, Drexel, 6 chairs, \$500; nonworking 25" Quasar console TV. Harris, 299-4559.

KODAK Trimlite Instamatic 18 camera, uses C110 film, w/15 GE Flip Flash packs included, \$30. Hochrein, 299-5225.

PRINTER, NEC 8023a, serial/parallel interfaces, \$390. Montry, 821-3758.

TORO 21" rotary lawn mower w/side grass catcher, 3.5HP, \$85. Thompson, 294-5704.

BACKPACK, Jansport D5; bicycle, Schwinn Varsity, 20 1/2" frame; integrated amplifier, Kenwood KA-8100, 80 watts/channel. Ritchey, 268-7620.

CRAFTSMAN radial arm saw, 10" mounted on mobile table w/shop vacuum cleaner attached, many extras. Barr, 884-2193.

TRANSPORTATION

'81 BUICK Regal V6, 2-dr. coupe, VT, AI/Wh, TW, CC, high mileage,

NADA \$6400, asking \$5750. Roblyer, 266-3275.

'81 HONDA CX500, case savers, windshield, backrest, \$1400. Chiamonte, 292-4131.

'72 HONDA CL350, 12K orig. miles, adult owned & ridden, \$450 OBO. Thorn, 892-7944.

BASS boat, 15', 40hp motor, 20 hrs., w/many extras, \$3000. Green, 255-9678.

SAILBOAT & trailer, 17' O'Day day-sailer, many extras, \$3200. Maloney, 821-6661.

'82 BUICK Regal, 4-dr., AM-FM-cass. stereo, cruise control, tilt wheel, AC, PB, PS. Tilman, 892-9325.

'80 PINTO runabout, orange, AC, 32K miles, Book \$3K, sell \$2700. 6701 Gisele NE. Schowers, 822-8494.

'78 SUBARU 4 x 4 wagon, 4-spd., AC, \$2500; '71 Datsun pickup, \$1350. Roeschke, 298-0365.

'74 DATSUN B210, 4-spd., 1-yr.-old paint job, 2-yr.-old AM-FM-cass. stereo, \$750. Kyger, 299-6398.

'78 BUICK Opel, 2-dr., 4-cyl., 43K miles, new brakes, exhaust & battery, one owner, \$2500. Hesch, 299-1844.

'69 VW bug, steel radials, new seat covers. McHarney, 266-3639.

'58 CHEVROLET Belair, 4-dr., 283 auto., rebuilt engine. Silva, 881-4152 after 5.

'78 PONTIAC LeMans 4-dr. sedan, VS, PS, PB, AT, AM-FM, new tires, muffler & battery, \$2190. Wengert, 294-5373.

'78 HONDA 400cc twin, sport model, etc./kick start, windshield, \$700. Coalson, 298-0061.

'83 HONDA V65, 1100cc, \$3500. Lucero, 892-7750.

'72 FORD Pinto, 4-spd., luggage rack, maintained, orange, \$600. Spraggins, 266-6403.

'75 GOLDWING, windjammer, bags, best offer. Grasser, 292-3799 or 265-6178.

'73 DODGE pickup, 318 engine, newly rebuilt trans., W.B., \$800. Gatchell, 281-2561.

'79 DODGE Colt, 2-dr. hatchback, 40 mpg, radio, new tires, \$2400. Pryor, 344-2931.

'82 ISUZU pickup, dix., LB, 3/4 ton, AT, AC, PB, AM-FM, camper shell, carpeted. Chandler, 299-5389.

'78 MERCURY Marquis, 2-dr., new all season radials, tilt wheel, AC, cruise control, PS, PB, \$2500. Zdunek, 265-7226.

'80 HONDA XL185SL motorcycle, street legal, trail ready. Fisher, 881-8072.

BICYCLES: Centurion LeMans 12-spd., almost new, \$195; boy's 16" w/training wheels, recently tuned, \$15. Gregory, 821-1429.

HONDA 750, new: tires, shocks, oil cooler; 42K miles, rebuilt engine. Thompson, 884-4883.

