

Home on the Range

— See Page Eight



Rocket Payload To Peer At Sun's Corona

A team of Australian and United States scientists and engineers will launch two rockets from a site in southwestern Australia on June 20 as part of a series of scientific observations for the solar eclipse. Launch locale is 70 miles north of the coastal city of Perth.

Purpose of the project is to study temperature distribution around the sun's corona in an investigation that can only be conducted above the earth's atmosphere during a total eclipse of the sun. The rocket-borne experiments will be backed up by ground-based observations taken in the path of the solar eclipse near Albany, south of Perth. About 96 percent of the sun will be obscured over Perth.

The rockets will be launched in a southwesterly direction into the path of totality over the Indian Ocean. Fifteen minutes later, the two payloads containing scientific instruments will impact in the ocean 160 km (100 miles) northwest of Perth.

Both of the two-stage Terrier-Sandhawk rockets will carry duplicate instrumentation payloads to an altitude of 320 km (198 miles). Just before entering the shaded area of the total eclipse, the onboard attitude control system (ACS) will point the scientific instruments at the eclipsing sun. Photographic data will then be taken during about three minutes of totality.

When the payload descends to 4.6 km (15,000 feet), a parachute will be deployed for splashdown in the ocean, some 15 minutes after launch. Aircraft and boats will be used to recover the payload, which is kept afloat by an air-filled flotation bag. The recovery

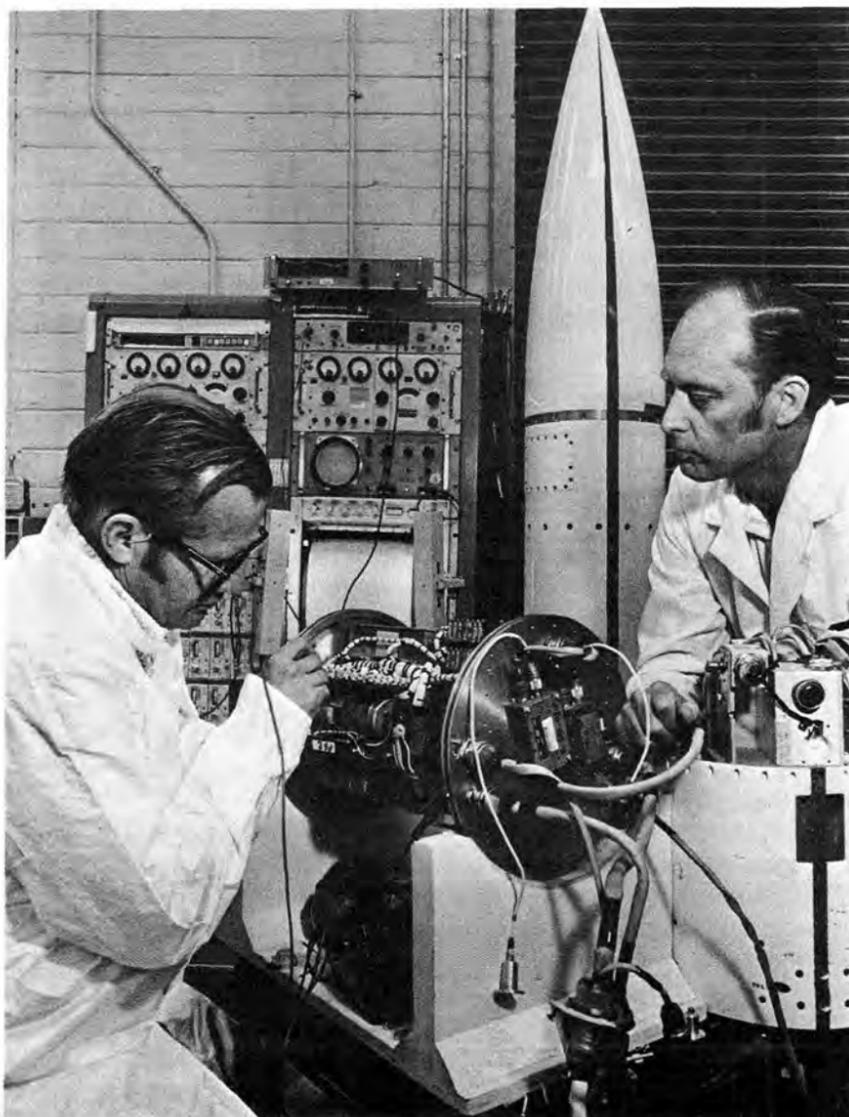
(Continued on Page Seven)

LAB NEWS

VOL. 26, NO. 12

JUNE 7, 1974

SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA



THIS telemetry package for a rocket payload to be launched from a site in southwestern Australia will gather data on the sun's corona during solar eclipse on June 20. It is being checked by engineer Paul Goen (left) and Lester Lathrop, project engineer, both of org. 1253. The two Sandians are among the 30 scientists and engineers from Australia and the US taking part in the project.

Afterthoughts

Non-smokers reply--In our last issue we touched a raw and quivering nerve when we suggested that the annoyance of being in an office with a smoker was only of the order of being in a restaurant near a bowl of okra soup. There was even an angry note from a lover of okra soup. Excerpts from a few of the letters follow:

"...to paraphrase Shakespeare's Hamlet 'It takes no study from the AMA, my lord, to tell us we suffer. The headaches and clogged sinuses are real, it is not like sitting next to okra.'"

"Not all of us who object to breathing un-recycled air are hysterical ...I have a severe allergy to smoke. Being in a heavily polluted atmosphere such as a conference room for as long as 10 minutes can make me ill for several days. It's hard for me to appeal to the good will or decency of smokers if they are encouraged by charming and humorous items such as yours to think of me as a hysterical fanatic."

"I am a non-smoker ...and at times I must reach for a gas mask because any suggestion of complaint, no matter how plaintive or inoffensive, is automatically written off by smoker supervision as 'hysterical, crusading, hypochondriacal, etc.'"

"Blowing smoke in my face is equal to assault with a deadly weapon. Don't do it--I'll defend myself! Buddy, I challenge you to prove, with proof that will stand up in court, and with sound medical facts, the wild statements made in your editorial...please see that the author is henceforth restrained until he does some gutty research and can prove his vapid opinions."

We also received a digest of an article "Cigarette smoke-filled room: a hazard to nonsmokers and children" taken from the Journal of the AMA, in which the author maintains that a nonsmoker will inhale many harmful tobacco by-products in a closed and smoky room.

Smokers reply--none as yet.

* * *

Save thee and me--"Everyone is more or less mad on one point."
Rudyard Kipling, Plain Tales *js



WALTER WILLIAMSON joins Sandia this month as an attorney in the 6000 organization. He succeeds John Kaufmann who is returning to WE's Teletype Corp. in the Chicago area. Walt gained his law degree from the Univ. of Maryland, comes to Sandia from Washington, D.C. where he was division patent attorney in the WE Transmission Division.

feed back

Q. Why does Sandia use Social Security numbers rather than the former employee numbers?

A. We have used Social Security numbers on all new applications of administrative systems since 1968. This approach was undertaken to eliminate the need for two separate employee identifiers, and the Social Security number was already required in certain cases by the government.

The Social Security number is used solely as a means of identification, and such use, which is entirely legal, does not disclose any personal information. Also, the Laboratories has special procedures designed to protect all personal information and to prevent its unauthorized use.

C. R. Barncord - 4110

* * * *

Q. Is any revision planned of mileage rates paid by the Lab for use of personal vehicles? All recent references to this subject have reflected much higher costs than those currently allowed by Sandia. Furthermore, even the ultra-conservative Internal Revenue Service allows more.

A. You are aware, I am sure, that Sandia discourages the use of personal vehicles for Laboratories business. Even so, we recognize that there will be times when their use is practicable, and the reimbursement is to cover cost of gasoline, oil, other supplies and services, maintenance, and fixed charges associated with operation of the vehicle. However, for your information, a recent survey on reimbursement rates for use of personal vehicles on Company business shows that 11 cents is widely used in industry and is near the top of rates being paid. We do not plan to make a change at this time but we are continuing to review trends and practices which might indicate the need for a change.

C. R. Barncord - 4110

Events Calendar

Through June 15 — Re-Discover New Mexico, 12 to 8 p.m., Mon. thru Fri., Sat. 10 to 6 p.m., Winrock Shopping Center.
June 7-9-10 — "Cube & Rose Parade" adult

Puppet Show, 8 p.m., U of A Fine Arts Center. 243-9461.
June 7-9 — Hunter Jumper Show, Horse Arena, State Fairgrounds, 8 a.m.
June 7-9 — Seventh Annual Alb. Inter-Tribal Pow Wow, Alb. Indian School.
June 8 — Alb. Symphony Orchestra: "Festival of Music" 8 p.m., Baseball Park, Alb. Sports Stadium.
June 9-12 — June Music Festival: Fine Arts Quartet, 8:15 p.m., Alb. Little Theater.
June 9 — N.M. Mt. Club, Tree Springs to Summit House, 7 mile hike, Western Skies, 8:15 a.m.
June 13-14 — Old Town Studio: "Who's Afraid of Virginia Woolf?" by E. Albee, 8 p.m. 242-4602.
June 16 — N.M. Mt. Club, Sandia Crest to I-40, 16 miles, mostly downhill, 3 qts. of water, Western Skies, 7 a.m.
June 16 — Arts In The Park: Old Town Plaza, Ballet de Folklorico, 3 p.m., Alb. Dance Theater, 4:30 p.m.
June 16 — Fourth Annual Madrid to Sandia Crest Bicycle Race, spectators welcome, 8 a.m.
June 19 — Children's Theater Production, San Pedro Library, 2 p.m.
June 20-24 — Arabian Horse Show, 9 a.m., Horse Arena, State Fairgrounds.

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&

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LIVERMORE NEWS

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LIVERMORE LABORATORIES

JUNE 7, 1974

Supervisory Appointments



GARY BEELER to supervisor of Structural Design Division 8157, effective May 16.

Since joining Sandia/Livermore in September 1964, Gary has worked primarily in the design and development of mechanical components, structural cases and hydraulic systems.

He received his BS and MS degrees in mechanical engineering from the University of Washington in 1963 and 1964, respectively. His graduate work was completed through a National Science Foundation grant.

Among his outside activities are sailing, skiing and camping.

Gary, his wife Tamra, and their three boys reside at 1232 St. Mary Drive, Livermore.



BILL WILSON to supervisor of Theoretical Division 8341, effective May 16.

Since coming to Sandia/Livermore in January 1969, Bill has been studying helium defects in metals and insulators in the physical research organizations.

Previously, he received his PhD degree in physics from the City University of New York in 1967. His MA in physics and BS in mathematics were from the same university, in 1965 and 1963 respectively.

Bill is a member of the American Physical Society and the American Association for the Advancement of Science. His leisure time activities include swimming, jogging and camping.

Bill and his wife Helle have three children, a boy and two girls. They live at 1032 Auburn Street, Livermore.



TED GOLD to manager of Systems Studies Department 8320, effective May 16.

Ted joined Sandia at Albuquerque in July 1961 and, in August 1963, transferred to Livermore's preliminary systems design organization. In May 1969 he became supervisor of the Systems Research Division.

Ted received a BS degree in EE from Rensselaer Polytechnic Institute in 1961. After joining Sandia, he earned an MS in EE from UNM and, last December, received his PhD in applied science from the U. of C. at Davis/Livermore under the EAP program. He is a member of IEEE and Operations Research Society of America.

He and his wife Sydell, a former Sandian, have three children, a girl and two boys. The Golds live at 2211 Tice Valley Blvd., Walnut Creek.

