Bill Brinkman Named VP, Research

Bill Brinkman, currently Director of the Physical Research Laboratory, AT&T Bell Laboratories, at Murray Hill, N.J., will become Vice President of Research 1000 on Aug. 1. He succeeds John Galt, who will become Vice President of Component Development 2000 with the retirement of Gene Reed.

Brinkman joined Bell Laboratories in 1966 and has worked on theories of condensed matter since that time. He became head of the Infrared Physics and Electronics Research Department in 1972, and in 1974 was named Director of the Chemical Physics Research Laboratory. He has been in his present position as Director of the Physical Research Laboratory since 1981. His work at Bell Labs has resulted in major contributions to the theoretical understanding of condensed matter.

He received his BS and PhD degrees from the University of Missouri. He spent one year as an NSF postdoctoral fellow at Oxford University before joining Bell Labs. Brinkman has served on a number of national committees including chairmanship of the National Academy of Sciences Physics Survey and its Solid State Sciences Committee. He and his wife Carol have two sons — 13-year-old Curt and 23-year-old David, a recent graduate of Boston University who currently works in New York. The Brinkmans have purchased a home in Glenwood Hills.

Bill Brinkman (1000)

LAB NEWS

VOL. 36 NO. 15 SANDIA NATIONAL LABORATORIES JULY 20, 1984

Beyond Barstow

CRTF Generating Salt Power

Electricity is now flowing into a New Mexico utility grid from the nation's newest solar central receiver system — the Molten Salt Electric Experiment (MSEE) — which has been incorporated into Sandia's Central Receiver Test Facility (CRTF).

The system, the only one of its kind in the U.S., uses solar-heated nitrate salt to generate steam that drives a turboelectric generator. Research indicates that molten salt (not common table salt, but 60 percent sodium nitrate and 40 percent potassium nitrate) is particularly well suited for use as the working fluid in solar central receivers because of its chemical stability, heat capacity, and lack of phase change (it does not boil in the receiver, as does water).

The MSEE has a thermal storage capacity of 6.5 million watt hours, enough to provide two hours of full electrical output without additional solar heating. "That storage capability should allow us to run at full capacity even during short-term transients like cloud banks and up to two hours after sunset," says Bill Delameter.

Bill, MSEE project engineer, is in Solar Components Division 8453; John Holmes of Solar Thermal Test Facility Division 6222 oversees the operation at the CRTF in Albuquerque.

During the summer, the MSEE is generating electricity on a regular basis as researchers work to characterize and optimize this advanced system. Electrical power produced by MSEE flows from the system into the Public Service Company of New Mexico power distribution grid on KAFB.

When operating at capacity, MSEE can generate 750 kilowatts of electricity, enough to satisfy the electrical needs of between 200 and 300 typical homes. To date, the system has typically been operated for just several hours a day as system checkout proceeds, producing about 650 kilowatts. As the summer continues, the team hopes to operate MSEE for as many hours as possible.

MSEE uses the molten salt to transfer solar heat to a water supply, thereby making steam to drive a turboelectric generator. The system consists of a molten salt solar receiver atop the CRTF's 200-foot-tall tower and salt storage tanks and molten salt steam generator at the base of the tower. Sunlight is focused onto the receiver from an array of heliostats (individually guided sun-tracking mirrors) north of the tower.

CRTF's 222 computer-controlled heliostats represent 88,000 square feet of reflecting surface, more than enough to cover one-and-a-half football fields. They aim energy, with an average concentration of about 250 suns, on the receiver where salt is heated to 1050°F. Pumps send this

(Continued on Page Three)

FROM THE BACKSIDE of the CRTF (Central Receiver Test Facility), several elements of the Molten Salt Electric Experiment are visible. At the top of the tower is the receiver, where molten salt is heated by the heliostat field (out of sight on the far side). The two tanks contain hot and cooled molten salt, the former ready for routing to the steam generator, the latter ready to be pumped back to the receiver. System can produce 750 kilowatts of electricity. Project engineer is Bill Delameter (8453, right); John Holmes (6222) is the on-site operations engineer.

Antojitos

Ah, Distinctly I Remember It was in the dry July 15 years ago tonight, a Sunday. I was acting in Tennessee Williams' play Orpheus Descending at the Adobe Theatre out in Corrales. Adobe's production was in danger of being upstaged, however, by the imminent descent of one Neil Armstrong from Apollo 11 to the surface of the moon, a live television drama it was most difficult to ignore. "The show must go on," I observed--when your argument is awkward, apply an aphorism. After all, my parents, sister, nephew, and niece had driven 600 miles to see their son/brother/uncle play the lead role in the steamy saga. We compromised by doing both. We planted a TV set on the stage, and the actors joined the audience in watching the historic event. There were plenty of seats--my family had to attend the play, but everyone else was home tethered to the TV. Long after curtain time, once we were all assured that Armstrong was safe, the show went on. But it was only a mundane, literally, performance; Armstrong's was a hard act to follow. Sandia didn't even try--the following day was declared a holiday.

●BH

* * *

Aunque la mona se vista de seda, mona se queda. (Even if the monkey dresses in silk, she's a monkey still.)

Happy Tenth!

71 Complete SSP

The Sandia Summer Science Program, in its 10th year, is a joint program with the Albuquerque Public Schools to further the interest of high school students in careers in engineering and science.

This summer, 31 Sandians served as volunteer instructors in the four-week program held at the Career Enrichment Center, and Manzano, Del Norte, and Bernalillo High Schools. Seventy-one students completed the program that included electronics, physics, computers/math, materials science, and energy resources.

When the course work was completed, students visited their Sandia instructors at their work sites. An awards luncheon was held at the Coronado Club where Dan Arvizu (6224) addressed the students. Ann Marie Griego (3511) is coordinator of the Summer Science Program.

volunteers in action

Here is a volunteer opportunity for employees, retirees, and family members. If you would like more information, call Karen Shane (4-3268).

NEW FUTURES SCHOOL'S PROJECT REDIRECTION assists pregnant teens and teen mothers to develop educational, economic, and personal self-sufficiency. "Community Women" volunteers are needed as positive role models for matching with a neighborhood teen. Training and a stipend for expenses will be provided.

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Editorial Offices in Albuquerque, 87185
Phone 505/844-1053 FTS 844-1053
In Livermore 415/422-2447 FTS 532-2447

BRUCE HAWKINSON, Editor
DON GRAHAM, Assistant Editor
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Member, International Association of Business Communicators

From USS Norfolk to NM Desert

(See Story Next Page)

Here's How It Works

The Molten Salt Electric Experiment (MSEE) uses a molten salt receiver that was designed and built by Martin Marietta. It is essentially a large box with a 9 x 9-foot opening on the side facing the heliostats. Sunlight concentrated by the heliostats enters the opening and strikes the receiver's 13 x 8-foot active surface — the inside back wall of the box. This surface consists of 288 Incoloy 800 tubes coated with a highly absorptive black paint. The receiver heats molten salt from 590°F to 1050°F at a rate of up to 97,000 pounds per hour.

Two storage tanks, also designed and built by Martin Marietta, are included in the MSEE system. The "hot" tank holds solar-heated salt from the receiver that will be routed to the steam generator. The "cold" tank is essentially a holding area for salt that has cooled after passing through the generator. Each holds up to 174,000 pounds of salt.

The 30-foot-tall, 10-foot-diameter hot tank uses technology previously applied to liquid natural gas tanks. It has corrugated Incoloy 800 liner and fire brick insulation, all inside a carbon steel shell. The liner is leak tight and corrosion resistant to protect the brick from the hot salt. It also is flexible enough to withstand thermal expansion during tank start-up and numerous pressure loading cycles (up to 50,000 in 30 years) during cyclic charge/discharge.

The cold tank (15 feet high with a 12-foot diameter) is similar, except that it does not require the internal insulation and liner because of its lower operating temperature — no greater than 600°F. "Although molten salt looks just like plain water, it 'freezes' — that is to say, it solidifies — at a relatively high temperature," says Bill Delameter (8453). "Therefore, we've included electric heaters in the cold tank to prevent the salt from cooling below 590°F during periods when the system is non-operational.

"Actually, the salt's freezing temperature is 430°F, but researchers believe salt should remain significantly hotter than that to eliminate any possibility of system clogging," Bill continues. "Some of those researchers, by the way, are Sandians. We probably know as much about molten salt as anyone in the country; we've done a lot of work toward understanding salts and their problems — containment, handling, that sort of thing. One good thing about salts, in addition to their efficiency in storing thermal energy, is that they pose no health hazards."

The system's steam generator, designed, built, and installed by Babcock & Wilcox, delivers 7800 pounds per hour of 940°F, 1050 psig steam at the turbine throttle. This permits the generator to produce 750 kWe, 450 V, 60-cycle three-phase power.

Primary steam generator components are an evaporator, steam drum, boiler recirculation pump, superheater, and attemperator. The evaporator and the superheater are U-tube, U-shell heat exchangers, with low-pressure molten salt on the shell side and high-pressure water and steam on the tube side. This configuration minimizes thermal stresses caused by differential expansion. Steam outlet temperature from the superheater is 1000°F; it is then cooled in the attemperator (by mixing with a small amount of saturated steam from the drum) to 940°F, the temperature required for turbine operation.

The turbine generator in the experiment was previously installed on a Navy submarine, the *USS Norfolk*. "We located it unexpectedly," says Bill. "But it proved to be ideally suited to the experiment because of its size rating and utility quality steam conditions."

SANDIA LIVERMORE NEWS

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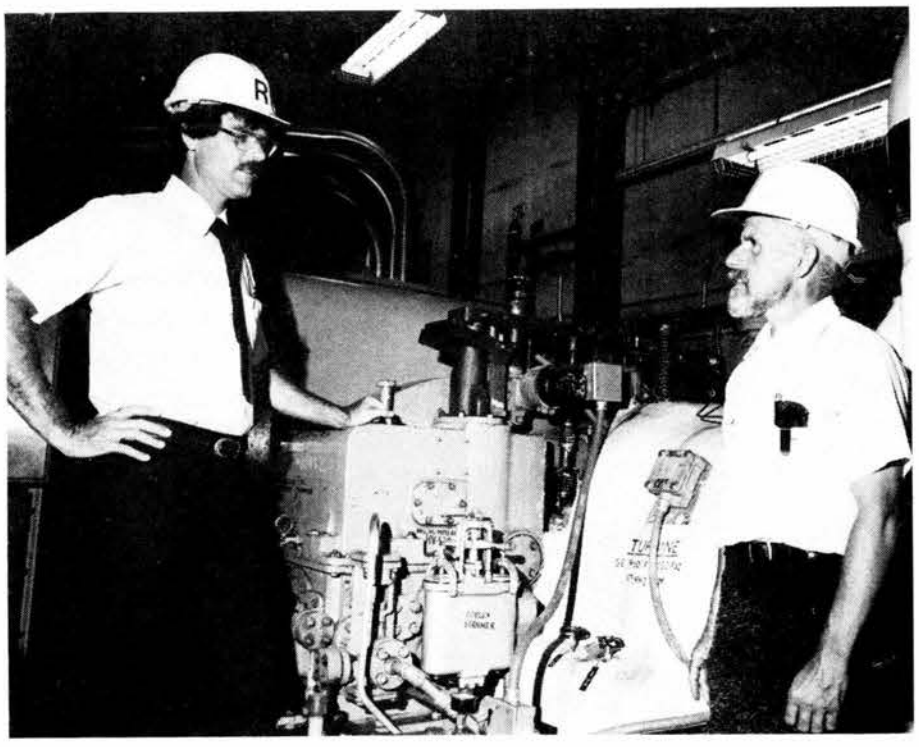


FROM A NAVY SUBMARINE, the *USS Norfolk*, came this turbine generator, which now resides inside the CRTF tower (in the basement 220 feet below the receiver at the top). It now converts the steam created by heating water with molten salt into electricity. Bill Delameter and John Holmes were among the Sandians who located and procured the generator from the Navy. "Right size, right price," says Bill.