'82 HONDA V45, Sabre, plex-fairing, rack, backrest, liquid-cooled, shaft drive, 3K miles, \$2750. Manzanaras, 298-1240.

'75 DATSUN 280Z, AM-FM-cass.; '80 Kawasaki KLX/250 Enduro, 380 miles. Drebing, 916 Chama NE, 266-6688 after 6.

'72 LTD, \$650. Smith, 299-5060.

'67 SCOUT 4-wd, V8, \$1200. Capps, 296-7774.

'73 VOLKSWAGEN bug, low miles.

Carroll, 294-0271.

BICYCLE, 3-spd., \$45. Turpin, 281-5933.

SKI boat, 16' Glassmaster w/115 Johnson, \$5500. Addy, 873-0405.

'74 CHEV 3/4 ton, Camper Special pickup, 108K miles, might consider trade for later model economical vehicle. Schubeck, 821-3133.

'62 CHEVY flatbed truck w/stake rack, 6-cyl., 4-spd., bed 12' long, 7.5' wide, \$1600; Honda 175 motorcycle, 2-cyl., \$400. Kane, 881-7672.

SAIL BOAT, Sunfish, 14' w/trailer, \$1000 Percival, 299-6606.

'81 MAZDA GLC hatchback, 5-spd., AC, AM-FM-cass. stereo, sunroof, 41K miles, \$4800. Harris, 299-6606.

'78 YAMAHA DT125, monoshock, \$450 OBO. Malm, 293-2127.

'65 CORVAIR Monza sport coupe, 4-spd., white, red interior, one owner. Wente, 299-5274.

'76 VW bug, low mileage, one owner, below book. Todd, 255-3111, 255-3161.

'78 HONDAMATIC Hawk 400cc motorcycle, 4K miles, adult ridden, kept in garage. Zucuskie, 881-4086.

'69 COUGAR 351, AT, PB, PS, AC, new radials, AM-FM-cass., \$2800 OBO. Keltner, 298-7888.

'81 KAWASAKI GPZ-550, 2500 miles, owner warranty. Ritchey, 268-7620.

'80 OLDS Cutlass Supreme, AC, PS, PB, tilt steering, AM-FM-cass., 29K miles, \$5900. Falacy, 293-2517.

'76 DODGE Aspen coupe, V8, AT, new paint, \$995. Barton, 268-7349.

'83 BUICK Park Avenue, 4-dr., deluxe equip., \$1000 below NADA book, \$13,500. Errett, 292-4885.

BICYCLE, men's 3-spd., Sears, 21" frame, caliper brakes, fenders, kick stand, chainguard, rat-trap pedals, new tires, \$50. Joseph, 299-6989.

REAL ESTATE

TWO wooded mountain lots in Sandias, 7 mi. from ski area, 20 min. to Lab, good solar, water, access, panoramic views, \$35K/acre. Cowgill, 298-1357.

NE heights, 3-bdr., 1 1/4 bath, lg. rms., landscaped, auto. sprinklers, dbl. garage, extras, 1500 sq. ft., \$79.5K, refinance. Straub, 298-9270 after 5.

7 1/4% assumable loan, 3-bdr., 2 bath, fp, landscaped, \$452 monthly pymt. Smith, 836-1676.

82 SCHULT MH, 14' x 68', 2-bdr., 2 bath, adult section 4-Hills Park. Arzigian, 298-0787.

2-BDR., 1 bath, block-stucco, lg. wall-ed back yard, SE hts. MacPherson, 293-1090.

NEW 2-bdr. adobe, 1 1/2 bath, 1 acre, Edgewood, will finance. Grammer, 242-1020.

'71 TOWN and Country MH, 14 x 70, 3-bdr., 2 bath, furnished, \$8995. Nogales, 268-8487.

1.71 ACRES in center of Moriarty, zoned commercial, bordered by Highways 41 & 66. Liston, St. Rt. Box 40, Tijeras NM, 281-3283.

'78 MH, 14 x 70, 2-bdr., 2 baths, front kitchen w/center cooking aisle, carport, covered deck, custom drapes, North Hills adult park. Rauch, 821-6992.