Take Note

Dick Cook (8434), vice chairman of the 1973 LEAP Committee, accepted the CHAD Award on behalf of Livermore employees from Dr. Jess Bromley, head of the Combined Health Agencies Drive in Alameda County. The presentation was made in recognition of last year's fund raising efforts during which Arnie Rivenes (8363) served as LEAP chairman. In 1972 Sandia was one of the first companies in the Bay Area to participate in CHAD. Twelve major voluntary health agency fund drives are brought together through CHAD.

Student Career Day at SLL

Local high school students spent a day at Sandia recently as part of their third annual YMCA Career Day. Aim of Career Day is to provide students with a glimpse of a career or profession they might like to pursue.

Five students joined Evelyn Foote, Supervisor of Secretarial and Clerical Development 8212-1; Ken Bennett, Visitor Control Section 8261-1; and Don Wagner, Personnel, Industrial, Relations and EEO Division 8212 for a first-hand look at the work done in these groups. A tour through the Sandia computer facility and electronic fabrication, machine shop and Gerber plotter areas was included in the day's activities.

Overall, some 120 students participated, along with about 100 Valley business people. Jim Wright (8151) currently serves as vice-president of the Y Men's Club.

Sandian Visits U. of Mexico

Ron Musket of Physical Research Division 8334 spent two weeks in Mexico City recently at the invitation of the Multinational Project on Physics of the Organization of American States (OAS).

Purpose of the visit was to take part in four seminars at the Institute of Physics of the University of Mexico. The seminars covered surface analysis fundamentals and techniques and were entitled "Depth Distribution of Oxygen Using Nuclear Reactions," "Surface Analysis Using Protons I," "Surface Analysis Using Protons II," and "Auger Electron Spectroscopy." While there, Ron also performed surface analysis experiments using ion-induced nuclear reactions.

Speakers

Walt Bauer (8334) and George Thomas (8314), "Gas Re-emission During 300 keV Helium and 150 keV Hydrogen Implantation of V, Nb, Mo and Stainless Steel," and "Electron Microscopy of He and H Implanted Metals"; Bill Wilson (8341), Charles Bisson (8441) and Donald Amos (5122), "Charged Particle Re-emission During Irradiation"; and Bill Swansiger, Ron Musket and Walt Bauer (all 8334) and Larry Weirick (8312), "Deuterium Permeation Through 309S Stainless Steel with Thin, Characterized Oxides," Conference on Surface Effects in Controlled Thermonuclear Fusion Devices and Reactors, Argonne National Laboratory, Argonne, Ill., Jan. 10-12.

Walt Bauer and Ron Musket (both 8334), "Surface Analysis Using Ion Beams," Gordon Research Conference on Thin Films, Santa Barbara, Calif., Jan. 21-25.



The classifiers were out in force at Livermore recently, only this time it was a case of declassifying rather than classifying.

A new system was established by the President in 1972 for classifying and declassifying government documents related to national security. The declassification activities pictured are a result of this order, which represents the

first major overhaul of the classification system in 20 years.

Livermore's review, performed by people from the Labs and the AEC installations, encompassed over 20,000 documents and results in the declassification of 12 percent of reports reviewed and a 13 percent declassification of technical files.



LABORATORY MODEL of the vidicon digitizer is checked by Thomas Evans (2342), a co-developer of the system. From top to bottom are oscilloscope, digitizer and computer.

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Vidicon Digitizer Developed

In the development of electronic hardware, an oscilloscope is a frequently used test instrument. The transient waveform — the trace — appearing on the cathode ray tube reveals much data about the electronics undergoing test. The trace may be analyzed in a number of ways, but one method — that of reducing the trace to numerical values, i.e., digitizing — offers considerable advantage in trace analysis.

An economical vidicon digitizer that uses any commercial oscilloscope to digitize waveforms has been developed by Gordon Bachand, Tom Evans and Keith Treece (all 2342). One model is for laboratory operations while the other is portable for field operations. The digitizer can simultaneously photograph and digitize the trace, while providing baseline digitizing to free the operator from precisely adjusting the vertical trace position.

Consisting of a silicon diode array vidicon tube mounted in a commercial TV camera, the system also includes an oscilloscope, mirror, beam splitter, logic chassis, display unit and a Polaroid camera. The compact field model includes the digitizer and an accessory case containing the TV camera, camera mount, digital cassette recorder and interconnecting cables.

Light from the trace on the cathode ray tube is coupled to the target of the vidicon tube with the beam splitter and mirror. The vidicon tube converts the light image to an electrical signal which is sampled in the logic chassis and converted to a series of 500 nine-bit digital words. The series of digital words is

stored in an internal metal-oxide-semiconductor (MOS) memory from which the data can be extracted and viewed on the display unit. The data can also be directed to a minicomputer or other peripheral device.

In addition to portability, the field model has the advantage of a static MOS memory compatible with either fast or slow peripheral devices.

For maximum accuracy, the vidicon digitizer is calibrated before digitizing with precise amplitude and time signals. These calibration signals are digitized and then analyzed by a computer, and the calibration factors are stored in the computer. The computer then uses the calibration factors to scale the data in engineering units and to correct for vertical and horizontal nonlinearities.

Overall accuracy of the digitizer has been checked by digitizing pulses of known amplitudes and widths. Pulse amplitudes were independently measured with an oscilloscope differential-comparator amplifier, and the pulse widths were measured with a time-interval counter. With prior calibration, the digitizer data always agreed within ± 2 digital counts ($\pm .4\%$ of full scale) of the scope and counter measurements. Standard deviation of the difference between data was one count. Thus, accuracy of the digitizer is essentially limited by its resolution.

Test results indicate that single-shot transients can be digitized at sweep rates of two nanoseconds per division. Since 500 digital samples are obtained, this represents a sample of 40 picoseconds.

Expect One Attack of Bursitis by 65

By Dr. A. S. Verdesca,
Medical Director WE

What do *tennis elbow*, *soldier's heel*, *housemaid's knee* and *weaver's bottom* have in common?

First, they're fanciful names for common forms of bursitis. Second, they're painful. Third, most people will experience an attack of bursitis by age 65.

Bursitis is a disease or inflammation of the bursa, and 140 or more of them are in the human body.

A bursa is a closed, fluid-filled sac with smooth walls that serves as a tiny cushion. It helps one structure of the body move over another without friction, like a soft roller-bearing.

Some are located just under the skin, in fact just between the skin and bony joints such as the elbow and the knee. Others are found under the thin fibrous sheets of tissue in which the muscles end.

Most bursae are present at birth but others develop later on in response to repeated friction. Some, usually those between bony prominences and skin, are not essential and can be eliminated without loss in function.

Others, between bones and muscle or tendon, or around joints, are important, and treatment means trying to preserve the basic bursa.

Descriptive names are given to the condition, as noted earlier. *Tennis elbow* often occurs in people who've never held a tennis racket in their hands. Another name for it is *miner's elbow*. And *nun's knee* is the same as *rug-cutter's knee*, and both are the same as *housemaid's knee*.

Even the common bunion is a bursitis usually found where the big toe joins the rest of the foot.

Oddly enough, the only bursitis lacking a fanciful title happens most of all: it causes the painful shoulder many people think is the *only* form of bursitis.

Another title-less, but quite common bursitis, occurs over the bony part of the upper outer thigh and is especially painful when trying to rotate the hip outwardly.

Every bursitis, however, is really the same condition, regardless of where it occurs, and what follows applies to all forms of the disease:

The two chief forms of bursitis are called *acute* and *chronic*.

Acute bursitis causes pain in the inflamed bursa with localized swelling and tenderness, usually from the accumulation of various fluids in the bursal sac. What really causes acute bursitis is unknown, although rare cases are caused by gout, acute or chronic infections and rheumatoid arthritis.

One of the hallmarks of acute bursitis is limited motion around the area. Sometimes the inflammation is so acute that even the weight of clothing over it is painful.

In most cases, the matter from the inflammation is absorbed by the cell lining of the bursa and the acute attack is over within a week or two. However, the condition may become chronic.

Chronic bursitis usually follows episodes of acute bursitis, or repeated aggravations, or chronic local infection. Or it may occur with no clearly discernible cause. In contrast to acute bursitis, which tends to hurt spontaneously, the pain of chronic bursitis

usually follows unusual exercise or effort.

Swelling from underlying fluid accumulation may be present and there is limited motion. Chronic bursitis may last from a few days up to months.

How is bursitis treated? For acute bursitis, complete rest of the affected part is a must during the early stages. Sometimes a sling or a splint or other support is necessary until the pain and muscle spasm begin to subside.

For the pain, aspirin — with or without the addition of a narcotic pain killer — is usually sufficient. Some doctors recommend heat. Where heat seems to aggravate the pain, then ice packs may be substituted. Massage, diathermy or ultrasonic treatments are also helpful.

To avoid the unfortunate complication of adhesive bursitis or "frozen joint," active movements should be undertaken as soon as the pain begins to subside.

If the acute pain persists, a local anesthetic or a cortisone compound may be injected. In some cases, this may have to be repeated.

On rare occasions, when pain persists for more than a week, X-ray treatments have usually been successful. Only if X-ray treatments prove unsuccessful is surgery required.

What about chronic bursitis? Diathermy, hot packs or baths, even massage, may help temporarily. Cortisone injections have proved helpful. Sometimes it's necessary to break up the calcium that's deposited in chronic bursitis with a needle while the patient is under anesthesia or during a cortisone injection.

As with acute bursitis, exercises of the surrounding muscles are always in order.

Supervisory Appointments



DAVE SCHUSTER to manager of Composites, Ceramics and Materials Properties Department 5840, effective June 1. He has headed Composite Materials Development Division since June 1969 where he has been engaged in research and the development of fiber-reinforced metals and ceramic materials. More than 25 technical articles on the results of his studies have been published.

Dave has a BS in metallurgy from Massachusetts Institute of Technology, an MS in metallurgical engineering and a PhD in materials science and engineering from Cornell University. At Cornell he was a research and teaching assistant. He joined Sandia in March 1967.

Since 1972 Dave has been chairman of the Technical Committee on Composite Materials, Institute of Metals Division, American Institute of Metallurgical Engineering. He is also a member of the American Society for Testing and Materials. He resides at 7100 Constitution NE.



NEW SUPERVISORS — Jack Houston (5114), John Portlock (2317) and Frank Gerstle (5844).

* * * *



JAN WILLIS to supervisor of newly-created Publications Services Division 3152, effective June 1. In November 1969 she assumed supervision of a Secretarial Services Section and, most recently, has supervised Publications Services Section 3151-1. Jan joined Sandia in 1959

as a secretary-stenographer and worked in various organizations until she left the Labs in 1962. Three years later she rejoined Sandia and, in 1966, was promoted to secretary of the Advanced Systems Research Department. She subsequently has been secretary to the Physics and Mathematics Research directorate and the Research vice presidency.

Jan holds a BS degree in business administration from New Mexico State University where she also earned a secretarial certificate. She and her husband Jim and their two children live at Canoncito Estates in the Sandias.

* * * *

JOHN PORTLOCK to supervisor of Tester Development Division 2317, effective June 1. He joined Sandia in August 1963 after earning a bachelor's degree in EE from Rose Polytechnic Institute, Terre Haute, Ind. At Sandia he was a member of the TDP program and earned a master's degree from UNM in 1965. He has worked several years on the design of earth penetrating seismic detectors and holds two patents for devices invented. For the past several years he has designed electronic components.

John enjoys bowling, tennis and bridge. He lives with his wife Janice and their son and daughter at 9216 Gutierrez Rd. NE.

JACK HOUSTON to supervisor of Surface Physics Division 5114, effective June 1. He joined Sandia in August 1966 and for his first year studied component behavior in radiation environments. He transferred to another group doing research on ion plating and thin film deposition where he studied the role of gas discharge on film properties. For the past five years, he has been engaged in the study of solid surfaces and their interactions with gases. The new division will concentrate on gaining an understanding of the fundamental nature of catalytic surfaces.