Continued from Page One

CRTF Generating Salt Power

molten salt to a steam generator or to a storage tank for later transmission to the generator. The resulting steam then drives a turboelectric generator. After passing through the steam generator and giving up much of its heat, the system's salt flows to another storage tank and eventually is pumped back to the receiver for reheating by the sun.

The MSEE represents a second generation in CRTF technology. The first generation, also managed by Sandia Livermore, is Solar One (near Barstow), a central receiver facility that uses water in its solar receiver. It has been generating 10 megawatts of electricity for the past two years. Many of Solar One's components were proof-tested at the CRTF during the late 1970s.

This summer, researchers are characterizing and optimizing MSEE performance. This involves operating the system under a wide range of conditions — different salt flows and different solar input conditions and through transients such as cloud passage, morning start-up, and evening shutdown.

The Sandians will determine how many hours a day the system can operate efficiently. They will also begin to get an idea about the system's long-term reliability and how much electricity it could realistically be expected to produce during a year.

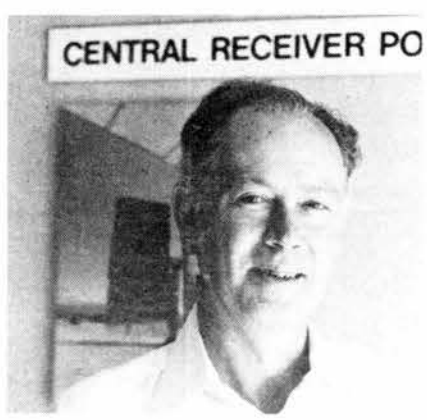
Later this year, several teams of utility and industry engineers and technicians will each spend several weeks at Sandia to become more familiar with solar central receiver technology in general, and to get hands-on operating experience at the MSEE.

The teams of utility and industry engineers and technicians will begin arriving in late August. During their visits they will actually operate the system — which utilizes digital controls rather than the analog controls that are familiar to utility operators.

"We're pleased that industry is taking an active role in the MSEE program," says Bill. "On the one hand, it's good experience for those folks. But it's also a great opportunity for us to get their reactions to a totally new concept in power generation; the feedback we get from them should be extremely valuable in scaling up this pilot plant to a commercial-size system, one of, say 50 megawatts."

Sandia is technical manager for the $5 million MSEE, which is jointly funded by the DOE, a group of utility and industry participants, and the Electric Power Research Institute (EPRI), a research and development arm of the electric power industry. Roughly 50 percent of the funds for the project come from DOE, 25 percent from industry, and 25 percent from utility companies.

Besides DOE and EPRI, participants include Arizona Public Service Co., the Arizona Solar Energy Commission, Babcock & Wilcox, Black & Veatch Engineers-Architects, Foster Wheeler, Martin Marietta, McDonnell Douglas, Olin Corporation, Pacific Gas & Electric Co., Public Service Co. of New Mexico, and Southern California Edison.



RETIRING

Tom Brumleve - 8453

Supervisory Appointment

STEVE BINKLEY to supervisor of Scientific Computing Division 8233, effective June 18.

He joined Sandia at Livermore in 1980 after working as a research associate in theoretical chemistry at Carnegie-Mellon University in Pennsylvania. He has been in Theoretical Division 8341 since his arrival at Sandia four years ago. During this period, he has applied theoretical chemistry methods to problems in explosive chemistry, silicon chemical vapor deposition, and combustion chemistry.

Steve earned his bachelor's degree at Elizabethtown College in Pennsylvania and a PhD in chemistry from Carnegie-Mellon.

He and his wife Sharon reside in Livermore. Steve is a member of the American Chemical Society. He enjoys classical music and horseback riding.

Take Note

Larry Hoffa (8271) shot a 64 to claim first place in the recent Sky West Tournament attended by the Sandia Employees Golf Club. This was a qualifying match for the 2nd Annual Associate Club 4-Man Team that will be held at Rancho Murrieta Aug. 9-10. Ben Odegard (8316) and John Brooks (8314) took second place with 67. Third place went to Tabo Hisaoka (8274) with a 68. The club's next event is a Match Play Elimination Tournament in Walnut Creek on July 7.

* * *

Saturday, July 28 is Sandia Off Shore Fishing Club's next outing. This rockfish trip will depart Monterey and go to Point Sur if the weather permits. Four other rockfish trips are planned for the remainder of this year. Call Larry Humphreys (8111) to make your reservations.

* * *

Some of the Directorate Challenge race results reported in the last issue of the LAB NEWS were incorrect. In the women's division, third place finisher was Karen Meyers (8424) with a time of 8:35; fourth place went to Susan George (8153) with a 10:24 time; and fifth place was won by Joan Funkhouser (8272) with a 10:38 time for the 1.2 mile course.

Sympathy

To Moe Hauk (8161) on the death of his brother in Longmont, Colo., May 28.

To Barbara Combs (8361) on the death of her mother in San Francisco, June 6.

To Dick Wilhite (8254) on the death of his father in Idaho Falls, Idaho, July 1.

Mobility, Communications for Handicapped Friend

Wheelchair Responds To Voice Commands

Recent developments in large scale integrated circuits and computers have made possible many things that were quite impossible only a few years ago: computer recognition of human speech, for example.

Paul Hofstadler (2112) was among the first to make practical use of this computer capability. He designed a voice-controlled wheelchair for his friend Hayden Dillon.

Hayden, 35, was born with muscular dystrophy. He is quadriplegic with only very limited use of one thumb, which he can gently rub against the index finger.

According to Paul, "It all started about two years ago. Hayden wanted me to make him a telephone he could answer." Paul attached wires with Velcro to Hayden's thumb so he could pick up the receiver and provided a headset for sending and receiving messages. Hayden could answer the telephone, but he couldn't place calls.

Even so, he's able to help his father, Bob. Bob spends full time taking care of both Hayden and Hayden's mother, Alice, who is paralyzed on one side, the result of a stroke about two years ago.

The Dillons subscribe to a service whereby a nurse calls every day at 3 p.m. If no one answers the telephone, the nurse sends an ambulance to the Dillon home.

But more important than the ability to answer the phone was mobility. Hayden's disabilities made both touch and "sip'n'puff" wheelchair controls inadequate. Once voice actuation, via a spectrum analyzer became available, Paul had a way to build the voice-activated wheelchair Hayden needed.

First is a headset, which clips to Hayden's glasses and won't fall off. The headset has a speaker that fits in his ear and a microphone that comes to the front of his mouth to allow him to control his wheelchair.

The computer now understands 18 different commands that enable Hayden to move forward, backward, stop, and turn. With a voice command, Hayden can also control a fan that cools the computer. And he can turn off the speaker, which beeps when he changes modes from maneuvering to traveling, if the noise is inconvenient.

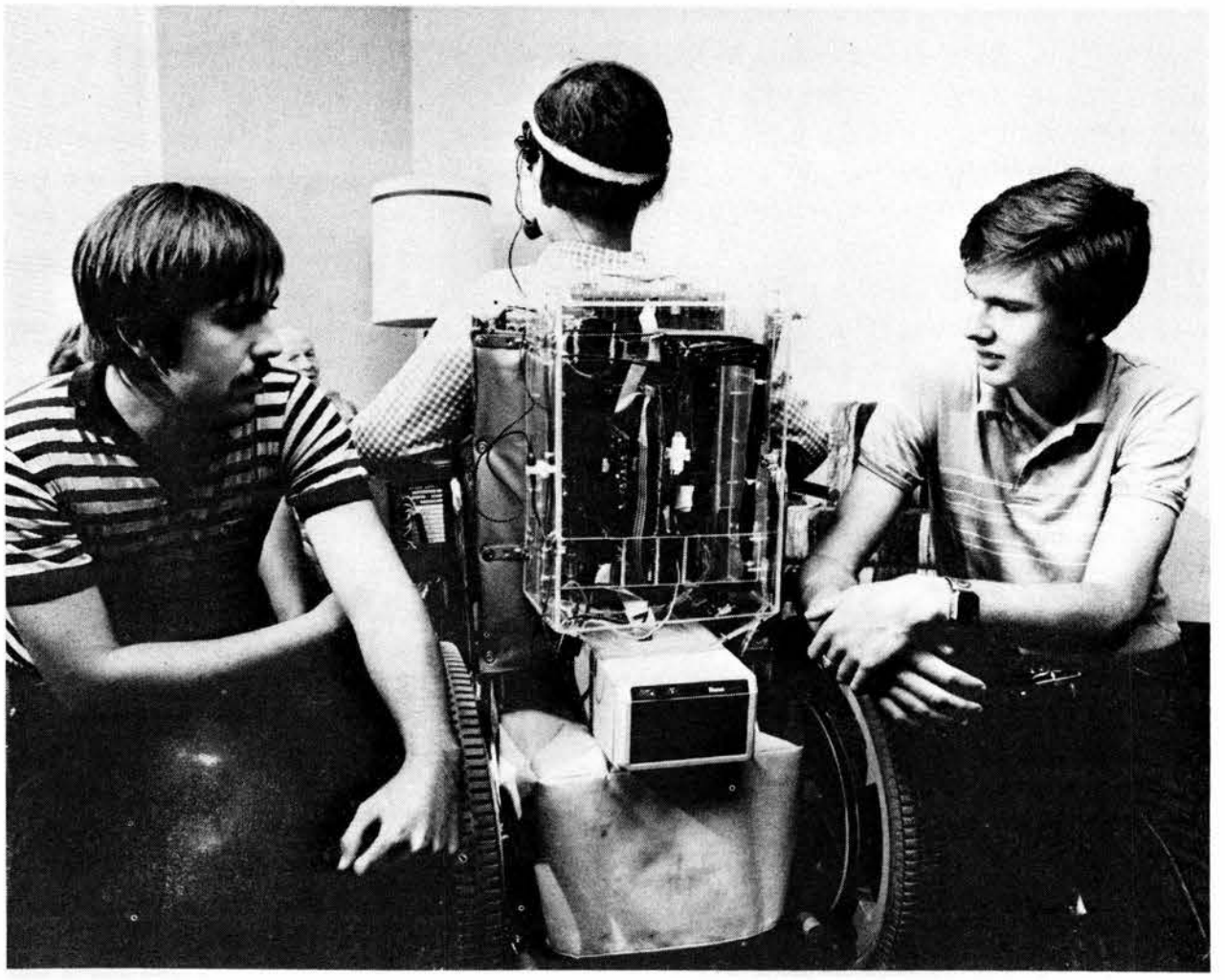
The computer could understand 80 commands and, with the proper programming, even more in mulitples of 80.

It took Hayden two weeks, practicing day and night, to learn to use his wheelchair. He also had to learn some basic manners.

"It took a week to teach him it's polite to look at someone when you talk to them," Paul says. "He's never been able to do that before."

After Hayden started using the chair, Paul had a few bugs to work out. Paul modified it so that the computer won't accept any more commands once Hayden says, "Stop." It won't respond again until Hayden says, "Activate."

These commands grew out of necessity. One evening, Hayden was sitting at the dinner table and mentioned the word "go" in the course of his conversation. He went, all right — and tipped the table over.



VOICE-ACTIVATED WHEELCHAIR designer Paul Hofstadler (2112; right) looks over the Apple computer and spectrum analyzer he mounted on the back of his friend Hayden Dillon's wheelchair. His friend Steve Schultheis (left) designed the box that houses the computer. Since this photo was taken, Hayden no longer needs to wear a headband. Paul has designed a headphone and earphone that clip onto Hayden's glasses.

The computer has also been "trained" not to listen to anyone's voice but Hayden's.