3-BDR., 1 1/4 bath, 10 mos. old, 1300 sq. ft., 2-car garage, landscaped, assumable low interest, \$58K. Lucero, 892-7750.

1700 SQ. FT. townhouse, 3-bdrs., 10.5% assumable, views, east of Tramway off Candelaria, possession Sept., close anytime, \$95,500. Schofield, 292-7220.

HOUSE in Rancho de Placitas, views west and mountains east, 2000 sq. ft., 4-bdr., 2 bath, low utility bills, good TV reception, \$95K. Nielson, 867-3968.

3-BDR. house, 1 1/4 baths, ceiling fans, 16 x 33 swimming pool, storage shed, wet bar. Moya, 293-7959.

ONE Acre, South Highway 217, view overlooking valley, wooded. Carroll, 294-0271.

CEDAR Crest, custom house, 3200 sq. ft., greenhouse, shop, forest park, water, views, .9 acre, fenced yard, 20 min. drive, \$169K. Eagan, 281-5696.

WANTED

GOLDEN Retriever athletic equipment, used tennis balls, etc.; large dog house. King, 298-2628.

COPY of *Spanish Grammar with Ease*, Jassey, used in Labs' Spanish classes. Shunney, 265-1620.

3/4 SIZE guitar suitable for child beginner. Johnston, 294-4574.

SOMEONE to share TLC, riding time, some expenses for use of my Appaloosa gelding stabled in North Valley James, 344-7854.

SHOP service manuals for 1980 Olds Cutlass. Coleman 884-5009.

CHILD'S swingset, preferably w/slide. Rodacy, 293-2668.

RESPONSIBLE teenager to supervise two girls, 12 & 7, weekdays at NE residence, need own transportation, \$40/wk. Jojola, 294-7354.

GOOD HOMES for good kids, high school foreign exchange students, many choices, various backgrounds. YFU. Wilson, 294-5501.

HARNESS/cart for pleasure driving horse. Turpin, 281-5933.

ROOMMATE or housesitting job, June 10 through Aug. 18. Urquhart, 524-1816.

TO RENT: Furnished 2 bdrm. houses or apts for visiting UNM law school profs — one June-July; one August to August 85 Occialino, 292-2297.

WORK WANTED

HS senior wants baby sitting & lt. housework, preferably full time. Switendick, 884-0153.

YARD WORK and odd jobs, estimates. Greg Cook 296-3064 or Per Lysne, 296-5037.

LAWN MOWING service, will cut, trim & haul off clippings, prefer NE or SE locations. Portlock, 299-3240.

SHARE-RIDE

DRIVE/passenger to share expenses on trip to NY or anywhere along the way, approx. June 30-July 21. Swahlan, 294-2126.

Coronado Club Activities

Grand Opening Swim Party Set Monday

THE ISLETA POOR BOYS, country and western favorites, are on the bandstand tonight playing the kind of music that makes Westerners ease into a TGIF euphoria that lasts all week. Happy Hour prices (very reasonable) are in effect from 4:30 until 8:30 when the music starts. Dining room hours are from 6 to 9 p.m. The special buffet tonight features carved roast beef at \$8.75, or you can select an entree from the Club's standard menu. Karen Edwards instructs free western dance lessons from 7:30 until 8:30.

MEMORIAL DAY on Monday will be a memorable party — grand opening time for the Coronado Club twin pools and patio area. Everyone's invited! No tickets required, no admission charge. The party starts with a concert by the Albuquerque Municipal Band under the patio gazebo from 11 a.m. until 1 p.m. Games and contests for all age groups are planned along with horseshoe and tennis tournaments. Lots of prizes will be given away. A beer truck selling mugs of the foamy stuff for 50 cents will be on line along with an outdoor bar. A luncheon buffet spread will feature assorted salads, sirloin steak, and barbeque beef along with hog dogs, hamburgers, fries, and all that stuff that kids like. At 2 p.m., a western group called Sage will take over the gazebo and play a stompin' kind of country music. Dancing is encouraged under the new permanent patio cover. All the ingredients are arranged. The only thing needed is you.