Jack earned BS, master's and PhD degrees in physics from Oklahoma State University. After graduation in 1965 he taught physics for three semesters at South Dakota School of Mines.

Jack is a member of the American Physical Society and the American Vacuum Society. He enjoys tennis and classical guitar. He resides with his wife Shirley and their son and daughter at 643 Bledsoe NW.

* * * *

FRANK GERSTLE to supervisor of Composite Materials Development Division 5844, effective June 1.

He first worked at Sandia as a summer hire in 1965 after earning his BA in mathematical science from St. Joseph's College in Rensselaer, Ind. He attended MIT the next year and earned his MS in mechanical engineering and returned to Sandia. In 1968 Frank took a leave of absence to earn a PhD in ME from Duke University.

At the Labs he has worked in a variety of areas including environmental test facilities design. Principally, he has been engaged in analysis and development of reinforced resin composite materials.

Frank's hobbies include backpacking and an interest in military history. He lives with his wife Louise and three-year-old son at 3904 Parsifal NE.



DICK GONZALES to supervisor of Metal Stock and Service Support Section 4821-4, effective June 1. For 25 years Dick has been working with metals. He was layout leadman in structural steel for Eidal Manufacturing Co. for nine years before coming to Sandia in November

1957. He has since worked at the acoustic facility in Area III and, following a year at that activity, transferred to the metal stock area.

Dick comes from a long line of Albuquerqueans — his great-grandfather was born here. He attended Albuquerque High and received his diploma from a Los Angeles city high school. Dick studied mechanical drawing and attended the N.M. Trade School. He served in the U.S. Army in 1947-48 and is a disabled veteran.

Dick likes to hunt and fish, and he especially likes any activity involving children. Last year he coached an amateur hockey team and is "Mr. Fixit" to most of the neighborhood children. He and his wife Emma, who worked at Sandia for 10 years, are active in the PTA and other groups. They have two sons and a daughter and live at 10804 Lexington NE.





HEAT SEEKING Redeye missile veers away from the target carriage as it chases a decoy flare. Detector systems undergoing evaluation have sensed the missile

attack and fired the flare. Coyote Canyon Test Field Division 9322 under Dave Bickel conducted tests of several missile detection systems for the Army.



REDEYE missile is fired from canyon floor at the rocket-powered target carriage zooming by overhead.

Detector Systems Tested

Shoot-Out in Coyote Canyon

Suspended between two mountain peaks, the heavy cable stretches a mile across Coyote Canyon Test Field. From the east peak comes a flash of flame. A rocket-powered carriage scoots along the cable. On the canyon floor a man aims a rocket launcher and fires. A heat-seeking Redeye missile arcs across the sky to intercept the carriage. Then a flare erupts

from the carriage and the missile, suddenly deceived, veers to chase the flare. Retro rockets on the carriage fire and it slows to a halt before touching the west peak. Only seconds have elapsed.

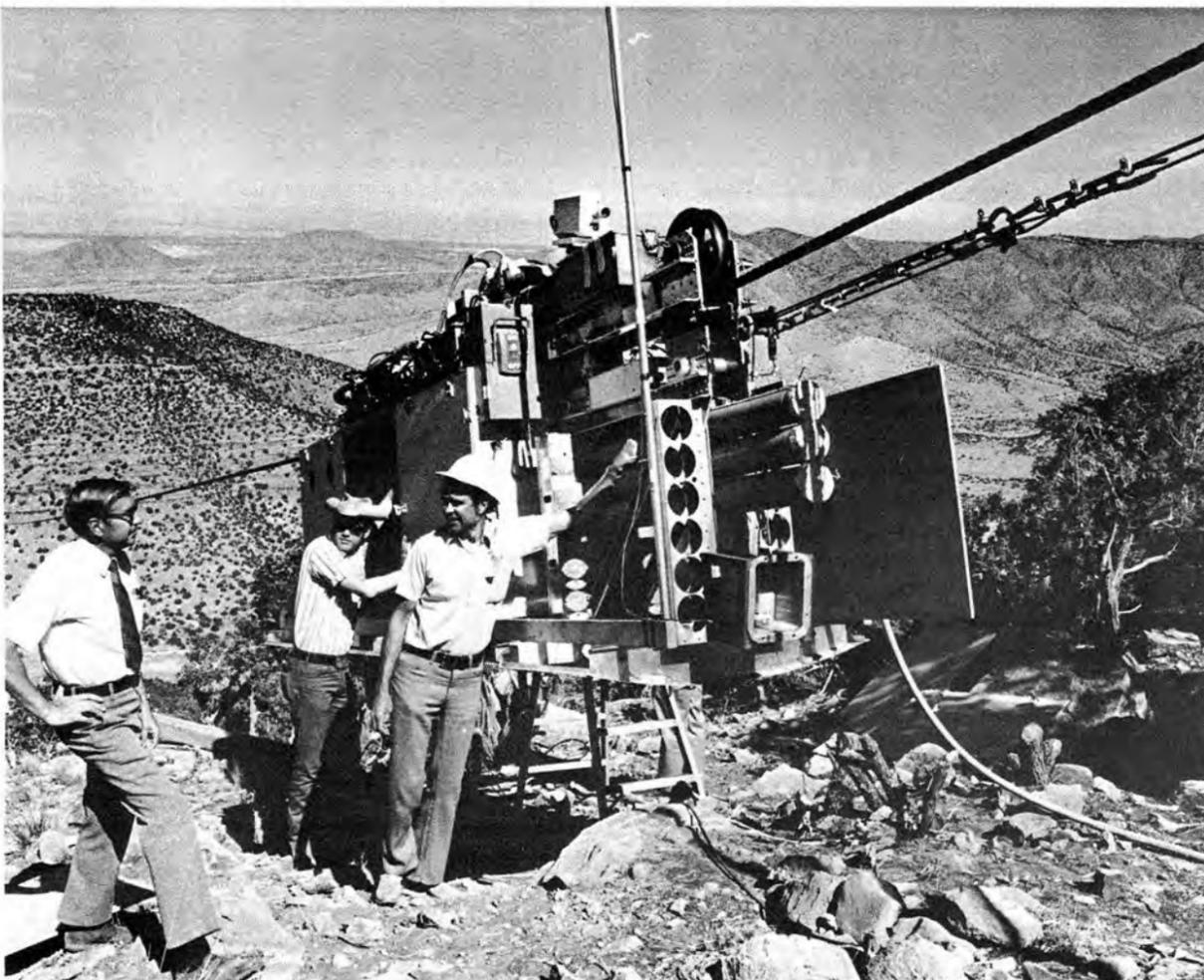
Sandia's unique aerial cable facility in Coyote Canyon was the scene recently of a series of Army-sponsored tests of several missile detector systems. Instrumentation on board the carriage plus TM relay to ground stations fully recorded all performance data. The carriage made 26 runs across the canyon.

Dave Bickel, supervisor of Coyote Test Field Division 9322, reports that the series was successful.

"The simultaneous controlled testing of several missile detectors could not have been conducted in any other way," Dave said. "With safety considerations, manned aircraft couldn't properly exercise the systems. There would be no way to evaluate the performance of each system. Drone aircraft could be used but could carry only one system at a time. And they are expensive and difficult to control accurately. Using the cable facility, we were able to test all systems under carefully controlled and identical conditions so that each system was fairly evaluated. We have complete data on all performances."

In addition to recorded performance data, a laser tracker provided information on missile trajectory relative to the target for all tests. Cameras on board the carriage also provided visual records of the tests.

The Army, Dave reports, is happy with the results of the Labs efforts. • dg



TARGET CARRIAGE is suspended on the aerial cable on the east peak of the facility. Mile-long cable stretches across the canyon. Dave Bickel (9322), left, discusses evaluation tests with Jack Webb (2122) and A.C. Carabajal (9322). On board carriage are several detector systems, cameras, recording and TM instrumentation, power supplies and thermite heat source.



Bldg. 802 Art Exhibit Is Work Of Claire Haut

A collection of paintings by Claire Haut (4124) is now on display in the elevator foyer of Bldg. 802. The paintings range from still lifes through landscapes and modernistic abstracts to wild collages.

Claire continually experiments, continually strives for different effects. She studied art at New Bauhaus (now Institute of Design, Illinois Institute of Technology) on scholarship from Moholy-Nagy, founder. Her work has been shown through the United States and Europe on a State Department tour. She has entered competitive art shows throughout the U.S. and her work has been accepted in various national, regional, state and local exhibits. In addition, she is an accomplished craftsman and jewelry maker.

Claire has worked at the Labs for 16 years.



CLAIRE HAUT (4124) displays one of several experimental collages now on display in Bldg. 802. She works in all media.

Take Note

Jack Tischhauser, manager of Applied Computer Science Department 2640, was recently elected regional representative (Mountain Region) of the Association for Computing Machinery. He will serve a three-year term on the ACM Council, governing body of the national organization. ACM is the professional society for computer people involved with computer software.

* * * *

An editorial in the February 1974 issue of *IEEE Transactions on Electromagnetic Compatibility* pointed to Sandia's work on lightning resistant connector devices as one of the significant advances in electromagnetic compatibility during the past year. It is now possible to use a multi-pin connector having a built-in lightning arrestor to reduce lightning hazards to missiles, aircraft and ground systems.

The work was described by Arlin Cooper (2126), inventor of the "Electrical Surge Diverting Connector," and Leland Allen (2121) in an article which appeared in the August 1973 issue of the publication.



EMPTY CABLE REELS tell the story. Ralph Wenzelburger (left) and Jose Gutierrez (both 4821-3) prepare to fill a cable order.

Stores People Coping With Shortages and Delays

Difficulties arising from the energy crisis have been experienced by everyone. But for most of us the effect has been minor — lower thermostats last winter, fewer weekend trips, more carpools and bus riding. Of course, everyone has paid higher prices for whatever was purchased.

"This energy situation has created some shortages," says Norm Ollman, supervisor of

Stock and Materials Management Division 4821. "Our biggest problems have been delays in delivery, and — along with everyone else — rising costs."

This division supplies all commercial stock items used at the Labs. They have an inventory of 16,000 line items; records for these items are handled by Stock Control Section 4821-1, supervised by Ray Beall. "Two years ago our backorders averaged about 600 items," Ray says. "Today, we have 1500 items on backorder. The shortages vary from week to week, depending on our own usage. Delivery on electrical parts is especially slow," Ray says. "We have some orders on resistors with an 8- to 12-month delivery lag. Metals, plastics, cable, paper, and hand tools are also in short supply. Delivery was made on items using copper, gold, silver, platinum or steel within 60 days, but now we plan on a minimum of 90 to 120 days. We have 50,000 feet of one type of cable on backorder right now; occasionally, the suppliers can send us a partial order — 2000 or perhaps even 5000 feet. And cable is a good example of the increase in cost. The 22-cents-a-foot cable is costing us 42 cents a foot today."

"Purchasing has done a good job for us," Norm continues. "Manufacturers have their problems too. They have allotments imposed on them and most try to be fair and fill what orders they can. Our buyers have been having a tough time because many suppliers now refuse to commit themselves to a set price to be in effect six months or a year from now."

"We've taken precautionary steps," Ray says, "and we'll continue to supply Sandia's needs. We've increased buying as well as the delivery rates."