"The components involved in the development of the prototype model cost Hayden about $5000 including the wheelchair," says Paul. "The hardware consists of an Everest and Jennings Model 34 wheelchair and a computer system that not only interprets the voice of the user, but also actually drives the wheelchair."

The system consists of an Apple computer, a voice processing module, an input/output isolation module, a mass storage device (disk drive), and a power supply that allows the computer to operate from the wheelchair's battery. The computer is mounted behind the back of the chair.

The battery is a big one with a capacity of 255 ampere hours (a car battery has a capacity of 40). Hayden's father plugs the battery in a wall socket each night to recharge it.

Steve Schultheis (son of Thomas Schultheis, 7634) assisted Paul with the design of the computer's box. Because Hayden can go outside in his wheelchair, the box is necessary to protect the computer from a rainstorm, for example. Steve designed a box that is both water resistant and convection cooled.

Steve and Paul were classmates at Del Norte High School. Steve just earned a BS in ME from NMSU. Paul graduated from UNM this spring with an EE degree; he is here this summer participating in the Special Microelectronics Master's Program and will attend graduate school at either the University of Arizona or Purdue University this fall.

Paul says, "This is more than just a voice wheelchair. Once you have someone communicating with a computer, it enables him to do lots of other things.

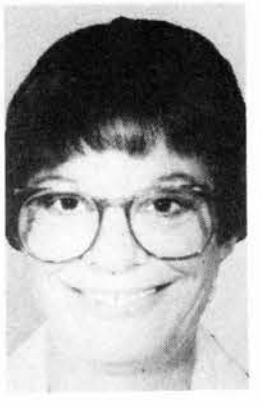
"Hayden can use all of the facilities of an Apple: drive a word processor or a printer and communicate with other computers like CompuServe and The Source."

Now Hayden can play video games with his Apple's monitor. He could also use a word processor if he had a printer.

Before Paul leaves for graduate school in late July or early August, he plans to install a voice-activated telephone (so Hayden can make calls) and possibly a remote-control TV device.

"When we get the whole system together," Paul says, "it'll be more of an environmental interface than just a wheelchair. The computer will never be overtaxed as far as I can see. The problem now is what to do with it.

"The wheelchair is nice, but it's not as important as all the other capabilities that are possible."



Death

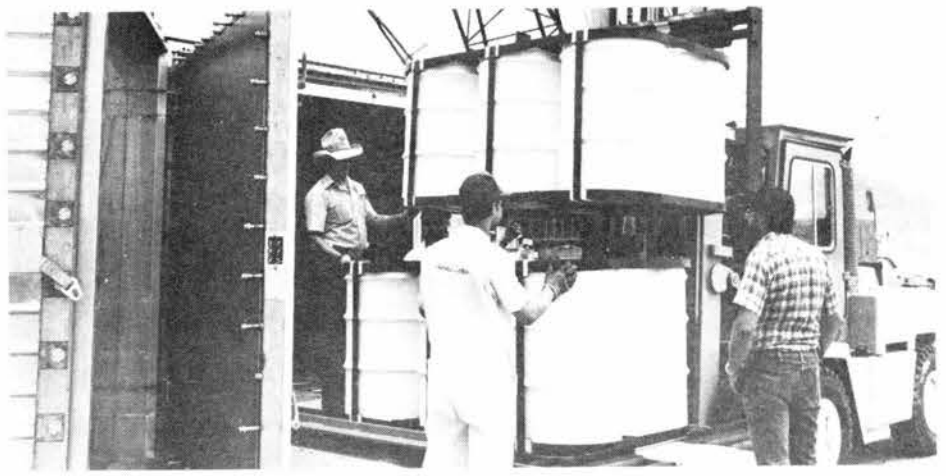
Nan Bragg, secretary to Division 6442, died June 29 after a brief illness. She was 50.

She had worked at the Labs since April 1982.

Survivors include a son and two daughters.

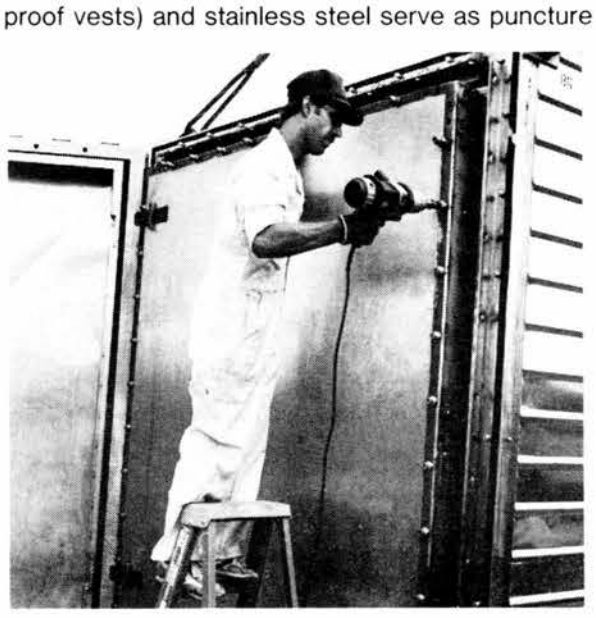
TRUPACT (TRansUranic PACkage Transporter) was designed for shipping defense nuclear wastes to storage sites or repositories such as WIPP (Waste Isolation Pilot Plant). Units would be carried by semi-trailer rigs or flatbed railcars.

WITH EASE, Marilyn Warrant (6322) rolls a pair of six-packs into a TRUPACT. She and B.J. Joseph were in charge of a handling demonstration at Sandia last week.



"SIX-PACKS" of 55-gallon steel drums will hold the nuclear wastes. Each TRUPACT can transport six six-packs, about 17,000 pounds. From left, B. J. Joseph, Dave Bronowski, and Ed Baynes (all 6323) stack the six-packs for insertion into a TRUPACT.

LEAK TEST PORT on inner door seal is checked by TRUPACT Project Leader Vern Romesberg (6322). Outer door behind him has same construction as the outer steel box — a steel tube framework covered on the outer surface with stainless steel sheet. Inside the frame, layers of Kevlar (like that used in bullet-proof vests) and stainless steel serve as puncture shields.



BOLTING the inner door is Dave Bronowski. Each TRUPACT is a steel box within a steel box with eight inches of rigid plastic foam, which serves as shock absorber and thermal barrier, separating the boxes.

TRUPACT

To ensure that transuranic waste materials will reach their destinations without releasing any radioactivity even if they're involved in severe traffic accidents, the DOE asked Sandia and its subcontractors to design, develop, manufacture, and test a means to transport such waste materials safely. The result is TRUPACT (TRansUranic PACkage Transporter).

It's 25 x 8 x 9 feet and weighs about 33,000 pounds. It can carry some 17,000 pounds of transuranic waste materials—paper filters, rags, protective clothing, tools, and the like that are contaminated by small amounts of plutonium.

The box within a box construction is designed to withstand severe accident conditions—a 30-foot drop onto a flat, unyielding surface; a 40-inch free fall onto a steel pin six inches in diameter; and a 30-minute exposure to fire at a minimum temperature of 1475° F.

Next stop for the TRUPACT unit shown here is Oak Ridge National Lab for the drop and puncture tests. The unit will be returned to Sandia for the fire test next month.

Transportation Systems Technology and Analysis Division 6322, supervised by Bill Wowak, and Transport Systems Development and Testing Division 6323, supervised by George Allen, Jr., provided most of the Sandia people involved in TRUPACT design and development.

Used In Lightning Arrestors

New Glass Seals to Aluminum

For the first time, glass hermetic seals for electrical connections have been made to aluminum. A hermetic aluminum electrical connector has been developed that is smaller, lighter, and easier to make than comparable stainless steel connectors.

Silicate glasses, commonly used to seal stainless steel connector shells to electrical contacts, cannot be used with aluminum because their sealing temperature is higher than aluminum's melting temperature (660°C). To overcome this problem, Jim Wilder of Ceramics Development Division 1845 developed a low-melting-point, phosphate-rich glass. This glass joins copper or stainless steel contacts to an aluminum connector shell with high reliability. A hermetic seal is assured because the glass chemically bonds to both the contact and the shell. The glass was characterized by Saundra Monroe (1845) and produced by the Glass Formulation and Fabrication Section 7472-3.

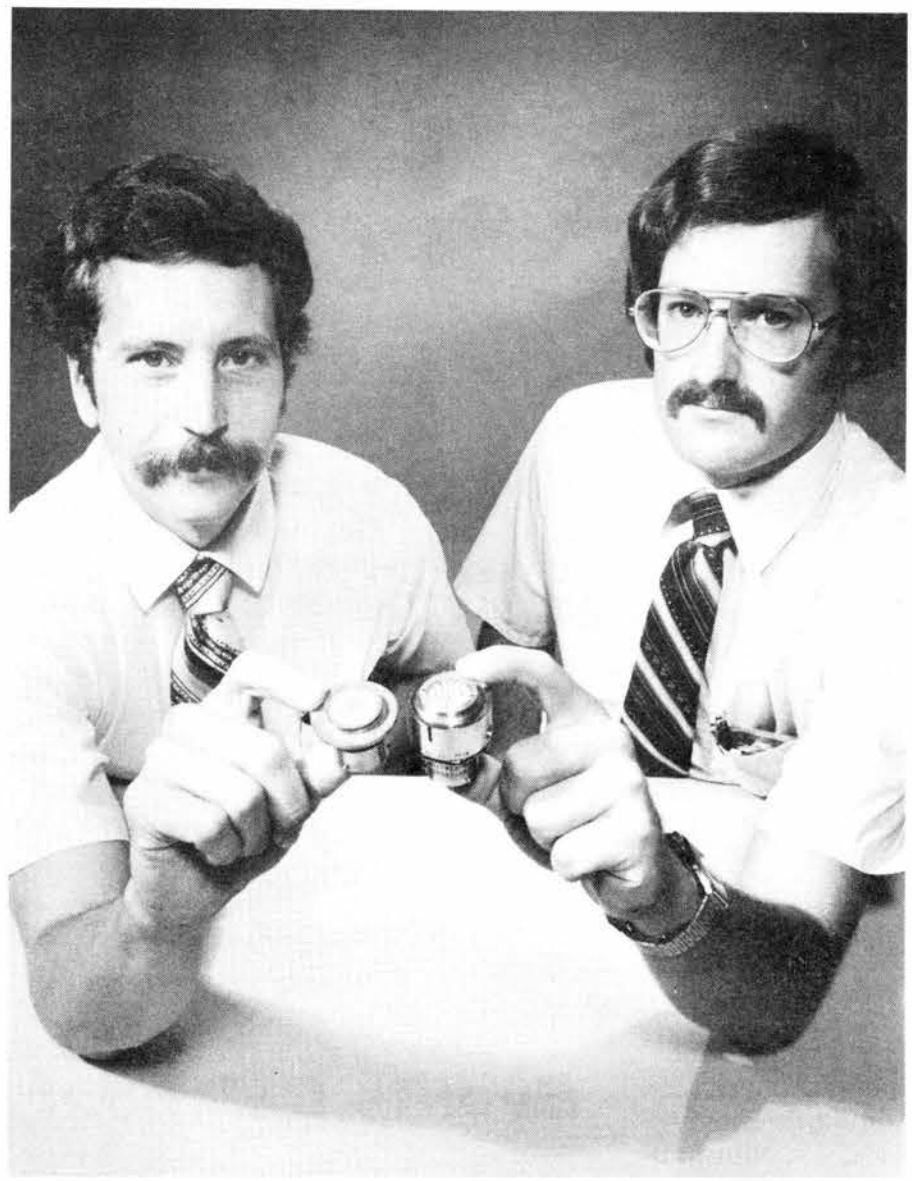
Prime concerns in the development effort were to match the coefficient of expansion of the glass to that of the contact material and to make that coefficient slightly less than that of the aluminum shell. It thus provides compression at the interface to the shell, which creates mechanical backup for the bonding. The aluminum shell material has a slightly higher coefficient of expansion than that of the glass. In the case of an aluminum shell, the contact materials can be copper or stainless steel.