NEXT FRIDAY, June 1, sees freshwater Mississippi catfish featured as the Happy Hour buffet spread for \$5.75 or \$8.75 with soup and salad bar. Karen Edwards instructs free western dance lessons; Sage is on the bandstand from 8:30 until 12:30.

ON THURSDAYS, the Coronado Club continues to present the finest in fresh seafood. Dining room hours are 6 to 8:30. In the background, Jim Trost plays fine piano. Menu selections usually include halibut, sole, monkfish, shrimp, oysters or the best from the New England catch that week. Club manager Mitch Griffin knows about seafood. Call 265-6791 for reservations. (In June, the fresh seafood dining will be scheduled every other Thursday — on June 7 and 21.)

VARIETY NIGHT on Saturday, June 2, features a Walt Disney classic comedy, *The Apple Dumpling Gang Rides Again*, starring Don Knotts and Tim Conway. Super sandwiches are available at 5:30; the movie starts at 6:30. Admission is free to members and their families.

TRAVEL — On Monday, June 4, the Club has arranged a program on cruise ship



EVERYONE'S INVITED! The Coronado Club's annual swim season grand opening party starts at 11 a.m. Monday with a concert by the Albuquerque Municipal Band, moves on to fun and games (lots of prizes) for all age groups, takes time out for dancing to western group Sage, serves a luncheon buffet under the new patio cover, and generally offers something (including 50-cent beer) for everyone, and everyone's invited. Standing at left is Phyllis Padilla (3510), special events chairman, with Pat Conlon (7473), entertainment chairman. In front are Tom Lenz, recreation and pool manager, with Carol Plugge, lifeguard.

travel to the Caribbean, to the Mexican Riviera, to Alaska, and other exotic places. Films will be shown and agency reps will be on hand to answer questions. The program starts at 7, and admission is free.

Coronado Club travel packages available include: *Heart of the Canadian Rockies*, Aug. 3-11, round trip airfare to Calgary, motor coach tour and hotels at Calgary, Lake Louise, Moraine Lake, Emerald Lake, Columbia icefields, Jasper, Banff National Park, Calgary Westin, and Chateau Lake Louise, \$1405; *Bahamas*, departure in September, round trip airfare to the Caribbean island, seven nights at the Sheraton British Colonial Hotel, travel taxes, \$748; *Jamaica*, Nov. 4-11, roundtrip airfare, seven nights at the Rose Hall Beach Hotel in Montego Bay, daily breakfasts, travel taxes, \$675.

Today is the deadline to sign up for the Fiji/South Pacific tour, June 30-July 8, for \$825. For additional travel information, call Charlie or Betty Clendenin at 299-2071.

MEMBERSHIP CHAIRMAN Frank Biggs (7112) extends an invitation to any one who works on KAFB to come to a pool party on Sunday, June 10, starting at 11 a.m. Festivities include a swim suit fashion show, 50 cent beer, and door prize drawings — two \$50 gift certificates from Gardenswartz Sportz will be given away. It's part of a Club membership drive. San-

dia and DOE employees are eligible for full membership, others for associate memberships. Either way, annual dues are \$60, which must be paid in advance (or a payroll deduction card signed). Anyone who joins will receive four free drink tickets, a \$5 snack bar coupon, and \$5 off any season ticket for pool and patio.

ITEMS TO REMEMBER — If you are celebrating an anniversary or a birthday with dinner at the Club, tell your waitress — you will be presented with a free cake with a candle and we'll all sing, "for you're a jolly good member." Also — and this might be convenient — Mastercard and Visa are accepted by the Club for dining tabs of \$10 or more.

Here's some more good news: discounts on movie tickets to Commonwealth Theatres are now available to Club members at \$2.50 each. These are in addition to the discount tickets to General Cinema Theatres which have been available for a long time also at \$2.50 each. Pick them up and pay for them in advance at the Club office.

UPCOMING EVENTS — Gourmet Dining (Club 35), June 12; Kids' Pet Show, June 16; Father's Day Brunch, June 17; Financial Seminar, June 19; Luau, July 7.