To help relieve the supply crunch, Ray and Norm urge you to tell them your requirements ASAP, especially if large quantities of one item are needed. • nt

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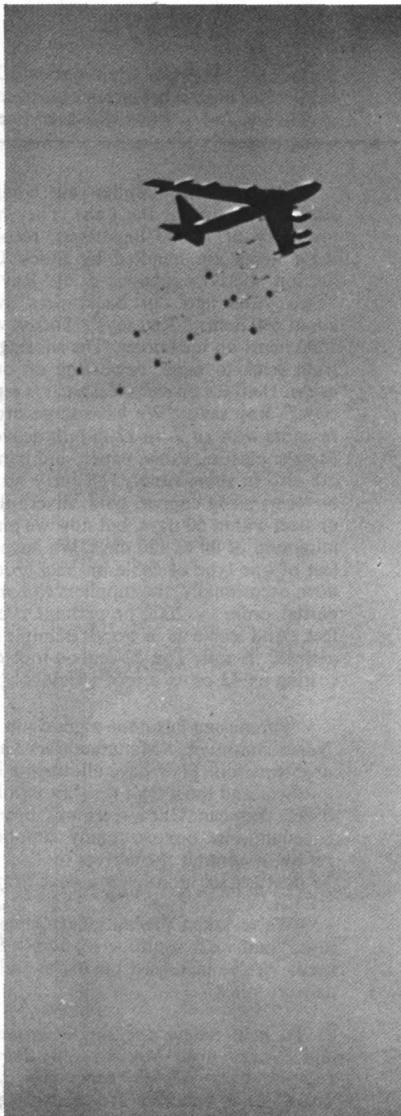
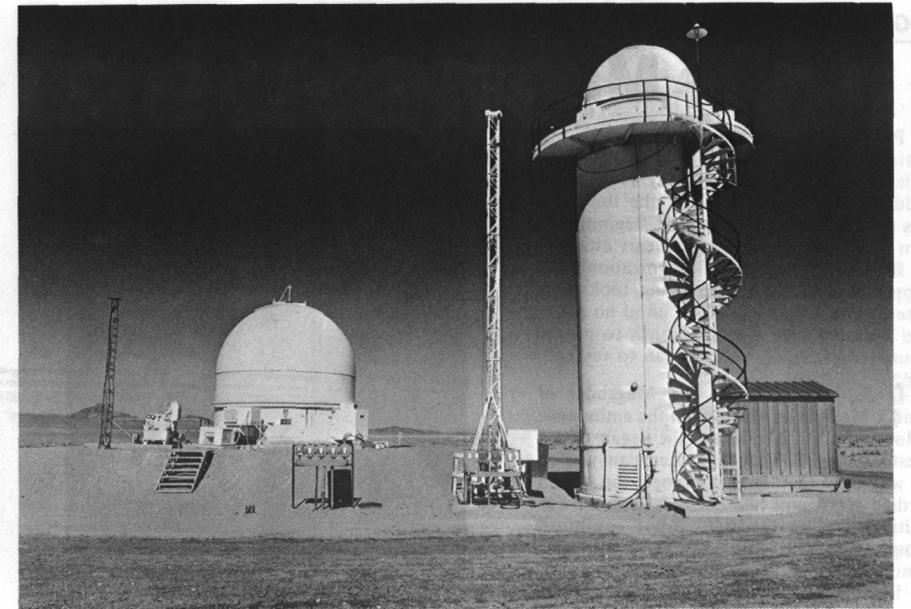
Rocket Payload To Peer at Sun's Corona

system emits radio signals to aid in the recovery operation.

Thirty scientists, engineers and technicians are working on the project. U.S. laboratories participating are Sacramento Peak Observatory of the Air Force Cambridge Research Laboratories, Laboratory for Atmospheric and Space Research at the University of Colorado, Los Alamos Scientific Laboratory and Sandia Laboratories.

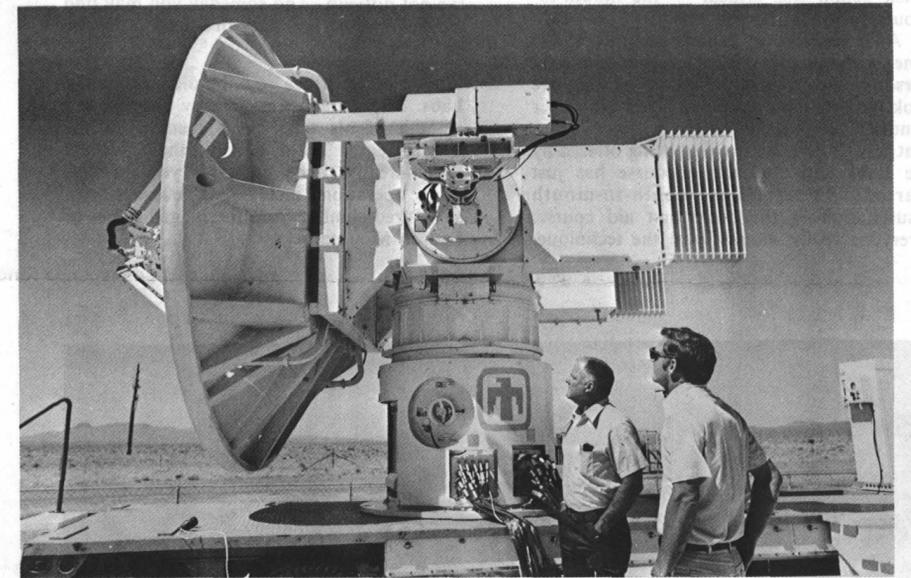
At Sandia, project manager is John Eckhart (1250), test director is Ed Hansen (1253), and project engineer is Wayne Lathrop who is working with Ken Goen (both 1253); and Pete Seward (1135) is handling the logistics. Labs responsibilities include assembling and launching the rockets and payloads, development of the pointing system, gathering instrumentation data and conducting recovery operations.

Home on the Range



LAB NEWS visited Tonopah Test Range last month. Saw the wild horses on the front page, plus these scenes and people. Counterclockwise from top:

- Range cattle head from waterhole to graze on the mesa.
- B-52 drops 18 sea mines and chutes from 3000 feet above main lake bed.
- Sign slows down intruders into cannon firing area.
- Sea mines impact on lake bed; one not quite down yet (center right).
- Bob Schowers (9473) operates tracking telescope.
- Tracking radar with John Patrick and Gene Arndt (both 9471).
- ME-16 telescope facility and 40-foot Contraves tower (used for precise positioning of range event).



Mouth to Mouth

Labs Man Saves Life

Paul Dailey of organization 9353 was sitting casually on a stool talking to colleagues in Bldg. 872 on May 17 when he suddenly slumped and fell to the floor. He was unconscious, not breathing, beginning to turn blue. Paul was having a heart attack.

Bruce Varnado, also of organization 9353, happened by as this was occurring, took quick note of Paul's loss of color, found no pulse, and immediately began mouth-to-mouth resuscitation. Paul's color began to return.

Dr. Fitzpatrick and Joe Magruder of Sandia Medical appeared with the ambulance followed by Dr. Mossman. Joe began closed chest massage. Shortly thereafter, Paul was on his way to Bataan Hospital where the special cardiac arrest unit had been alerted and was waiting. During the ride, Bruce continued mouth-to-mouth resuscitation, while Joe continued CCM.

Paul is now recovering satisfactorily at home.

Dr. Mossman puts it directly: "Bruce's quick action was critical — the mouth-to-mouth resuscitation restored life."

As it turned out, Bruce's presence at the time was equally critical. He is the only person in the group with first aid training. He took the training a couple of years ago under Sandia's out-of-hours program. Bruce notes that this is the same training being offered by the Labs now. In fact, a course has just started. "You learn mouth-to-mouth resuscitation in the basic first aid course. Everyone really should learn the technique.



Bruce Varnado (9353)

It's not difficult. And someday you may find yourself in the life and death situation that we had here."

We asked Bruce what he did outside the Labs. People in distress occupy a significant amount of his time. As a member of the Sandia Search Team, he and other members have already taken part this year in four rescue operations, including the evacuation of an injured climber from the rugged slopes of Ladron Mountain.

\$1.5 Million Authorized For Microelectronics Labs

AEC has announced that \$1.5 million has been made available to Sandia Laboratories to remodel and expand Bldg. 870 to house new microelectronics laboratories. Semiconductor Device Department 2110 will be the main occupant of the building when construction and equipment installation is completed about October 1975.

When additions are complete, Bldg. 870 will contain some 15,000 sq. ft. of laboratory and office space, 5800 sq. ft. of which will be clean room areas housing two separate microelectronics laboratories.

Integrated circuitry process development and prototype device fabrication will be performed in one of the labs by Division 2113. The other lab, operated by Division 2432, will produce hybrid microcircuit prototypes.

The integrated circuit work will be performed in the Solid State Development Laboratory (SSDL), designed to optimize use of clean room areas for semiconductor processing. SSDL consists of two levels of cleanliness, an ultra-clean "class 100" area where critical steps in wafer fabrication occur, and a surrounding "class 10,000" clean area for less critical steps. The class designation refers to the number of airborne particles per cubic foot greater in size than 0.5 micron.

To gain maximum use of the class 100 area, large processing equipment such as diffusion furnaces, the epitaxial reactors, and the ion implanter are located so that they are accessible from within the ultra-clean area for processing, but are servicable from without. Only very low levels of contamination are acceptable if the lab is to be successful in fabricating radiation tolerant LSI integrated circuits, one of its major goals. The Sandia SSDL is similar to Bell Labs' Device Capabilities Laboratory (DCL) at Allentown, Pa., and substantial interaction between the two Labs is planned. To this end, Bob Gregory, supervisor of 2113, will spend the summer at the Bell Labs facility in Allentown.

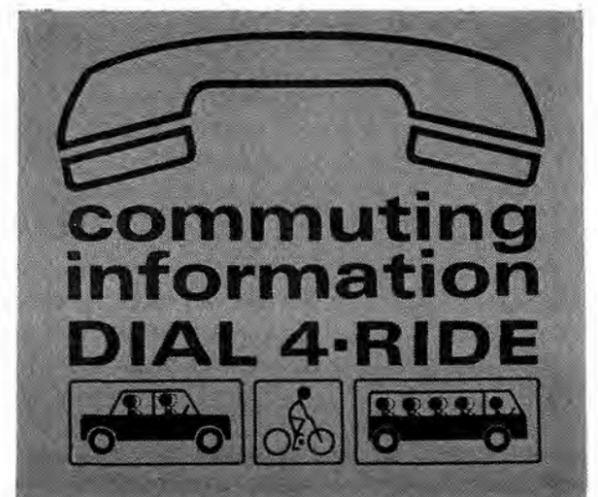
The SSDL will play a key role in future Sandia programs by enabling in-house designs of integrated circuits to be exercised before production so that design errors can be detected. The facility will also provide small quantities of prototype custom circuits for advanced system evaluation. For outside production, SSDL will establish processes and process controls on circuit fabrication.

Adjoining SSDL, the new hybrid microelectronics facility will increase the Labs' capability to fabricate prototype hybrid circuits. Integrated circuits will be assembled into hybrid circuits which, in volumes as small as one cubic inch, can replace several racks of electronic tubes. Both SSDL and the hybrid microelectronics facility will enable Sandia to remain in the forefront of microcircuitry design and development.



WHOOO's the newest Wise Owl Club member? It's Lawrence Chavez (9718), right, here getting admitted to the select group of those whose eyesight was saved by wearing safety glasses. Lawrence was installing conduit in the attic of Bldg. 893 when a

support board tilted and he grabbed an air duct for support. A corner of the duct shattered his glasses, but no harm befell his eyeball. Making Wise Owl membership official are Bob Flaxbart (9710), center, and Jerry Jercinovic (9540).