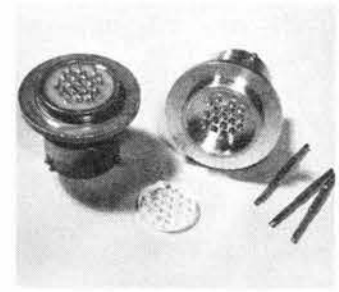
The phosphate glass has been extensively tested in single-pin seals as well as in a multi-pin simplified shell geometry. It is still undergoing long-term tests — temperature cycle, mechanical shock, random vibration, chemical durability (elevated temperature and humidity) and pin pull evaluation.

"Before this develoment there was no practical way of sealing glass to aluminum," says Larry Andrews of Interconnections Division 2154. "But with the phosphate glass we were able to look at the possibility of designing an aluminum lightning arrestor connector (LAC) for weapons applications as well as for aluminum hermetics in general. We selected the aluminum LAC as the demonstration vehicle for aluminum hermetic seals because, among all our connectors, it has some of the most stringent technical requirements. After a few tests comparing an aluminum version with an existing stainless steel connector, we found that several big improvements over previous designs were possible.

"The first very attractive feature was a reduction in weight; the second was reduction of the overall volume of the LAC.

"We also hope to cut the cost by a factor of two, because with aluminum it's possible to use an impact extrusion process instead of matching from bar stock, the process that's used with stainless steel. The area in which there may be an increase in cost for aluminum connector processing would be in surface finish. The aluminum would be plated with cadmium over nickel for extra corrosion resistance. However, the cost of plating would be offset by the elimination of the electropolish step that is required by the stainless steel shells."





LAC DEVELOPMENT is illustrated by Jim Wilder (1845) and Larry Andrews (2154). Jim is displaying an aluminum LAC made possible with his development of new phosphate-rich glass that can be hermetically sealed to aluminum. It is also about half the volume and one-fifth the weight of the older stainless steel LAC Larry holds. Photo at top shows a finished aluminum LAC, an aluminum case, three connector pins, and the glass preform. The unit is assembled in a jig and fired for one hour at 425° C.

Sandia's LAC uses a standard length electrical connector shell, such as the Bendix LJT (Long Junior TriLock). Its purpose is to protect components from lightning damage by shunting high currents to ground. This occurs when the gas-filled gap between the contacts and the connector shell is subjected to enough voltage to break down the normally insulative gas and provide a path to ground. Controlling the gap with a ceramic varistor material — also developed at Sandia — permits more precise determination of the voltage at which breakdown occurs. (A varistor is a voltage-dependent resistor in which resistance decreases as the applied voltage increases. The varistor turn-on voltage is determined by the material composition and by its processing.)

"As a proof of concept, mock-up aluminum LACs were tested with a 200,000 ampere simulated lightning pulse," Larry continues. "Samples from each lot are also subjected to a 20,000 ampere simulated lightning test as a part of acceptance testing. This consists of three successive pulses of 20,000 amperes, peaking at 35-millisecond intervals. So far, all of the aluminum LACs have withstood this testing."

In a comparison with a stainless steel LAC with similar specifications, the weight was reduced from 195 grams to 40 grams; and volume was cut nearly in half when the expansion chamber was eliminated from the design — tests showed it was not needed to accommodate the expanding gases generated during breakdown.

"Though connectors of this type are not yet commercially available, considerable interest has been expressed by the private sector," Larry continues. "They are thinking of a general hermetic line using aluminum, separately from the lightning application. It seems that industry has been looking for a connector of this kind for some time."

Lightning Arrestor Design

Electronic components within weapon systems must be protected from high-voltage transients caused by external sources like lightning. The key to the aluminum lightning arrestor connector design is the ability to seal the contacts (made of 321 stainless steel) into the shell (made of 6061 aluminum) with a single glass preform that contains holes corresponding to the contacts. The phosphate glass chemically bonds to the oxidized contacts and the anodized aluminum shells or nickel-plated parts.

Conventional LACs operate through the electrical breakdown of gas-filled gaps. When a high-voltage transient appears, the gaps quickly go from an insulating to a conducting state and shunt the transient from the connector pins to the connector shell and ground.

Supervisory Appointments

LEE ELLIS to supervisor of Purchasing Division B 3713, effective June 18.

Lee has been with the purchasing organization since coming to Sandia in June 1979. He received his BS in history and political science and his MBA in marketing, both from UNM. Lee is a member of the National Contract Management Association. He enjoys reading, photography, music, and singing with his church choir. Lee and his wife Sharon (a former Sandian) have a two-year-old son. They live in Rio Rancho.

* * *

FRANK ROSS to supervisor of Flight and Lab Test Development Division II 7262, effective July 1.

Since joining the Labs in 1957, Frank has worked in production tester design, system test equipment design and, most recently, with his current department—Quality-Assurance Engineering and Evaluation Department 7260.

He received his BS in EE from Oklahoma State University. Golfing is his favorite off-the-job interest. Frank and his wife Dolores have six children, with two still at home, and two grandchildren. They live in the NE heights.

* * *

JIM HENDERSON to supervisor of Flight and Lab Test Development Division I 7261, effective July 1.

Jim joined the Labs in 1976 in the components and systems reliability division. For the past five years he has served as QA Coordinator for the energy programs directorate and, more recently, for the energy programs vice presidency, Organization 6000. Before coming to Sandia, he was QA and Reliability manager for Gulton Industries, Inc.

Jim received his BS and MS from UNM. He enjoys running and church activities. He and his wife Gay have three sons — the oldest a senior at New Mexico Tech. They live in the NE heights.

* * *

GARY BEELER to manager of Electromechanical Subsystems Department 2540, effective July 1.

Gary joined the Labs at Livermore in 1964 as a staff member in the advanced component development division. He then worked as project engineer on the W71 Spartan program and with the advanced devlopment systems group. Gary was promoted in 1974 to supervisor of a mechanical design division working on the B77 project. He later headed the group working on the W82 Phase III and, since 1979, has headed the B83 Mechanical Division 8152.

He received his BS and MS in ME from the University of Washington (Seattle). He enjoys camping and skiing. Gary and his wife Tamra have two sons and are looking for a home to purchase in Albuquerque.

***

JIM BAREMORE to manager of Safeguards Application Department 5210, effective June 18.

Jim joined the Labs in 1963 as a member of the Technical Development Program. He received his BS in EE from the University of Missouri and his MS in EE from UNM.

Seated (from left): GARY BEELER (2540), JIM BAREMORE (5210), and MIKE ORRELL (7655). Standing (from left): LEE ELLIS (3713), FRANK ROSS (7262), and JIM HENDERSON (7261).

From left: ART AHR (7626), KEITH MATZEN (1273), BRUCE MILLER (1270), and DAVE RYERSON (5144).

He left Sandia in 1965 to attend the University of Missouri where he received his PhD in EE in 1968. He then served as a Captain in the Army Signal Corps and, after completing a year in Vietnam, returned to Sandia in the fall of 1970. Jim was promoted in June 1972 to supervisor of the Electronic Timer Development Division and worked on weapon components. Since 1979 he has worked in the Safeguards Directorate on several different projects; he recently returned from a nine-month assignment to Washington, D.C., where he was involved in a Special Communication Study for the Defense Communications Agency.

Jim enjoys jogging, amateur radio, and some sports; he is currently involved in the construction of his new home in the NE heights.

* * *

MIKE ORRELL to supervisor of Project Design Definition Division IV 7655, effective May 11.

Mike joined Sandia in March 1980 in the plant engineering building and facilities design group. Since, 1981, he has been with the Switching Devices Division 2545.

Mike received his BS in ME from UNM, an MS in industrial engineering from Texas A&M, and an MS in ME from UNM. He enjoys gardening and golf. Mike and his wife Debie have two sons and a daughter. They live in NE Albuquerque.

* * *

ART AHR to supervisor of Product Data Operations Division 7626, effective May 11.

Art first joined Sandia in May 1957 in the personnel department at Livermore. He transferred to Albuquerque the following year and served as the Livermore coordinator in the personnel organization. Art later worked in the print shop and in weapons program administration. He left the Labs and worked for EG&G in Las Vegas from 1963-67. When he returned to Sandia, he worked in a programming division in the computing organization. Since 1975, Art has been with Office Systems Division 2613, where he worked on the development of a phototypesetter.

Art received a BBA from UNM and an MA in business administration from Highlands University. He enjoys hiking and fishing. Art and his wife Patricia (3661) have six children and one grandchild. They live in the NE heights.

* * *

KEITH MATZEN to supervisor of X-ray Laser Physics Division 1283, effective July 1.

Keith joined Sandia in 1974 in the laser theory division. Since 1980 until his present promotion, Keith has been working on the general physics of the theory of target interactions and z-pinch plasma implosions in Division 1265.

He received a BS in physics and chemistry from Hastings College (Neb.) and a PhD in kinetic theory from Iowa State University. He is a member of the American Physical Society. Keith enjoys bicycling and tennis. He and his wife Terri have two children and live in the SE heights.

***

BRUCE MILLER to manager of Directed Energy Research Department 1270, effective June 18.

Bruce became a member of the technical staff at Sandia in 1977, working on pulsed energy programs, primarily on charged particle beam transport and accelerator design. He was promoted to supervisor of High Energy Beam Physics Division 1272 in July 1981. Before joining Sandia, he was a Captain in the Air Force at Kirtland's Weapons Lab.

He received a BS in engineering physics and an MS and PhD in nuclear engineering, all from Ohio State University. He enjoys skiing and tennis, and he plays trumpet and valve trombone in a couple of musical groups. He also works with Little League baseball and basketball. Bruce and his wife Cindy have two children and live in the NE heights.

* * *

DAVE RYERSON to supervisor of Telemetry Technology Development Division 5144, effective June 18.

Since joining Sandia in 1965 as a member of the Technical Development Program, Dave has worked in the nuclear readiness program, making many flights in the NC-135 aircraft; worked with the off-shore instrumentation group; and, since 1981, has worked with telemetry development in the Instrumentation Development Division 5146.

He received his BS in EE from Iowa State and his MS in EE from UNM. Dave is a member of IEEE. He enjoys camping and model railroading. Dave and his wife Marilyn have three children and live in the NE heights.

Retiree Deaths

(April-June 1984)

Orrin Caudill (68)	April 5
Oakley Belden (78)	April 9
Carlos Baca (74)	April 5
Joseph Tilley (73)	April 16
Earl Shannon (77)	May 1
Melody Laffoon (71)	May 1
James Sanchez (66)	May 7
John Anderson (64)	May 20
James Southall (78)	May 23
Gabriel Beatrice (77)	June 10
Samuel Smith (77)	June 15
C.M. Gueldenzoph (86)	June 30

Events Calendar

July 20-22, 27-29—"Sea Marks," Corrales Adobe Theatre, 8:30 p.m., Old San Ysidro Church; for directions and reservations, call 898-3323.

July 21-22—12th Annual Northern Pueblo Arts and Crafts Summer Show: large, high-quality event, many tribes participating; San Ildefonso Pueblo, 1-852-4283.

July 25—Santa Fe Chamber Music Festival Outreach Concert, 7:30 p.m., KAFB, 1-983-2075.

July 25—St. James Feast Day—grab day, some dances: Acoma, Cochiti, Laguna, San Felipe, Santo Domingo, and San Ildefonso Pueblos; contact pueblos for information.

July 25—NM Museum of Natural History lecture and film: "A Close Look at Bats," 7 p.m., KiMo.

*July 25-*29*—"Billy Bishop Goes to War," musical presented by the Santa Fe Festival Theatre, 8 p.m., *2 p.m., KiMo.

July 26—Annual Santa Ana Feast Day, corn dance, Santa Ana Pueblo, 1-867-3301; Taos Pueblo, 1-758-9593.

July 27-28—Puye Cliff Ceremonial, Santa Clara Pueblo, 1-753-7326.

July 27-28—Iris Guild Sale, 12-8 p.m., Albuquerque Garden Center, 296-6020.

July 28-29—Santa Fe: 33rd Annual Spanish Market—colcha embroidery; wooden bultos, retablos, furniture; and filigree jewelry; under the portal, Palace of the Governors.

August 2—Old Pecos Bull Dance, Jemez Pueblo, 1-834-7359.

August 3-5—Lincoln: Annual Old Lincoln Days—celebrates 103rd anniversary of Billy the Kid's death.

Take Note

New Mexicans for Space Exploration announces the following schedule of events for Space Week 1984:

July 20 (6:30-7:30 p.m.): The U.S. Post Office will have a special cancellation station at UNM (room 100 in the Biology Bldg.)

(7:30-9 p.m.): *Talk by Dr. Eric Jones (LANL), "Interstellar Migration and the Human Experience," UNM, Biology 100.*

(9-10 p.m.): Stargazing party at UNM observatory, weather permitting.

July 21 (10 a.m.-6 p.m.) and July 22 (12-6 p.m.) Coronado Center: mall exhibits by space-related firms and organizations; special cancellation station.

July 22 (2-3 p.m.): Coronado Center: Autograph session by former Sen. Harrison "Jack" Schmitt, last man to walk on the moon.

For more information, contact Carl Mora (400), 4-4904.

* * *

The LAB NEWS has two new staffers this summer, Sharon Ball and Kristen Kanuika. Sharon is chairman of the English department at Valley High School and is writing feature articles this summer. Kristen is an '84 graduate of Bernalillo High School. She has the monumental task of indexing all past issues of the LAB NEWS.

* * *

Retiring this month and not shown in LAB NEWS photos are Leo Arellano (132), Joseph Trujillo (2631), Ruth Birdseye (7631), Joe Gurule (3423), and Delores Smith (7473).

* * *

Dick Russell, director of Purchasing 3700, led a meeting yesterday for his 220 employees outlining educational opportunities sponsored by Sandia that are available to employees. John Hart (3730) discussed individual career development to benefit the organization. Assisting from Training and Education Division 3523 was Joe Danclovic.

A second event, to be held Aug. 30 at the Coronado Club, will feature speakers from UNM, U of A, and T-VI as well as representatives of Training and Education Department 3520.

* * *

On July 11, 1949, Sandia gained three new-hires who are still on-roll. The three, Bill Austin (3741), Joe Hernandez (3154), and Hank Willis (3100), are shown in this issue's Mileposts.

AND THAT'S THE WAY IT WILL BE!

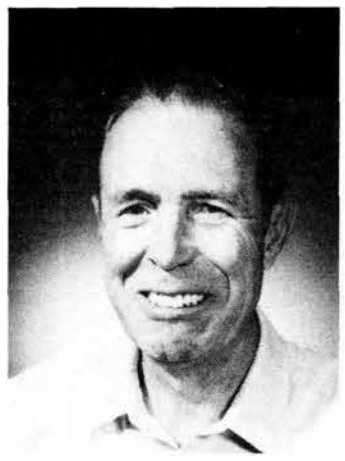
The way I think the world will end is not in financial collapse. It is like this: Someday everyone in the world will have a car, and they will all get caught in a huge traffic jam and be unable to move. Then they will all have to fill out some government form for it, and they will be unable to do that either, because the form is so complicated. And that will be the end of the world.

— Ezra Zilkha, international banker and financier, quoted by Harold Seneker, "Look at the Assets," in *Forbes* (May 7, 1984).