Credit Union Reporter



MAN, HELMET, CURB & BIKE — Dick Prairie (1643) was biking to work when his attention wandered to a dragging front wheel. Whereupon he bashed into a parked car, went sailing off the bike, and landed head first on the edge of the street curb. Luckily, Dick was wearing the SBA-recommended helmet and it took the impact nicely. Dick was dazed but recovered quickly. At last count, about 70 SBA'ers were using this helmet.

Recreation Notes

FUN & GAMES

Shoot 'Em Up — Celso Montano (9550) took second place in the slow fire event of the Annual AEC/ALO Pistol Tournament held at LASL on May 20. Also representing Sandia were Luciano Archuleta and Milt Lesicka (both 9550).

* * * *

Sandia Chess & Go Club — Next regular monthly meeting is Monday, June 17, 7:30 p.m., at the Coronado Club. Members and non-members are invited.

* * * *

Sandia Bicycle Ass'n. — SBA now has 387 members and, as far as we know, is the largest more-or-less organized bike group in the state. We sponsor neither tours nor races, nor do we have meetings, but we do aim to improve cycling conditions in the city and on the Base; for the former some moderate success has been gained, while for the latter — well, you can't win 'em all. The work of SBA is done by an executive committee, currently headed by Billy Thorne (5162), who, after a year in office, is ready to step aside. All SBA members will shortly receive a ballot to vote upon a new executive committee.

To join SBA, send your name, organization, E-number and office phone number to SBA, Org. 3162. If you wish, enclose a buck because the association occasionally supports some bike oriented cause. You'll receive the SBA newsletter which carries bike news, tips on riding, good deals, and the like.

* * * *

Sandia Runners Ass'n. — The La Luz Trail race is scheduled for Aug. 24, more than two months from now. Last year 10 or so SRA'ers competed in the 7-1/2-mile event. Many more SRA members could achieve the satisfaction of completing La Luz if their training began to include practice runs up at least a portion of the trail. These runs get your mental view of the race under control, and most La Luzer's agree the psychological — not the physical — aspect of the event is dominant.

By *Ralph Hampy*
Board Member



(Ed. Note: Some Credit Union columns have aroused more questions — and requests for back issues — than others. One of these, originally run Aug. 27, 1971, is reprinted here. A sequel on the same subject will appear in the near future.)

Save a Bundle, Maybe: Mortgage Prepayment

Once a month, in a sort of ritual, we write a check to the mortgage company, seal it in the envelope, and make a mental note to the effect "... only 22½ years to go ...". Most mortgage holders have the impression that the critical dimensions of their mortgages are fixed, i.e., interest rate, term of the loan, monthly payment, etc. But the fact is that through the use of a device known as "prepayment" a considerable amount of interest can be saved and the term of the loan shortened.

Study the table below. It shows what you actually pay over a period of years toward principal and interest on a 30-year \$30,000 loan.

COST OF A 30-YEAR, \$30,000

ANNUAL INTEREST RATE	TOTAL PRINCIPAL PAID	TOTAL INTEREST PAID	TOTAL AMOUNT PAID
5%	\$30,000	\$27,978	\$57,978
6%	\$30,000	\$34,753	\$64,753
7%	\$30,000	\$41,856	\$71,856
8%	\$30,000	\$49,247	\$79,247
9%	\$30,000	\$56,900	\$86,900

It's clear that the interest bite ranges from severe to painful, especially if you've bought your home in the last few years when rates of 8 and 9 percent were not uncommon.

Next, let's consider the effect on the loan of prepayments. By prepayment, we mean making additional payments on the principal in addition to the regular monthly payments. This table is a typical amortization schedule for a conventional 30-year \$30,000 loan at an annual interest rate of 8 percent. Only the first 25 monthly payments are shown.

Sympathy

To Harlan Lenander (1600) on the death of his mother-in-law in Albuquerque, May 16.

To Freddie Weber (3140) on the death of her mother in Kansas City, May 17.

To Kent Johnson (3617) on the death of his mother in New York.

To Frank Norris (9751) on the death of his wife in Albuquerque, May 31.

To Pete Gallegos (2336) on the death of his father in Albuquerque, May 30.

INTEREST RATE	MONTHLY PAYMENT	TERMIN MONTHS	FACE AMOUNT
8.00%	\$220.13	360	\$30,000.00

PAYMENT NO.	PAYMENT TO INTEREST	PAYMENT TO PRINCIPAL	BALANCE DUE
1	\$200.00	\$20.13	\$29,979.87
2	199.87	20.26	29,959.61
3	199.73	20.40	29,939.21
4	199.59	20.54	29,918.67
5	199.46	20.67	29,898.00
6	199.32	20.81	29,877.19
7	199.18	20.95	29,856.24
8	199.04	21.09	29,835.15
9	198.90	21.23	29,813.92
10	198.76	21.37	29,792.55
11	198.62	21.51	29,771.04
12	198.47	21.66	29,749.38
	\$2,390.94	\$250.62	
13	\$198.33	\$21.80	\$29,727.58
14	198.18	21.95	29,705.63
15	198.04	22.09	29,683.54
16	197.89	22.24	29,661.30
17	197.74	22.39	29,638.91
18	197.59	22.54	29,616.37
19	197.44	22.69	29,593.68
20	197.29	22.84	29,570.84
21	197.14	22.99	29,547.85
22	196.99	23.14	29,524.71
23	196.83	23.30	29,501.41
24	196.68	23.45	29,477.96
	\$2,370.14-B	\$271.42-A	
25	\$196.52	\$23.61	\$29,454.35

In the early years of the loan the amount paid toward principal is discouragingly small while the interest paid is large. But suppose the homeowner makes the first 12 payments in regular monthly fashion and, at the time he makes the 12th payment, he decides to prepay the principal for the next year (payments 13 thru 24). He pays an additional \$271.42 (Box A) which is only slightly greater than his regular monthly payment. In doing so, the homeowner saves a whopping \$2370.14 in interest payments (Box B) and takes a year off the term of the loan as well. During the early years of the loan, principal prepayments can be modest — for one month or several months — and yet result in suprisingly large savings in interest payments.

All home loan mortgages have some stipulation regarding principal prepayment. Prepayment can usually be made without penalty up to a certain amount, generally 10 or 15 percent of the original principal may be paid in a given year. Check your loan papers or call the mortgage company for details on your loan. Even if a penalty is imposed, it usually amounts to only 1 or 2 percent of the amount paid over that allowed.

Whether prepayment is the route for you to follow depends to a large extent on the interest rate of your mortgage. Nowadays there are some 9 percent mortgages in existence, but — believe it or not — there are still some active 4½ percent mortgages. Prepayment is probably desirable for the former but not the latter. If your mortgage is in between, then you must judge if the cash to be applied to a prepayment could be more profitably invested elsewhere.

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J.E. Houston (5114), "Retrieval of Electron-Excited Auger Structure by Dynamic Background Subtraction," Vol. 24, No. 1, APPLIED PHYSICS LETTERS.

J.E. Schirber (5150), "Pressure Dependence of the Superconducting Transition Temperatures of PdH and PdD," Vol. 46A, No. 4, PHYSICS LETTERS A.

R.A. Anderson (5814), "Mechanism of Fast Surface Flashover in Vacuum," Vol. 24, No. 2, APPLIED PHYSICS LETTERS.

G.W. Arnold (5112), "Ion-Implantation Effects in Noncrystalline SiO₂," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

W. Beezhold and K.L. Brower (both 5112), "Electron Paramagnetic Resonance of the Lattice Damage in Boron-Implanted Intrinsic Silicon," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

F.B. Brumley, D.C. Evans (both 2115), and D.L. Mangan (2414), "IEMP Studies of a Dielectric-Filled Cavity: A Comparison of Experiment and Theory," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

R.A. Burghard (2113) and C.W. Gwyn (2114), "Radiation Failure Modes in CMOS Integrated Circuits," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

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B.J. Gregory (2113) and B.D. Shafer (2116), "Latch-Up in CMOS Integrated Circuits," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

D.H. Habing and B.D. Shafer (both 2116), "Room Temperature Annealing of Ionization-Induced Damage in CMOS Circuits," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

J.C. King (2500) and H.H. Sander (2113), "Transient Change in Q and Frequency of AT-Cut Quartz Resonators Following Exposure to Pulse X Rays," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

G.J. Lockwood, G.H. Miller (both 5226), and J.A. Marble (5223), "Absolute Measurement of Low Energy Electron Deposition Profiles in Semi-Infinite Geometries," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

J.M. McKenzie (2115) and L.J. Witt (2412), "Measurement of the Neutron Energy Dependence of Base Current Degradation of a Silicon Bipolar Transistor," Vol. NS-20, No. 6, IEEE TRANSACTIONS ON NUCLEAR SCIENCE.

R.B. Pettit (5823) and W.J. Camp (5151), "Phase Separation in the Semiconducting Binary Liquid Selenium-Thallium," Vol. 32, No. 7, PHYSICAL REVIEW LETTERS.

B. Morosin (5154), "Crystal Structure of Bis Benzene Chromium Iodide," Vol. 30B, Part 3, ACTA CRYSTALLOGRAPHICA.

A. Narath (5000) and D.C. Barham (5151), "A Phase-Coherent, Extended-Frequency-Range, High-Power RF Transmitter System for Pulsed Nuclear Magnetic Resonance," Vol. 45, No. 1, THE REVIEW OF SCIENTIFIC INSTRUMENTS.

D.W. Schaefer (5814), et al, "Intensity Fluctuation Spectroscopy of Motile Microorganisms," Vol. 248, No. 5444, NATURE.

L.F. Shampine (5122), "Limiting Precision in Differential Equation Solvers," Vol. 28, No. 125, MATHEMATICS OF COMPUTATION.

R.O. Woods and T.K. Devlin (both 1255), "A Cryopumping System of Balloon-Borne Mass Spectrometers," Vol. 45, No. 1, THE REVIEW OF SCIENTIFIC INSTRUMENTS.

R.G. Kepler (5810) and D.C. Hoesterey (Eastman Kodak), "High Field Mobility in Anthracene Crystals," March issue, PHYSICAL REVIEW B.

H.P. Stephens (5823) and E.K. Beauchamp (5846), "A Calorimetric Technique for Measuring Strain Energy Release in the Dicing of Stressed Glass and Glass-Ceramics," Vol. 53, Feb. 1974, AMERICAN CERAMIC SOCIETY BULLETIN; Stephens, "Determination of the Enthalpy of Liquid Copper and Uranium with a Liquid Argon Calorimeter," April 1974 issue, HIGH TEMPERATURE SCIENCE.

M.J. Sagartz (9324), "Response of a Three-Layered Ring to an Axisymmetric Impulse," March issue, AIAA JOURNAL.

D.A. Nissen and R.W. Carlsten (both 2523), "The Surface Tension of the Molten Binary System LiCl-KCl," April issue, JOURNAL OF THE ELECTRO-CHEMICAL SOCIETY.

J.N. Olsen (5213), "Picosecond Infrared Holography



SANDIA LABS Board of Directors met here for its annual meeting May 23 and 24, and AEC Commissioner Larson joined the group for a portion of the session. From left, seated, D.E. Procknow, Pres. of WE; J.S. Herbert, EVP, WE; Commissioner Larson; Pres. Sparks; and W.O. Baker, Pres. of Bell Labs. Standing, from left, P.E. Hogin, EVP, WE; D.W. Thomas, EVP, BL; K.G. McKay, EVP, BL; Sandia's EVP Jack Howard; and J.T. West, EVP, WE.

on Bismuth Film," Vol. 24, No. 5, APPLIED PHYSICS LETTERS.

C.L. OLSON (5241), "Pressure Gradient Focusing of Intense Beams," Vol. 16, Dec. 1973, PHYSICS OF FLUIDS.