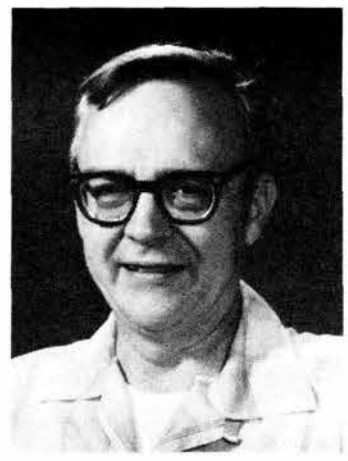
MILEPOSTS
LAB NEWS

JULY 1984

Joe Apodaca (3417) 25

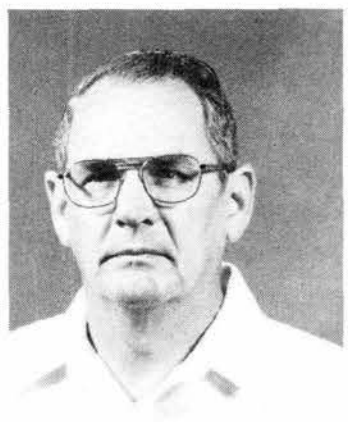


Norm Baker (5111) 25



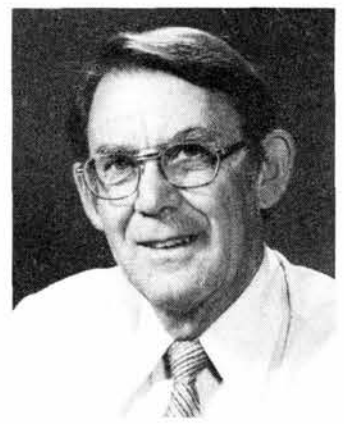
Dick Guilford (2364) 30

Arnie Rivenes (8162) 25

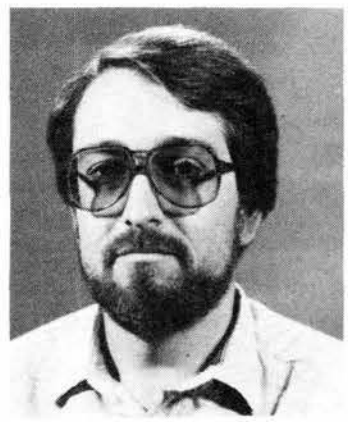


Leon Parrish (6247) 25

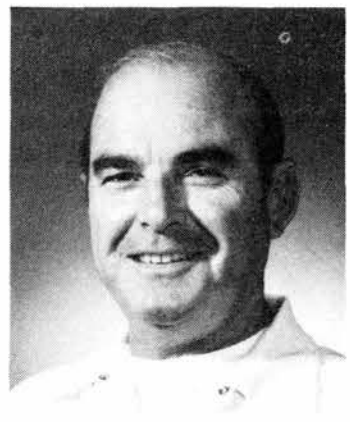
Donna Eaton (2614) 15



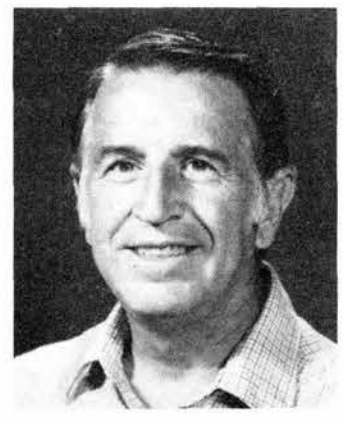
Roy Fitzgerald (5261) 25



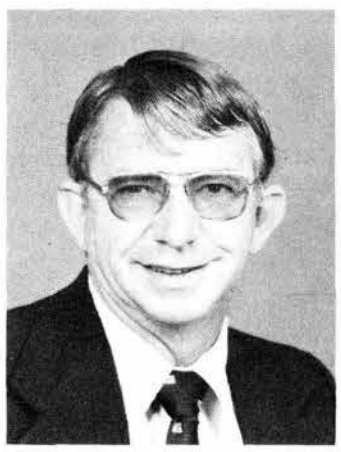
Paul Hatch (1832) 15



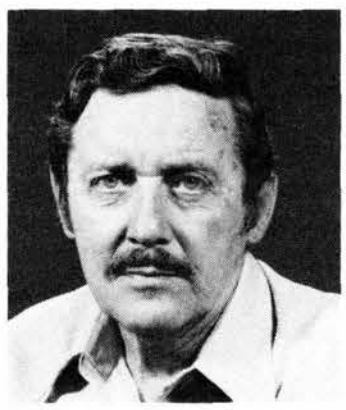
Ray Sanchez (3463) 15



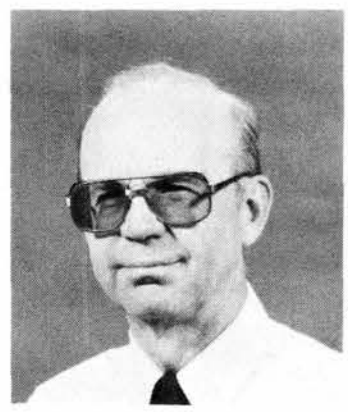
David Barham (5252) 25



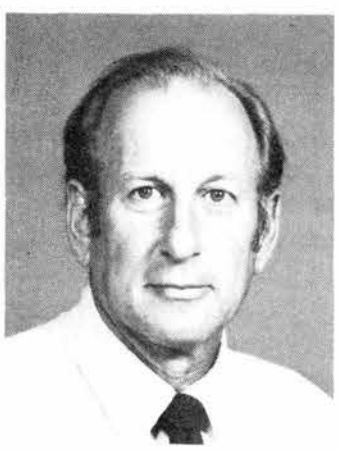
Bob Tockey (8461) 30



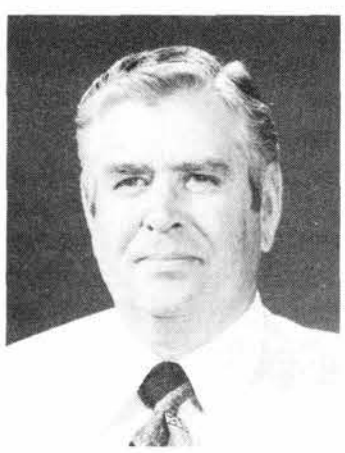
Art Mullendore (1831) 20



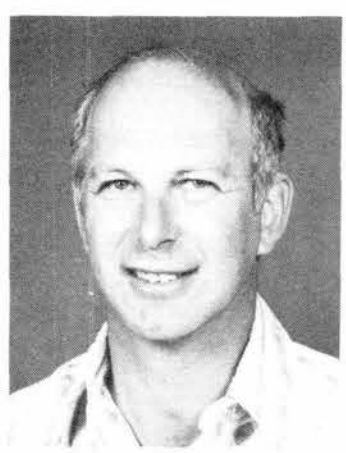
Dick Johnson (7633) 25



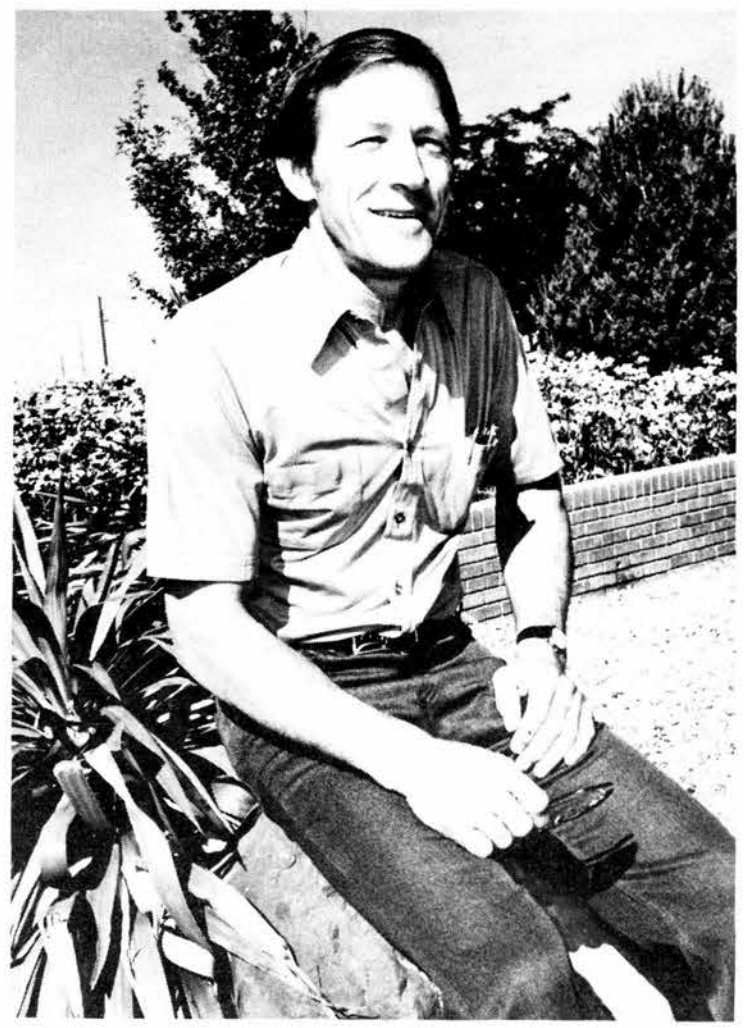
Walter Bauer (8340) 15



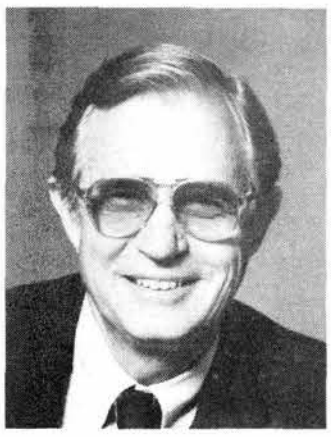
Tom Starr (7265) 30



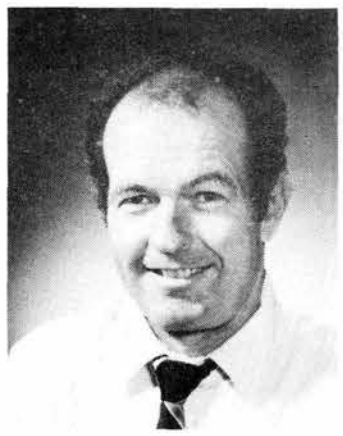
Dave Abrahams (8416) 25



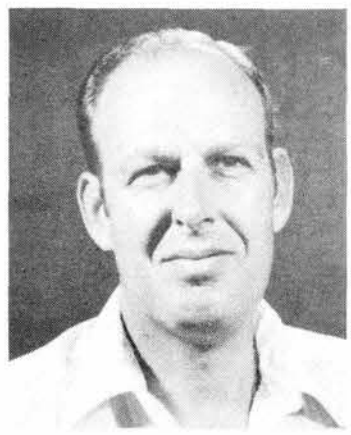
Carl Curtis (7525) 25



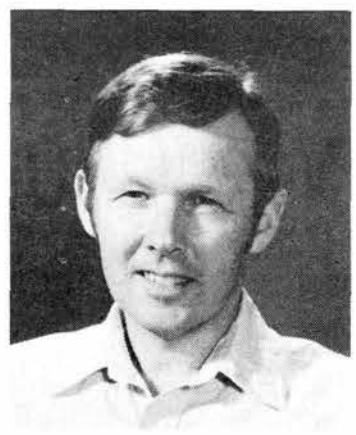
Ralph Cozine (8250) 25



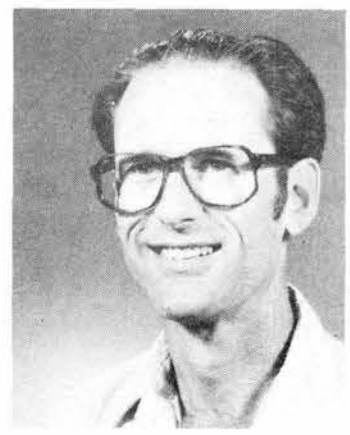
Mike Eaton (5252) 20



Howard Seltzer (324) 20

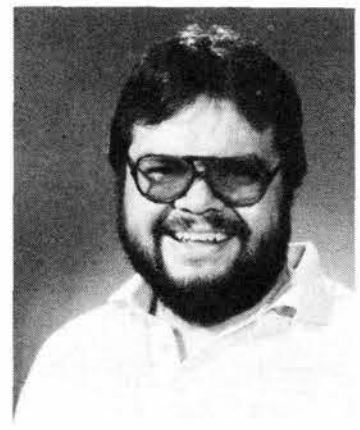


Bob Cover (5215) 20

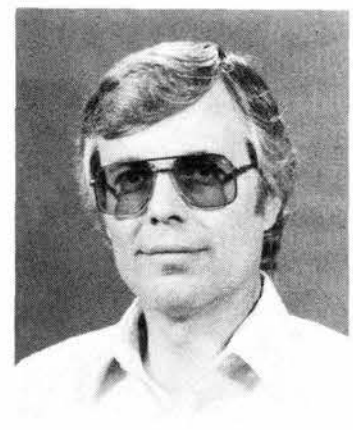


George Fisk (1128) 10

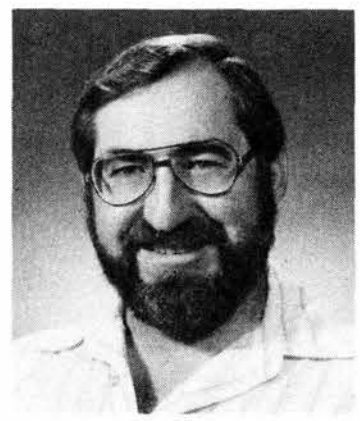
Joe Hernandez (3154), Bill Austin (3741), and Hank Willis (3100) 35



Robert LaFarge (1631) 10

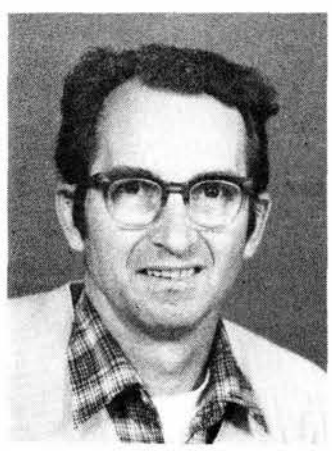


Ned Keltner (7537) 20

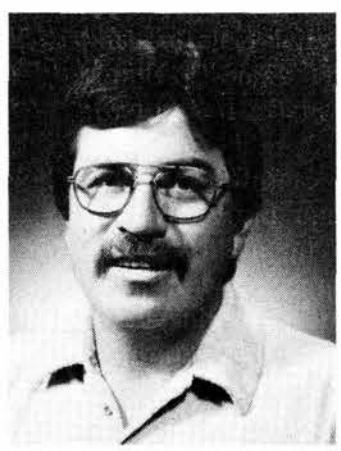


Carl Konrad (1534) 15

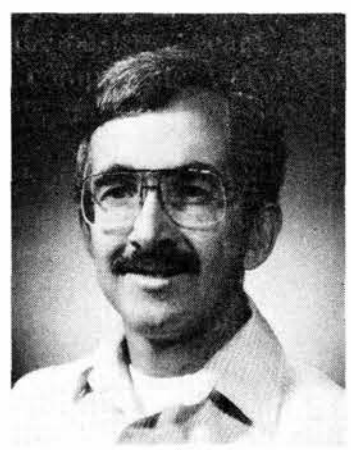
Herman Kaneshiro (7473) 20



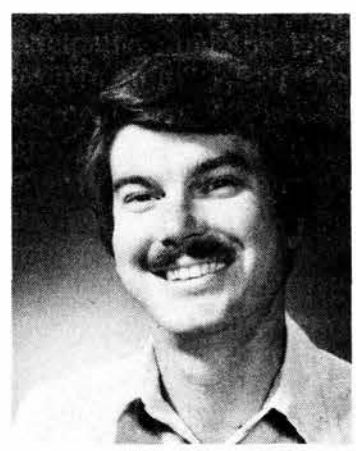
John Totten (8123) 20



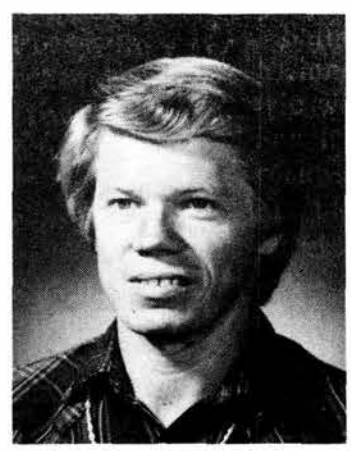
Rich Sanderville (5216) 10



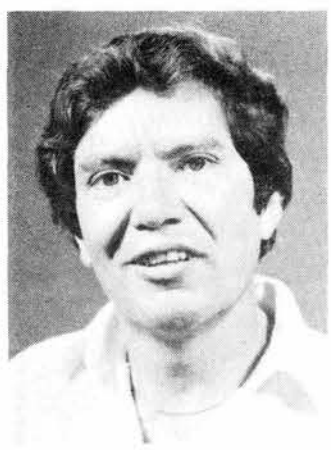
Philip Stanton (2513) 20



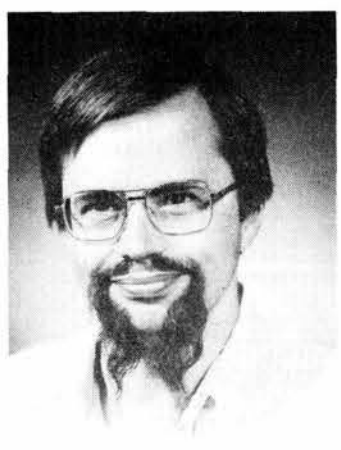
Steve Richards (2336) 15



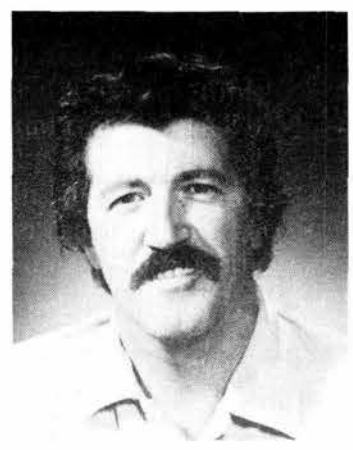
Steve Breeze (7116) 15



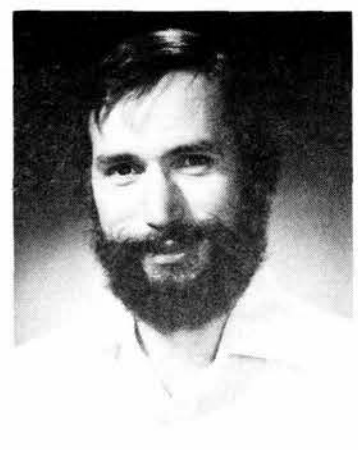
Ron Allred (1812) 15



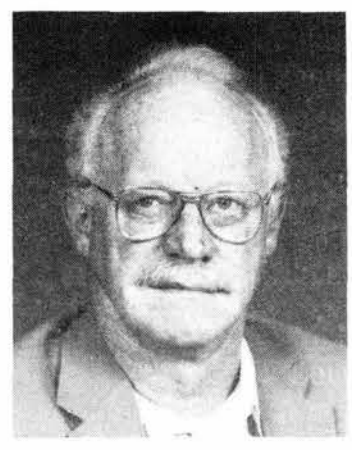
Bill Fienning (5254) 20



Arthur Sharpe (1245) 20



Lee Bertram (2646) 10



Doug MacMillan (8411) 25

Congratulations

Estie (21-1) and Clint (6311) Shirley, a daughter, April Nicole, July 9.

Ann (7613) and David Yates, a daughter, Laura Elizabeth, July 2.

Sympathy

To Chris Padilla (7631) on the death of his mother in Albuquerque, June 27.

To Thomas James (5347) on the death of his father-in-law in Nebraska, June 25.

THE JUNGLE TELEGRAPH

An American missionary serving in the jungle village of Ukarumpa in Papua (New Guinea) has a computer-age problem. He writes home that he is having trouble rounding up a third solar panel to match the two he has. Why does he need this sophisticated gear? To power his microcomputer.

— *Forbes*

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

RULES

1. Limit 20 words.
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

ELECTRIC dryer, Montgomery Ward, extra large drum, $100; coffee table, Mediterranean oak, 21" x 54", corner pillars, two doors, $100. Hernandez, 268-5000.

PUG puppies, two males, one female, six weeks old. Bernal, 869-2305.

CHILD'S record player w/ twin speaker & stand, (Clairinette 12), $40 OBO. after 2, Mosteller, 256-3227.

CHAMBERS four burner cook top, chrome, needs one switch, $45; basketball hoop w/ net, wood backboard, $5. Baack, 296-2312.

KAYAK, inflatable, never used; drum, Ludwig snare with case; helmet, Bell Moto-III, 7 5/8. Hanson, 298-2120.

MATCHING nite stands w/ drawers, never used, walnut color wood, $100 pair. Paul, 299-6387.

COCKER spaniel puppy, AKC registered buff male, $100. Gonzales, 296-8138.

REMINGTON automatic shotgun, 12 gauge, 5 shot, never used. Lake, 888-4581, after 6:30.

RING, .59 carat diamond solitaire graded AGS 0/0/3 (cut, color, clarity; 0 best: scale 0-10). Craft, 821-1369.

ROTARY lawn mower, 22", self propelled, $25. Diegle, 294-5565.

POLAROID autoprocessor for 35mm, still in original box, $60. Passman, 821-4999.

TWO twin beds & frames, Sleep 'N Aire mattress, $80 each. Konrad, 294-2807.

STEEL belted radial GR78-15 w/ rim (3 1/16" center hole); polyglass belted G78-15 w/ rim (2 7/16" center hole), $20 each. Muir, 883-7933.

T.I. 58C & PC 100C printer, $75 OBO. Prior, 296-2930.

PORTABLE exercise bike, collapsible for storage, odometer/speedometer, adjustable brake, 134 miles, $45. Rainhart, 821-3690.

ANTIQUE cannonball bedframe, Vermont maple, single-size, $180. Dalphin, 265-4029.

KITCHEN bar stools (4), fabric cushions, heavy metal post legs, six months old, $110. Daniel, 292-9281.

TICKETS to N.Y.C., two round-trip tickets on Continental, $700 value, on space available basis, $350. Adams, 256-7265.

LAWN mower, 20" rotary w/ 3hp B & S engine, $50. Almquist, 294-4723.

WEIGHT bench w/ weights & manually operated treadmill, best offer. Vancil, 299-7211.

ORIENTAL rug, handmale in India, 100% wool, 9 x 12, beige/brown, $495, $2000 value. Dalin, 821-8667.

MOTORCYCLE jacket, black leather, Harley-Davidson, $100 OBO; H-P calculator model 12C, $60 OBO. Berman, 296-5640.

MAYTAG auto washer, $50; Flexsteel sleeper sofa; Honda trail bikes (2); infant & toddler clothing; women's clothing, size 8. Troncoso, 897-1167.

CAMPER shell, long wide bed, $200; French provincial couch, early 40's, $200; maple kitchen set, 4 chairs, $380; R/V refrig., $200. Ramel, 821-0475.

JENNINGS 22 auto, $55; 22 Magnum bolt w/ scope, $95; new Savage 12 ga., M/F, vent, ejectors, single trigger, $240. Kureczko, 298-1577.

SUNN concert lead guitar, amp. 610L speakers, $600; Fender Rhodes stage seventy-three electric piano, $350. Heatherly, 294-4378.

PEDIGREE Pekingese, spayed female, 1½ yrs. old, blond, $100. Valdez, 265-2457.

SEWING machine, Kenmore zig-zag, walnut cabinet; swivel rocker, blue / white / gold velour stripe, $50 each. Gosselin, 884-8107.

BASSET dining set, table, 6 chairs, china closet; custom sofa, matching chair w/ otoman, armchair; chest freezer. Mozey, 822-0296.

SEARS Kenmore continuous-clean electric stove, $300; RCA Whirlpool ½ ton A/C, $100. after 6, Dotts, 294-8297.

REGULATION basketball backboard & hoop, $20; antique student desks, different prices. Peterson, 256-7514.

MICROFLOPPIES w/ controller, $300; TTY, $75; DVM, $100; VIC 20 w/ chess, $85. Hubbard, 842-9431.

EXERCYCLE, Montgomery Ward, speedometer, odometer, rowing handle bars, $75. Hunter, 256-7758.

TWIN bed, box springs, mattress & frame, extra long, $70. Sheldon, 293-0467.

TELEVIDEO 910 smart terminal, $350 OBO. after 5:30, Boyd, 281-2275.

LAWN mower, 3½ hp. Jacobson-rotary, 21", needs some work, $45. Johnson, 255-2846.

TWIN headboard, $5; rollaway bed, $30; 2 15SSR13 radials, $5 each; blue bathroom sink, $10; Ithaca 12 ga. pump shotgun. Zirzow, 298-1479.

DOG house, small dog, Allwoods built, $5, you pick up. Christy, 256-0711.

SUITCASE, Sears softside textured vinyl pullman bag, 24 x 28 x 10, holds numerous suits and/or dresses, separate zippered accessory compartment, $25. Allen, 296-6453.

REFRIGERATOR, Sears 16 cu. ft., w/ icemaker, $100; solid wood front entry door, 36" x 79", $25. Barnard, 256-7772.

GOLF, left-handed 1980 Wilson Staff Tour, 8 irons, $160; 3 woods, $85; Palmer putter, $20; set $240. Connor, 268-9497.

DRAPES, floor-length w/ rods, 1 set covers 6' window, 2 sets cover 4' window. Sharp, 821-8745.

FURNITURE, large dark brown vinyl couch & oversize recliner w/ brass buttons, vinyl cracked, Paul, 296-6500, after 5.

CAMERA 35mm SLR Fujica manual, F1.6 lens & filters, $35; Sunpak thyristor electronic flash, adjustable tilt, $10; 2-drawer night-stand, $15. Robinson, 255-0114.

DENON DP-1250 manual turntable w/ Grace 707 MK II tonearm, $300. Booth, 296-3955.

BUNDY flute, case & music stand, $100. Lewin, 898-2303.

TWO 20" Huffy bikes, rugged tires, half price, $50 each. Carli, 298-9271.

HARPSICHORD, 2 8' ranks, buff stop, rosewood keys, bent side, built from Burton kit. Drayer, 821-4017.

POOL table, balls, cues, repair kit, $50; rollaway bed, $40. Tuffs, 255-9663.

ALLAN Houser silk screen, dated 1952, 27 x 32, framed, $175; Travel-Aire portable swamp cooler, 12 x 15 x 15, $15. Gregory, 268-2022.

LEATHER sofa, loveseat & ottoman, red w/touches of black, sofa covers included, $400. Valdez, 298-2654.

SAM Andy freeze dried foods, protein, fruit, veg. groups; small freezer, 3.5 cu. ft., $75. Tilgner, 294-6464.

FILE cabinet, $25; bike shoes, $12; toy riding tractor, $30; reciprocating saw, $40; shop vac, $50. Hickman, 296-6984.

SOFA & chair, green velvet, $125. Boyer, 299-2165.

ROWING machine, DP-300 multi-gym, $95. Arenholz, 298-1724.

CHILD'S go-cart, Clark Cyclops, rebuilt, B & S 3.5 hp engine, new tires, good frame. Hawn, 281-1419.

GARAGE sale, gas grill, power mower, file cabinets, bookshelves, doll house, luggage, miscellaneous furniture, 7/21-22, 6025 Bellamah NE. Magnuson, 268-5955.

COZUMEL, Mexico, two Continental standby airline tickets, must be used by Oct. 8, $670 value for $250. Lenberg, 821-6197.

'75 COLEMAN tent trailer, sleeps 5. Baca, 864-4358.

HAWAIIAN vacation package, airfare, 7 nights lodging, Aug. 4-11. Also Continental Airline travel vouchers, both below cost. Rexroth, 293-6025.

STEREO console, Magnavox, $140 OBO; sneaker roller skates, plastic wheels, size 3, $25; ping-pong table, $30. Mora, 821-6759.

KELVINATOR 2-door refrigerator/freezer, approx. 16 cu. ft., white, $125. Lipkin, 881-6038.

SEARS two-wheel utility trailer w/ cover, 19 cu. ft., 1000 lb. load capacity, $250. Arthur, 256-7359.

D-41 MARTIN guitar w/ hard case, left handed, $1400. Perryman, 281-3020.

SLANT-TOP desk, 29½"w, 40"h, 16½"d, $150. Chorley, 296-1454.

AKC LABRADOR retrievers, breeding for field, show, or family pet, whelped 6/29/84, available 8/17/84, Pedigree available. Worrell, 299-0381.

TRANSPORTATION

'81 HONDA CX5000 water cooled, shaft drive, extras, $1650 OBO. Zirzow, 298-1479.

'82 KAWASAKI belt drive 440cc, LTD, low mileage, windshield & case-savers, $1099. Jarrell, 293-9671.

'76 PENTON dirt bike, 400cc, $500. Wright, 296-3850.

'74 FIAT 124 conv. 1800 model, needs work, $1200. McClaflin, 292-2852.

'77 MGB convertible, new top, yellow, $3950. Mast, 292-0764.

'79 HONDA CX500C, Vetter fairing, sound, trunk, backrest, low mileage, adult owned, $1475. Caudle, 281-2189.

'67 OLDSMOBILE Cutlass, has engine, transmission, wheels, windows, you haul away. Chavez, 842-6374.

'81 YAMAHA YZ 465, Yeis box, Boyesen reeds, $925; Bell Moto-III, 7 3/8, yellow, $45. Healer, 298-6967.

'82 TRAVEL trailer, 32' Nomad w/ water cooler, $8500. Grant, 281-5907.

'76 HONDA CB 550, 4 cyl., super sport Vetter fairing, luggage rack, $750, will trade for fishing or sailboat or tent camper. Rozelle, 298-0396.

'77 DATSUN B210, AC, AT, AM/FM cassette. Cooper, 884-2814, after 5.

'77 GOLDWING, blue, white Windjammer SS fairing, Bates trunk, trailer hitch, electronic ignition, extras, 44,000 miles, $1895. Goldstein, 821-9531.

'82 FIAT Bertone X19, removable top, air, p. windows, 5 speed, stereo, 31,000 miles, new brakes, radials, $6200 OBO. Patrick, 265-4569.

'72 MUSTANG covertible, 351 Cleveland, AT, PS, PB, AM/FM cassette, $4500 OBO. Potter, 892-8812.

'72 TRIUMPH 650 Bonneville motorcycle, rebuilt & customized, extras. Gonzales, 344-4933.

'76 HONDA Civic, new exhaust, shocks & ignition switch, recent engine overhaul, $950. Neumann, 822-0562.

'72 TOYOTA Corona (deluxe), A/C, new radials, 70K miles, $950. Rutz, 296-9590.

'77 FORD pickup, V8 engine, 4-speed, new tires & chrome rims, white w/ blue interior, $2500. Granger, 869-2649.

'75 GRANADA, AT, PS, PB, AC, 4-door, $1500. Berg, 898-2100.