R.J. Baughman, G.L. McVay (both 5154), and R.A. Lefever (2432), "Preparation of Hot-Pressed Silicon-Germanium Ingots. Part I-Chill Casting of Silicon-Germanium Alloys," Vol. 9, No. 5, MATERIALS RESEARCH BULLETIN.

R.T. Johnson (5155), R.K. Quinn (5154), and C.J. Miglionico (5822), "Surface Nucleated Crystallization in Ge₁₅Te₈₀As₅ Semiconducting Glasses," Vol. 9, No. 5, MATERIALS RESEARCH BULLETIN.

J.V. Walker (5220) and J. Stevens (EG&G), "A Time Resolved Spectrometer for High Intensity Relativistic Electron Beams," Vol. 45, No. 2, THE REVIEW OF SCIENTIFIC INSTRUMENTS.

A.G. Beattie (9352) and R.A. Jaramillo (5155), "The Measurement of Energy in Acoustic Emission," Vol. 45, No. 3, THE REVIEW OF SCIENTIFIC INSTRUMENTS.

R.S. Berg, G.J. Kominiak and D.M. Mattox (all 5834), "Incorporation and Behavior of Helium in Cold-Worked Films," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

A.R. DuCharme (5154) and R.L. Gerlach (former Sandian), "The Role of Coster-Kronig Transitions in the Ionization of Surface Atoms," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

E.P. EerNisse (5112), "Sputtering Measurements with the Double Resonator Technique," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

R.A. Gerber and E.L. Patterson (both 5212), "Intense Electron-Beam Initiation of a High-Energy Hydrogen Fluoride (HF) Laser," Vol. QE-10, No. 3, IEEE JOURNAL OF QUANTUM ELECTRONICS.

J.A. Panitz (5114), "The Crystallographic Distribution of Field-Desorbed Species," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

R.L. Park (5115) and J.E. Houston (5114), "Soft X-Ray Appearance Potential Spectroscopy"; and R.L. Park and D.G. Schreiner (5114), "Oxidation of Carbon Monoxide on Palladium," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

R.R. Sowell, R.E. Cuthrell, D.M. Mattox, and R.D. Bland (all 5834), "Surface Cleaning by Ultraviolet Radiation," Vol. 11, No. 1, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

V.L. Dugan (4734) and R.E. Trujillo (5251), "On a Fundamental Problem in Radiation Biology," Vol. 44, 1974, JOURNAL OF THEORETICAL BIOLOGY.

S.R. Dolce (5226), "Time Resolved Position Measurements - A New Application for Position Sensitive Detectors," Vol. 45, No. 4, REVIEW OF SCIENTIFIC INSTRUMENTS.

M.J. Forrestal and D.K. Overmier (both 9324), "An Experiment on An Impulse Loaded Elastic Ring," Vol. 12, No. 5, AIAA JOURNAL.

G.J. Simmons (5120), "On a Problem of Erdos

Concerning a 3-Coloring of the Unit Sphere," Vol. 8, No. 1, JOURNAL OF DISCRETE MATHEMATICS; Simmons and G.P. Steck (5122), "On the Distributions of R_{mn}^+ and (D_{mn}^+, R_{mn}^+) ," Vol. 8, MATHEMATI-CARUM HUNGARICA.

F.G. Yost (2431), "Ultimate Strength and Morphological Structure of Eutectic Bonds" Vol. 3, No. 2, JOURNAL OF ELECTRONIC MATERIALS.

Speakers

B. Stiefeld (9351), "NDT and Interactive Data Display"; B. Donaldson and W. Schimmel (both 1543), "Method for Thermal Diffusivity Measurement in a Deposited Thin-Film Using a Pulsed Laser"; D. Anderson and L. Maschoff (both 9471), "Real Time Digital Control of Remote Tracking Instruments"; and B. Kampfe and M. Johnson (both 9333), "Sled Track Alignment Using Music Wire," International Instrumentation Symposium, May 21-23, Albuquerque.

D.J. Thompson (3313), "Personnel Radiation Dosimetry," Emergency Preparedness and Radiological Assistance Seminar, May 21-24, Mound Laboratory.

J. Chang and P.A. Miller (both 5254), "Laser Plasma Aided Focusing of Relativistic Electron Beams From Hydra"; T.H. Martin (5245), "Advances in Pulsed Power Technology Relativistic Electron Beams"; M.M. Widner (5241), "Theoretical Study of Pinched Electron Beam Damage to Anode Witness Plates," First Institute of Electrical and Electronics Engineers, International Conference on Plasma Science, May 15-17, Knoxville, Tenn.

M.J. Forrestal (9324), "The Response of Structures to Impulse Loads Produced by Magnetic Energy," Stanford Univ., May 9.

J.M. Hueter (3131), "The Academic-Industry Marriage in Cooperative Education as Viewed by the Technical Employer," Univ. of Cincinnati Cooperative Education Institute, May 23, Chicago.

C.N. Vittitoe (5223), "The SHARP Code," DNA meeting, May 22-23, Alexandria, Va.

D. Emin (5155), "Small-Polaron Theory," Solid State Colloquium, Naval Ordnance Lab, May 28, Silver Spring, MD.

L.V. Rigby and A.D. Swain (both 1642), "Some Human Factor Applications to Quality Control in a High Technology Industry," International Symposium on Human Factors in Quality Control, May 29, Buffalo, NY.

C.B. Bailey and R.E. Jones (both 2642), "Usage and Argument Monitoring of Mathematical Library Routines"; D.E. Amos, S.L. Daniel and M.K. Weston (all 5122), "CDC 6600 Subroutines IBESS & JBESS for Bessel Functions $I_\nu(x)$ and $J_\nu(x)$ $x \geq 0$, $\nu \geq 0$ "; L.F. Shampine (5121) and H.A. Watts (2642), "Global Error Estimation for Ordinary Differential Equations," Mathematical Software II, May 29-31, Purdue Univ.

E.J. Graeber (5825), "Computer Simulation of X-Ray Powder Patterns," UNM Graduate Chemistry Seminar, April 5.

B.M. Butcher and A.L. Stevens (both 5167), "Dynamic Mechanical Properties of Coal"; G.A. Carlson (5167), "Dynamic Response of Selected Geological Materials to Pulsed Energy Deposition"; R.T. Walsh (5166), "Dual Coordinates for Ground Motion Calculations," 55th Annual Meeting of American Geophysical Union, April 8-12, Washington, D.C.

L.J. Burchett (9352) and D.W. Ballard (9351), "Effects of Metrication in Nondestructive Testing," Spring Conference, Standards & Metrology Division, American Defense Preparedness Association, April 9-10, Washington, D.C.

J.N. Sweet (2432), "Accelerated Lifetesting and Failure Modes of Thin Film W Contacts on SiGe Thermoelectric alloys"; F.G. Yost and F.P. Ganyard (both 2431), "Aging Studies of Pb-In Solder on Au Metallized Substrates"; J.R. Adams and J. Villanueva (both 2431), "Determining Thermocompression Bondability Using the Coefficient of Dynamic Friction"; D.W. Bushmire and P.H. Holloway (both 2431), "Removal of Organo-Carbon Contaminants by Ozonization"; P.H. Holloway, "Quantitative Analysis of the Influence of Contaminants on Thermocompression Bonding of Gold"; Holloway and Bushmire, "Detection by Auger Electron Spectroscopy and Removal by Ozonization of Photoresist Residues," 1974 International Reliability Physics Symposium, April 2-4, Las Vegas, Nev.

G.W. Arnold (5112), "High-Density Damage in Al_2O_3 by Low-Energy Proton Implantation"; R.S. Blewer (2413), "Evaluation of Helium and Hydrogen Isotope Depth Profiles in CTR First Wall Material Candidates by Proton Backscattering," First topical meeting on Technology of Controlled Nuclear Fusion, April 16-18, San Diego.

J.P. Martin (1232), "Buried Line Sensor Evaluation for BISS," Carnahan Conference on Electronic Crime Countermeasures, April 16-19, Lexington, Ky.

A.L. Stevens (5167), "Residual Mechanical Properties of Textured and Spall-damaged Beryllium"; M.R. Scott (2642) and R.E. Kalaba (USC), "A New Method of Nonlinear Matrix Eigenvalue Problems of Structural Mechanics"; D.L. Wesenberg (9324) and M.R. Birnbaum (8331), "Dynamic Elastic-Plastic Response of Aluminum Rings Subjected to a Cosinusoidally Distributed Impulse Loading"; R.E. Jones (2642), "Use of Restructuring in Mesh Generation," AIAA/ASME/SAE 15th Structural Dynamics and Materials Conference, April 17-19, Las Vegas, Nev.

L.B. Mendelsohn (Polytechnic Institute of NY), F. Biggs (5223), and J.B. Mann (LASL), "Relativistic Hartree-Fock Compton Profiles for the Rare Gases and Lead," Washington Meeting of APS, April 22-25.

M.J. Clauser (5241), "Thermonuclear Reactions in Solid Spherical Laser Targets," 7th European Conference on Plasma Production by High-Power Lasers, Max-Planck-Institut für Plasmaphysik, April 22-26, Garching bei München, Germany.

W.S. Sarcic (5643), "Application of Singular Perturbation Methods to Non-Linear Mechanics Problems," Reactor Analysis and Safety Division Seminar, April 23, Argonne, Ill.

M.L. Lieberman, R.M. Burlee (both 5843), F.H. Braaten (3623), and G.T. Noles (5843), "Carbon/Carbon Development Program: Substrate Simulation, Process Scale-Up & Properties of an Improved Heatshield Material," 19th SAMPE Symposium, April 23-25, Anaheim, Calif.

C.W. Frank (5811), "The High Pressure Chemistry and Physics of Iron," Symposium of NATO Advanced Study Institute on Petrophysics, April 25-29, Newcastle, England.

J.L. Jellison (5833), "New Techniques for Evaluating Thermal Compression Ball Bonds," and "Progress Report on Laser Seam Welding," IMOG Joining Subgroup Meeting, April 18, GE Pinellas Plant.

R.A. Sallach (5831), "Magma Tap-Science Fiction or Future Fact," NMIMT, April 17, Socorro.

W.D. Love (9423), "The User-Oriented Data Reduction System"; J.D. Tebbs (9332), "The Sigma-5 Automated Data Processing System"; T.M. Schultheis (9423), "The DITAC System at TTR," Computer Applications Workshop II, April 19, LASL.

J.C. Swearer (5847), and J. Lipkin (5162), "In-Flight Strength Degradation of Reentry Vehicle Substructures"; J.E. Gover (2315) and F.B. Brumley (2115), "A Comparison of One and Two Dimensional Calculations of Radiation Induced Electric Fields Produced in Squib Geometries"; E.F. Hartman (2115), C.G. Scott (2509) and J.E. Gover (2315), "The Initiation Mechanism of Lead Azide at Low Dose Levels in a Radiation Environment," Symposium on Nuclear Survivability of Propulsion and Ordnance Systems, April 23-25, Seattle.

B. Stiefeld (9351), "Nondestructive Testing and Quality Assurance," National Composite Materials Conference, April 16-17, New York City.

M. Moss (5844), "Filamentary Composites: Design and Fabrication," NMIMT engineering colloquium, April 24, Socorro.

N.J. DeLollis (5813), "Sandia Adhesives Program," Adhesive Materials Colloquium, April 24-25, LLL.

A.J. Clark, Jr. (9330), "Modern Trends in Environmental Testing"; A.F. Witte (Kaman Science Corp.) and D.O. Smallwood (9332), "A Comparison of Shock Spectra and the Least Favorable Response Techniques in a Transient Vibration Test Program"; D.J. Tebbs and N.F. Hunter (both 9332), "Digital Control of Random Vibration Tests Using a Sigma V Computer"; D.O. Smallwood (9332), "Methods Used to Match Shock Spectra Using Oscillatory Transients"; N.F. Hunter (9332), "Specifications for Equipment Used in Analysis of Transient Shock and Vibration Waveforms"; and N.F. Hunter, "Transient Waveform Reproduction on Hydraulic Actuators Using a Nonlinear Gain Estimation Technique," Institute of Environmental Sciences 1974 Annual Meeting, April 28-May 1, Washington, D.C.

C.E. Land (5113), "PLZT Ceramics: Optical and Electrooptic Properties in the Visible Spectrum"; G.A. Carlson (5167), et al., "Measurement of CTE and Dynamic Response to Pulsed Energy Deposition in Hafnia-Titania Compositions"; G.L. McVay and R.J. Baughman (both 5154), "Effects of H_2O on Diffusion in Glass"; G.L. McVay, "He Permeation Through a Glass Ceramic"; G.L. McVay and R.J. Eagan (5846), "The Effect of Water on the D.C. Conductivity of Sodium Silicate Glasses," American Ceramic Society Meeting, April 28-May 2, Chicago.

D.M. Bush (2523), "Results of Thermal Battery Cell Testing"; A.R. Baldwin (2522), "A Long-Life, Low-Voltage Power Thermal Battery," Power Source Symposium, April 29-May 2, Atlantic City, N.J.

L.A. Harrah (5811), "Energy Transfer and Localization in Vinyl Aromatic Polymers," British High Polymer Conference, April 29-May 3, Moretonhampstead, Devon, England.

S.T. Picaux (5111), "Mass Transport Between Al and Ag Thin Films as Studied by Ion Scattering"; R.D. Bland and G.J. Kominiak (both 5834), "Effect of System Parameters on the Induced Substrate Bias in DC and RF Sputtering"; R.S. Blewer (2413), "Studies of Near Surface Helium and Deuterium in Metals Using Proton Backscattering"; J.A. Panitz (5114), "The Crystallographically Dependent Adsorption of Hydrogen on Iridium"; D.R. Begeal (2413), "Hydrogen and Deuterium Permeation and Diffusion Through Molybdenum"; L.C. Beavis (2413), "Detection and Analysis of Small Helium Flow"; D.G. Schreiner (5114), "Application of the On-Line Computer to

Appearance Potential Spectroscopy"; G.E. Laramore (5151), "Model Calculations of Binding Energy Differences Between Bulk and Surface Atoms in Metals"; R.O. Woods (1255), "Performance of a Zeolite Pump Used in Stratospheric Mass Spectroscopy," 10th Annual Symposium of the N.M. Chapter of the AVS, April 30-May 2, Santa Fe.

H.P. Stephens (5823), "Determination of High Temperature Thermodynamic Properties by Levitation and Liquid Argon Calorimetry," Calif. State Univ. chemistry seminar, May 1, Long Beach.

H.R. Spahr (5625), "Computer Generated Visual Documentation of Theoretical Store Separation Analyses," Scientific Computer Information Exchange Meeting, May 2-3, New York City.

D.W. Swain, G.W. Kuswa (both 5242), J.W. Poukey and C.L. Olson (both 5241), "Collective Ion Acceleration in Linear Electron Beams," International Conference in High Energy Accelerators, May 2-7, Stanford, Calif.

R.R. Harnar (9512), "A Quality Program for Radioisotopic Thermoelectric Generators," Eighth Interworks Quality Control Conference, May 4, Princeton, N.J.

W.P. Schimmel and A.B. Donaldson (both 1543), "A Mathematical Model for Predicting Radiation Surface Losses from a Laser-Heater Foil," ISA symposium, May 5, Albuquerque.

F.J. Zanner (5532), M.J. Davis (5530), and R.W. Fisher (5532), "Diffusion Bonding of Gilding Metal (Cu-10%Zn) to a Titanium Alloy (Ti-6Al-6V-2Sn)," AWS 55th Annual Meeting, May 6-10.

D.R. Johnson (2431), "Lead Frame Bonding," NEPCON '74 Southeast, May 8-9, Orlando, Fla.

J.M. Peek (5641), "Theoretical Evidence for a New Type of Structure in the Molecular Generalized Oscillator Strength Function," Rocky Mountain Quantum Chemists Seventh Annual Get-Together, May 9-10, Univ. of Colo., Boulder.

W.P. Bishop (4761), "Deep Sea Disposal of

Radioactive Wastes: Problems and Prospects," Arizona State University ME faculty, April 19, Tempe; Bishop and C.D. Hollister (Woods Hole Oceanographic Institute), "Seabed Disposal - Where to Look"; M.L. Merritt (1150), "The Sandia Workshop," Waste Management '74 meeting, April 22-24, Univ. of Arizona, Tucson.

T.F. Marker (6010), "The Invention Process," April 2, Sandia Kiwanis Club, and April 27, Downtown Optimist Club.

H.H. Patterson (1230), "Mexico and the Sea of Cortez," April 2, Adult Fellowship group, St. Paul's Methodist Church.

G.C. McDonald (9623), "Metrication," April 5, Industrial Education Conference, Portales, N.M.

H.C. Monteith (9344), "Computer Science," April 25-26, Hayes Jr. High Career Day; and "The Necessity for a Military Force," April 27, Valley high school ROTC group.

A.C. Schwarz (2516), "Detonators for Initiation of Insensitive Explosives"; B.R. Steele (2515), "Methodology for Computation of Interface Parameters of a Hot-Wire Explosive Device from the Electrothermal Response Analog"; and "Improved Loading System for Explosives and Pyrotechnics"; W.B. Leslie (2515), "Fast Acting Squib Studies," "The Stone Flipper - An Actuator Test Device," "Investigation of a High Temperature-Spark Insensitive Actuator," and "High Temperature Miniature Valve"; R.J. Burnett (2516), "MC2427 Detonator High Temperature Aging"; H.S. Schuldt (2515), "Long Term Detonator Powder Surveillance Studies"; T.M. Massis (2515), "Long Term Effects of Humidity on HNAB and HNAB-MDF"; D.K. McCarthy (2516), "A Procedure for Reproducibly Dyeing RDX"; D.J. Gould (2515), "The Effects of Extreme Thermal Environments on Small Diameter Hexanitrostilbene (HNS) MDF," and "The Compatibility of Delrin and PBX-9404," JOWOG Meeting, May 6-10, SLA.

G.W. Arnold (5112), "Ion Implantation Effects in Insulators," Invited paper, AEC CTR Insulator Review Meeting, April 19-20, San Diego.

R.H. Ericksen (5844), "Room Temperature Creep and Failure of Borsic Filaments," and "Room Temperature Creep of Kevlar-49", W.R. Hoover and R.E. Allred (both 5844), "The 'J' Integral as a Failure Criterion for a Borsic-Al Composite," AIME meeting, May 1974, Pittsburgh, Pa.

D.M. Mattox (5834), Invited paper "Ion Plating-Review and Update"; S.C. Levy and F.W. Reinhardt (both 2523), "Electrochemical Reduction of Cr(III) in Molten LiCl-KCl Eutectic"; N.R. Armstrong, R.K. Quinn (both 5154), and N.E. Vanderboigh (UNM), "Voltammetry in Sulfolane IV: Variation of Electrode Surface and Its Effect on Charge Transfer Parameters of Ferrocene Oxidation in Sulfolane," Electrochemical Society meeting, May 12-17, San Francisco.

L.T. James (2126), "Map-Matching Location-Estimation Using Range-Scan Pulse-Radar Images"; J.A. Cooper (2126), "A Computer Simulation of Radar Scene Recognition," National Aerospace Electronics Conference, May 13-15, Wright-Patterson AFB, Ohio.

D.J. Sharp and J.R. Sim (both 2432), "A New Approach for Mass Anodic Adjustment and Passivation of Tantalum Nitride Thin Film Resistors"; R.E. Knutson (2432) and C.M. Bloyd (2442), "Thick Film Potentiometers"; R.K. Traeger (2431), "Development of a Lightning Arrestor Connector," IEEE Electronic Components Conference, May 13-15, Washington D.C.

N.J. DeLollis (5813), "RF Activated Gas Treatment of Materials," SPE 1974 Annual Technical Conference, May 13-16, San Francisco.

R.S. Berg (5834), F.J. Friedlaender and L.F. Silva (both Purdue), "Bloch Line Interaction in Coarsely Crystalline Permalloy Films," International Magnetics Conference, May 14-17, Toronto, Canada.

A.L. Stevens (5133), "Residual Mechanical and Thermal Properties of Spall-Damaged Aluminum," Society for Experimental Stress Analysis, spring meeting, May 14-17, Detroit.

R.G. Baughman (5155) and R.A. Lefever (5154), "Beta-Alumina-Czoehrlski and Vapor Growth"; H.S. Levine (5824), "Homogeneous Nucleation of Bubbles: Surface Charging Effects," Western Section Crystal Growth Meeting, May 17, San Diego.

J.K. Rice and F.K. Truby (both 5215), "An Instrumental Limitation to the Rate of Kinetic Processes Measurable by Time-Resolved Mass Spectrometry"; G.C. Nelson (5825), "Quantitative Aspects of Ion Scattering Spectroscopy"; R.T. Meyer and A.W. Lynch (both 5824), "High Temperature Vaporization of Solid and Molten Lava," Conference on Mass Spectrometry and allied topics, May 19-24, Philadelphia, Pa.

R.L. Park (5115), "The Application of Core Level Spectroscopies to Catalysis Research," Invited paper, Physics Department Colloquium, May 21, Washington State University, Pullman, Wash.

R.G. Easterling (1643), "Some Results and Remarks, Mostly on Goodness of Fit," Univ. of Wisconsin Statistics Seminar, April 24, Madison.

R.C. Maydew (5620), "Boundary Layer Transition on Reentry Vehicles," Dept. of the Army, U.S. Army Ballistic Research Laboratories, Aberdeen Proving Ground, May 8, Maryland.

Speakers

MILEPOSTS

LAB NEWS

June 1974



Elsie Wickham - 2633

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Harold Linker - 1511

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Don Sonnier - 9718

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William Walker - 1254

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Herman Von Steeg - 8421

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Charles Duffey - 8335

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Edmund Starr - 2632

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Woody Woodall - 9623

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Don Benthusen - 8342

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Ed Williams - 8342

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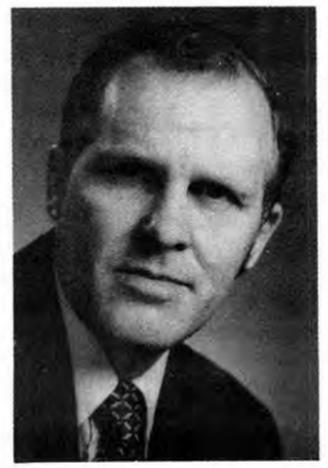
Kenneth Wiley - 1135

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Glenn Dietel - 8148

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Darrell Christensen - 8367

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Ray Culy - 8183

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Calvin Cox - 9414

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Richard Jones - 2122

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Robert Male - 9414

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The Quiet Heroes: Just Listening Helps

The phone rings. A man answers. His manner is calm. He asks if he can help. The words are sympathetic and restrained on one side, agitated and hysterical on the other. No conversation now — a long silence. He listens — not to speech but to weeping. The sobbing continues, 5 minutes, 10 minutes, and longer. Finally the sobs fade and two people begin to talk.

This is just one incident experienced by a volunteer on duty at the Suicide Prevention and Crisis Center. "I didn't lose contact with my client," the volunteer says. "In fact the telephone was a lifeline, a tie to a person who had dropped to the very depth of his own personal crisis and then began the climb back. He became rational, we talked, and I was able to refer him to an agency for help with his problem. And this is what the Center is all about. Twenty-four hours a day, seven days a week, there is always someone to help if a person reaches that critical time when the will to live conflicts with the will to die."