'78 RAMCHARGER, 4 wd., auto, air, 360 CID, regular gas, PS, PB, AM/FM tape. French, 293-3451.

'80 SUZUKI GS750E, $1495. Norwood, 292-0072, after 5.

'76 VOLKSWAGEN "poptop" camper, Michelin tires, stereo, sleeps 5, ice box, sink, one-wheel trailer, new clutch & windshield, $3995. Asprey, 296-6673.

'76 OLDSMOBILE, custom cruiser, station wagon, PB, PS, PW, AC. Halbgewachs, 268-1584.

'67 VOLVO P1800, rebuilt engine, reupholstered, repainted white, AM/FM stereo, 5-speed, $5000. Murphy, 892-0288.

'83 TOYOTA Tercel 4 wd., wagon, $7700 OBO. McConahy, 265-1198.

'82 HONDA Night Hawk 650, fairing, case guards, etc. Demaree, 294-7019.

'66 MGB convertible, red w/ new black top, rebuilt engine, transmission & new clutch, $3500 OBO. Trompak, 296-5438.

'77 KZ 900, 700 miles on 1015 engine, chrome RC header, mags, luggage rack, back rest. Roth, 243-3283.

'75 CAMARO 350, AT, AC, 2 new tires, new windows, upholstery, flywheel, starter, rebuilt engine & carb, needs paint & minor body work. Duran, 867-3629.

'78 SUZUKI motorcycle, TS-100, 4500 miles, $350 Baker, 293-0358.

'77 PACER, one owner, 3-speed, PS, AC, new radial tires, AM/FM cassette, $1200. Hendrick, 296-2163.

'78 CHEVY Impala, 4-dr sedan, AT, AC, PS, PB, AM/FM stereo, white w/ brown interior, $2100. Taylor, 822-0637.

'76 DATSUN pickup, air conditioning, new upholstery, radial tires, 77,000 miles. Jefferson, 293-3529.

'83 S-10 BLAZER 4 wd, AC, stereo, Tahoe, manual trans., $10,400. Marder, 883-3863.

'77 CHEVY C-10 pickup, straight-6, AM/FM radio, heated shell w/ carpeting, extra bench seat, intercom, $3950. Ferguson, 293-2853.

'76 DODGE Aspen Coupe, V8, AT, new paint, $895. Barton, 268-7349.

'78 HONDA Goldwing, 21K miles, Vetter fairing & bags, $2600. Perryman, 281-3020.

MOPED, Honda Urban Express, 2000 miles, electric start, 80 MPG, 30 MPH top speed, helmet, $225. Kiefer, 296-2331.

BICYCLE, men's, 10-speed, 23" butted frame, chromed fork, cotterless cranks, $100; men's 3-speed, $50. Joseph, 299-6989.

NEW HONDA XL 600, less than 300 miles, full warranty w/ windshield & luggage rack, $1990. Johnson, 266-0513.

BICYCLE, boy's, 10-speed, 24". Eldredge, 881-4528.

ROGER Decoster dirt bike, chrome-moly steel frame, custom tires, grips, & rims w/ double clamp & pads, $135. Tennyson, 292-5844.

MOTORCYCLE, Suzuki, 400cc street bike, low miles, $575. Heckes, 299-6022.

¾ TON Chevy pickup, camper; 4 wd, V8, air, automatic, PB, PS, dual tanks, dual exhaust, $6700. Yates, 865-5905.

BMW R90/6, full fairing, Krauser bags, trunk, back rest, many new parts, best offer. Brooks, 265-8612.

BIKES: 26" Schwinn Suburban 10-speed, $100; 26" Schwinn 5-speed, $75. Hickman, 296-6989.

SAILBOAT, 24 ft., Venture, 2 jibs, spinnaker, dinette, head, sleeps 5, will consider joint ownership, $5500. Pike, 299-6153.

REAL ESTATE

3 BDRM, Ranchos de Placitas, 2300 sq. ft., Jacuzzi, pool, 4+ acres, corrals, 2 fireplaces, heated brick floors, beamed cathedral ceilings. Kanuika, 293-3834.

'74 12' x 60' MOBILE home w/ stove, refrigrator, dishwasher & air conditioner, $8000. Vigil, 836-6314.

WOODED acre lot in Forest Lakes, Colorado (above Vallecito Reservoir). Smith, 298-7365.

SELL or trade for income property, 13 acres, So. 14, 30 miles from Sandia. Jeys, 298-8989, after 5.

18 ACRES, 3 miles east of So. 14 near Juan Tomas, ideal solar, easy terms, $2300/acre. Baack, 296-2312.

LOS LUNAS/Tome area, Manzano View Estates, 1 acre off S. El Cerro Loop, utility access, restricted. Gonzales, 842-9604.

FOREST Lakes lot, near Durango, Colorado. Lake, 888-4581, after 6:30.

FOOTHILLS location near Lomas & Tramway, 3 bdrm., 2 bath, great room w/ cathedral ceiling, FP, wet bar, sprinklers, $82,900. Kelly, 299-7190.

5⅓ ACRES in Jemez Mtns, electricity, pure spring water, natural gas, national forest surrounding, ponderosa pine & meadow, $48,500. Hughes, 299-6674.

6 CONTIGUOUS commercial lots, downtown Estancia, Highway 41 next to Co-op Restaurant. Johnson, 255-2846.

4 BDRM, new, all brick, atrium, fireplace, 2 baths, 2-car garage, $7000 cash to loan, prefer VA back. Meyer, 897-4117.

2400 sq. ft., 3 BDRM, den, FR, 2 baths, 2 fireplaces, 3-car garage, extras. Guidotti, 298-8818.

WANTED

6" JOINTER/plainer. Kurowski, 881-1859.

BOYS' 5 or 10 speed bicycle. Harrigan, 266-4143.

NON-SMOKING female looking to room with same in your home. Brooks, 883-1485, after 5.

CLARINET (B flat). Rutz, 296-9590.

PATIO doors, removed sliding glass door sets, 5 ft. or 6 ft. widths, reasonable. Adams, 256-7265.

CHILDREN'S encyclopedia or Animal Time-Life books. Lucero, 296-2473.

CARTOP carrier; 2 or 3 burner Coleman stove; backpacking stove. Rodacy, 293-2668.

TRACTOR tires, deep-V tread, 2 ea. 16 x 6.50-8 NHS & 2 ea. 23 x 10.50-12 NHS, all 2-ply rating, buy/swap for lawn treads. Hughes, 299-6674.

VISITING SNLL staff member needs furnished house in Albuquerque to housesit or rent during August. Curro, 867-2471.

FEW PIECES of flagstone to complete sidewalk. Chorley, 296-1454.

Coronado Club Activities

Two-for-One Steak Specials On Tonight

TONIGHT at Happy Hour, one of the Club's favorite musical groups — the Isleta Poor Boys — plays country and western style for dancing. In the dining room, a rare opportunity these days: two steaks for the price of one. You can get two 8-oz. top rounds for $7.95, two 8-oz. top sirloins for $8.50, and two 8-oz. filet mignons for $9.25. Happy Hour begins right after work with special prices (very reasonable) in effect until the music starts. The band plays from 8:30 until 12:30. Dining room hours are from 6 to 9 p.m.

Next Friday, July 27, the W.D.C. Band plays a variety of danceable tunes and the two-for-one steak specials continue.

YOLANDA ARMIJO, former Sandian, is taking time out from her master's degree work at UNM this summer to return to the Club and renew the old Friday evening singalongs. Yolanda will be appearing in the main lounge starting at 6 p.m. each Friday through August to play piano — the old tunes and requests — and to lead the singing.

Yolanda led a popular singalong at the Club for a couple of years during the early 70s, then organized La Ultima — a swinging Latin variety band that often featured Pete Gallegos (2545) on guitar and vocals. Paul Metoyer (3435) played drums.

ON SUNDAY, July 22, the Sandia Jazz Corporation featuring Arlen Asher on reeds and Jim Trost on piano play under the covered patio from 1 to 4 p.m. A portable dance floor will be set up and a bar will be in operation. A special $1 price is offered on strawberry daiquiris and margaritas. Members without pool and patio tickets pay $1 admission; guests, $1.50.

NEXT THURSDAY, July 26, the Club offers a selection of fresh crab — snow crab, dungeness, king crab, or a combination. Prices range from $6.95 to $10.95. Manager Mitch Griffen has these flown in special for the occasion, so reservations help — call 265-6791.

TRAVEL DIRECTOR Charlie Clendenin (2611) announces two more Coronado Club-sponsored excursions — a charter bus trip to ride the Cumbres-Toltec scenic railroad on Sept. 30 and an Aspencade tour Sept. 26-30.

The Cumbres-Toltec bus leaves at 5:45 a.m. Sept. 30 for Antonito with breakfast snacks and refreshments served on the bus. The plan calls for riding the narrow gauge railroad all the way across (Antonito to Chama) providing there are sufficient sign-ups for a trip in the opposite direction. Otherwise, it will be a standard rail trip to Osier and return. Price is $48 per person due Aug. 30.

GARY SHEPHERD (2614; left), directs a rehearsal of the third annual production of "Black Wisdom, Beauty and Fashion, and Talent Show" at the Neighborhood Center Theatre, 1020 Edith SE. The cast of 30 youngsters will celebrate black culture through music, dance, fashion, and drama (including the latest in breakdancing, above) July 27-29. Curtain goes up at 7:30 p.m. Admission is a $2 donation. Gary has directed the Neighborhood Drama Project for 14 years; the group presents several shows annually.

The Aspencade is a charter bus trip to visit the Aztec Ruins, Telluride (two nights), Ouray, Silverton, Purgatory, Alpine Slide, Durango (one night), Vallecitos, Pagosa Springs (one night in a Pagosa resort), a hayride and hamburger fry, Chama, and a ride on the Cumbres-Toltec narrow gauge railroad. The high country scenery should be spectacular this time of the year. The $220 double occupancy price includes a continental breakfast on departure, snacks and refreshments on the bus, and all items on the itinerary. Pay a $50 deposit now, the balance by Aug. 25.

These two trips will be discussed in detail plus "Travel in New Mexico" at a travel program on Monday, Aug. 6, at 7:30 p.m. in the Club ballroom. Speaker will be Bob Butler (7233) of La Guia Tours.

Charlie emphasizes that the Coronado Club sponsors only those trips where group rates make significant savings to members. With the current airline competition and tie-ins with resort facilities, an individual can usually book a tour at the best rates available. In some cases, groups pay more for travel.

The Mazatlan trip Nov. 12-19 is a Club-sponsored trip. The $399 (double occupancy) price includes airfare, seven nights at the luxurious Playa Mazatlan (sometimes called Coronado Club South), transfers, baggage handling and bellman tips, all Mexican and U.S. travel taxes, and a two-hour poolside cocktail party.

In the meantime, Charlie and his travel committee have gathered a ton of material about travel to anywhere. If you need information on tours, airlines, or agencies, call Charlie or Betty Clendenin at 299-2071.

ON TUESDAY, July 24, the fifth in a series of Club-sponsored financial seminars will be presented at 7 p.m. in the ballroom. "Fixed Income Investments" will be discussed by Julian Hippeli and Jim Zitzman of American First Financial. They will explore municipal bond trusts, government bonds, and "Ginnie Mae" government backed mortgage notes. Next month on Aug. 21, American First Financial investment counselors will discuss real estate investments. There is no admission charge.

NOW IS THE TIME to mark your first Saturday in August and set it aside for Variety Night. The Club will show Walt Disney's world classic "Snow White and the Seven Dwarfs," the film that brought the movie cartoon to the status of art. Food service starts at 5, the movie at 6. There is no admission charge for members and families.

Retiring

Stanley Landrith (4021)

Lil Silva (3152)

Rudy Walter (3745)