Much of the credit for having a Suicide Prevention and Crisis Center goes to Bob and Irene Matthews. A retired Sandian, Bob is still active in the work of the Center. The staff consists of 100 volunteers who operate under policies of a 30-member board of directors and a four-member executive board. Volunteers work an average of three to four hours every other week and are thoroughly trained by a group of professionals — psychiatrists, psychologists, social workers, lawyers, and others — who also donate their time and are on call in an advisory capacity.

A common feeling was expressed by one volunteer: "Crisis work can sometimes leave



you with a feeling of emotional or mental depletion, but it's momentary; you recover and answer the next call. But there is one feeling that sustains us, that encourages us to try even harder. It's a feeling of rejoicing or of thankfulness. It happens when we learn, usually by indirect means, that we were successful, that we did indeed help someone in trouble."

National average for suicides is 10 per 100,000 people; Albuquerque average is 20 per 100,000, the third highest rate in the nation. There were 83 known suicides in Albuquerque in 1973. And the Center is currently handling about 450 calls per month.

"These calls are not all suicide threats," says Julian Sanchez (9000), a board member of SPCC. "We are also a crisis center; not all critical situations have suicide connotations."

Other Sandians active in the work of the Center are Henry Dodd (4751), vice president of SPCC; Fred Johnson (3321) and John Christopher (4000). The Center needs volunteers, especially during the day; persons interested should call the Center, 265-7557, for information. • nt

Sandians Contribute To New Book on Solid State Science

A new volume just published by Academic Press includes a book-length monograph by Cecil Land (5113), Phil Thacher (9352) and Gene Haertling, a former Sandian. The trio contributed a section on *Electrooptic Ceramics*, a summary and review of research performed in the field through 1972. A large part of the work discusses Sandia-developed electrooptic memory devices, quadratic electrooptic devices and electrooptic scattering devices such as the Sandia Ceramic. The monograph also reviews physics of materials and fabrication processes.

Title of the book is "Applied Solid State Science — Advances in Materials and Device Research." It is the fourth volume of a series.

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MISCELLANEOUS

- BAR STOOLS, two black and white, \$40; two end tables, \$15; long-handle shovel, \$3. Padrick, 299-1815.
- 32 X 16 ABOVE ground pool, filter, cover, ladder, slide, about 100 lbs. chlorine, cleaning supplies and equipment, 18' redwood deck, \$500. Garrison, 256-7267.
- SEWING machine in cabinet, \$25; walnut and teakwood corner table, \$15. Shirey, 298-6362.
- SLIDE-IN RAISE-UP camper, stove, ice box, water tank, sleeps two, \$395; electric paint gun, \$30. Lackey, 898-5175.
- GERMAN shepherd puppies, AKC, 6 weeks old June 6. Shay, 299-2634.
- PORTABLE General Electric stereo, \$25. Piper, 298-2053 after 5.
- 4-PC. GROUPING, living room. Samuelson, 268-1810 after 6.
- LAWN mower, needs overhaul but runs, \$20; student school desks, two sizes, \$5 ea. Stuart, 265-7315.

- 10 X 16 TENT, Continental style, aluminum frame, 5 large windows, canopy. Hoover, 821-0341.
- POOL table, regulation size, \$100. Russell, 299-0159.
- REFRIGERATOR, 11 cu. ft., G.E., \$40. Peckumn, 256-3363.
- SADDLE, parade type, black with red and metal trim, \$150; leather chaps, child's size, \$15. Opland, 869-2012.
- DISHWASHER, Whirlpool portable, \$40. Saylor, 299-9006.
- TABLE saw, Sears 8" tilting arbor, one extension, blades, dodo set, stand, 3/4-hp ballbearing motor, \$225 value for \$74.95 delivered. Womelsduff, 266-9739.
- REPAIR manuals for '65 or '66 Dodge/Dart. McGuckin, 299-1342.
- CORVAIR engine, free, pick it up. Barnaby, 265-4353.
- TRASH bags, meet city specs., now \$3.50/box but still cheaper than most; proceeds to S. 10 Village Project. LAB NEWS office.
- '72 MOBILE home, 2-bdr., carpeted, AC, stove, refrig., \$1000 & assume existing loan w/payments \$68/mo. or \$4500 cash. Rogers, 256-1821.
- FURNACE, gas forced air, 80,000 BTU, \$40. Hansen, 898-3544.
- '71 TRAVEL trailer, Aristocrat Lo-Liner, heater, refrig., stove, two gas bottles, monomatic toilet, mirrors, hitch, battery, \$1500. Prew, 296-3815.
- FORD Tot-Gard car seat, brand new, for children approx. 1 to 4 yrs. old, new \$27, my price

- \$20. Hatch, 296-2773.
- 10 X 16.5 WHEELS with tires, \$30 ea.; camper trailer chassis with hydraulic brakes, \$100; 8 ft. cab-over camper, \$250. Shock, 877-3728.
- TRAIN board, 4x5 ft., HO engines, cars, extras, board folds to wall, scenery attached, \$30. Esterly, 256-9251.
- SEWING machine, Early American, maple cabinet with plenty of drawer space, zig-zag, buttonhole, decorative stitches. Jefferson, 299-1125.
- FREE kittens, box-trained, 2 fluffy white males, 1 female. Brandon, 294-1285.
- PLAYPEN; highchair; stroller; rabbits, 1 rabbit free. Hickman, 298-3804.
- GARAGE SALE, June 8-9: Luggage, misc. baby items, tuners, recorder, electric knife, fry pan, bun warmer, misc. dishes, trays, etc. Kuswa, 821-0204.
- PORTABLE items. Singer apt.-size washer-dryer combination, \$30; tiny washing machine, \$10; Smith-Corona typewriter w/case, \$25. Hawkinson, 281-5239.

REAL ESTATE

- WEST MESA, 4-bdr., 1-3/4 baths, built-ins, large lot, custom window guards, security alarm system, many extras, \$24,950. Predika, 855-4530.
- WOODED lot overlooking Taos Ski Valley, close to ski lifts, \$7000, 20% down. Cropp, 296-1877.
- 3-BDR., den, 1-3/4 baths,

- covered patio, sprinklers, landscaped, 1900 sq. ft., 5-3/4", \$147 PITI, \$31,000. Varnado, 265-0145.
- TWO half-acre lots, Rio Grande Estates, \$1200 ea. Phillips, 255-0143.

TRANSPORTATION

- '71 MINI-BIKE, 3 h.p., "Cat," \$50. Fox, 299-9031.
- '68 AUSTIN Healey Sprite Mark IV Roadster, 38 mpg plus, green, radial tires, radio, extras. Russell, 299-0159.
- '65 CHEV. Impala SS396, 2-dr. hardtop, 3-spd., AT, green paint, 67,000 miles. Hawley, 268-9552.
- '71 TRIUMPH, TR-6, 42,000 miles. Fox, 299-9031.
- 250cc HD SPRINT SX, street-dirt bike, 4-stroke, \$300. Carlson, 299-6610.
- '70 HONDA, 350-SL, low mileage. Hopper, 294-5717 after 6.
- '73 MX racing motorcycle, Husqvarna, many extras, \$680. Smaier, 299-8413.
- '73 HONDA CB 175, 2000 mi., \$400, or best offer. Hunter, 265-1161 from 7 to 9 p.m.
- '71 SCOUT, 4-WD., 6-cyl., 4-spd. Edenburn, 265-5184.
- '73 SUZUKI 185cc trail bike, 1400 mi., luggage rack, \$595. Wolcott, 293-5934.
- '72 YAMAHA Enduro 125, 1600 mi., new knobbies, shop manual, \$350. Looney, 255-7349.

- GIRL'S Schwinn bicycle, single spd., \$50. Rea, 299-9315.
- CESSNA 140, Rag Wing, FGP, VHT-3, 1100 hrs., smooth, annual inspection due in July, \$2300. Jacobson, 265-0995.
- '71 YAMAHA 350 R5, \$345. Watterberg, 294-6759.
- '71 FORD station wagon, low mileage, green & white, \$1750. See on Base. Browne, 345-3910.
- '67 CHEVY 4-dr. Malibu, V8, AC, AT, \$750; 2 '70 Honda trail bikes, \$265 total; girl's 24" Schwinn bike, \$15. Hayes, 294-4563.

WANTED

- YARN, odds and ends to be used to make lap robes for elderly at Encino Gardens. DeBaca, 344-3369.
- PRESSURE cooker canner. Mikkelsen, 268-1485.
- ITEMS for flea market sale, benefit of nonprofit N.M. Ballet Company, tax deductible, receipts issued. Moss, 298-2643.
- TEEN to help with work in yard and garden, now throughout summer, rate negotiable, SE Heights. Bishop, 255-5765 after 6.
- RIDE from 1421 Marcella NE. to Bldg. 802. Gray, 299-7035.
- HORSE trailer; water tank 100-300 gal.; trailer frame. Rose, 298-4849.
- BEGINNERS Flute. Cyrus, 898-4038.

FRIDAY	SATURDAY
7 — HAPPY HOUR VEAL CORDON BLEU Adults \$2.75 Under 12 \$1.75 FRANK CHEWIWIE Lounge Denny	8 — FAMILY VAUDEVILLE NIGHT "Y" MARLINS ABSENT-MINDED PROFESSOR Food @ 6, Show @ 7
14 — HAPPY HOUR HUNGARIAN BUFFET Adults \$2.75 Under 12 \$1.75 BEN CHAVEZ Lounge Barbara	15 — TEEN GO GO MINNESOTA ORGANIZATION 7:30 - 10:30 Members 25¢ Guests 75¢

LUAU PLUS — Roast pig, maui maui, mai tais, and midriiffs plus UNM coaches Norm Ellenberger and Bill Mondt (schedules permitting) at the Club on the 22nd. Cocktails at 6, entertainment at 7 during the luau,



Mondt



Ellenberger

dancing at 9, sporttalk (if desired) throughout — Wolfpackers take note. Pick up tickets by the 22nd.

MARLINS — A flashy fish, beautiful to watch, fun to catch. Catch the Heights Y Marlins at the Family Vaudeville on the 8th. This synchronized girls swim group is competition-level quality and beautiful to watch too. For the theoretical physicist, there's also a movie explaining anti-gravity. It's *The Absent-Minded Professor* who uses his discovery to fly his Model-T. Plus a *Three Musketeers* serial.

GINGHAM — Skirts and blue jeans and callers and fun. Square dance on the 12th (and



TURNABOUT 1) is fair play. Hence Kate Hawley and Bob Lassiter (3132) take turns at the camera; and 2) is what the roast pig will be doing on the C-Club spit for June 22 Luau.

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Buy U.S. Savings Bonds

26th) at 7:30. More info from Marge Lovato (299-1375) or Jo Merillat (242-4873).

PROPPER — That's what Lee Marvin's drunken horse had to have to survive *Cat Ballou*, a very funny Western. Jane Fonda too, yet. Free to members at 7:30 on the 19th.

MINNESOTA — In New Mexico? Group name of Minnesota Organization invades the Club on the 15th to make sounds for the Teen Go Go. Parent-types must get tickets for their teen-types before the sounds start.

JUKE/DART — New in the Bar are a jukebox — pop, C & W, etc. (but no oldies;

too bad) — and a recent marvel of the age in which we're privileged to live, an electronic dart game. Midweek Happy Hours revert to the old schedule — Tuesdays from 4:30 to 7:30.

PRE-AUSTRIA — Slide show and question/answer session on the 25th at 7:30. If you're not signed up, don't go — the scenery would remind you of what you're missing.

MORE INFO — 265-6791.