Labs Has New Role in Oil Recovery

DOE recently authorized Sandia Laboratories to manage a part of the nation's enhanced oil recovery program, a segment called "Deep Steam." The Sandia project is funded at $23 million over the next five years. Advanced Development Division 5731 under Dick Traeger has done development work on the project, and the newly formed Thermal Processes Division 5737 will assume responsibility for the work in the future.

"We have a number of objectives," Dick says, "including the development of a deep down-hole steam generator for use in wells where economic oil production has stopped. Heat from the steam reduces the oil viscosity, and steam pressure drives the oil to the producing well."

In normal oil production, the primary recovery is the result of natural pressures pushing (or aiding in the pumping of) the oil to the surface. Secondary recovery uses natural gas or water to maintain the reservoir pressure necessary to drive out more oil.

"Still, an average of two-thirds of the oil in the reservoir is not recovered," Dick says. "DOE's Division of Oil, Gas, Shale and In Situ Technology has several programs to develop technology for recovering this 'tertiary' oil—an estimated resource of 300 billion barrels. Sandia's job is to develop a technology using steam to recover heavy oils from deep reservoirs economically."

In California, today, heavy oil is being recovered from thousand-foot depths by injecting steam into the reservoir. This operation is profitable. At greater depths, recovery becomes uneconomical because of heat loss during injection and mechanical failures.

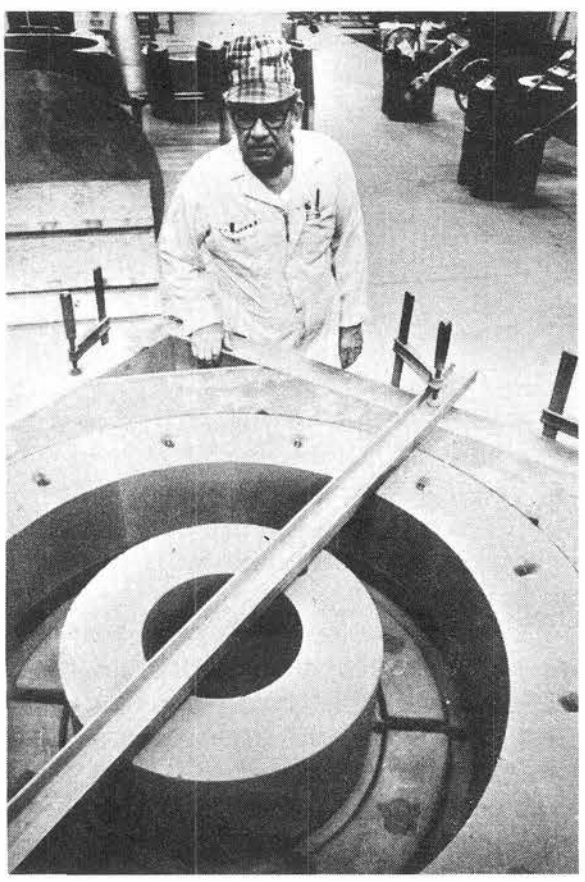
"Sandia will design a steam generator to fit in existing oil wells and work underground to depths of 2500 to 5000 ft.," Dick says. "This will not be easy but we have the technical resources to meet this challenge.

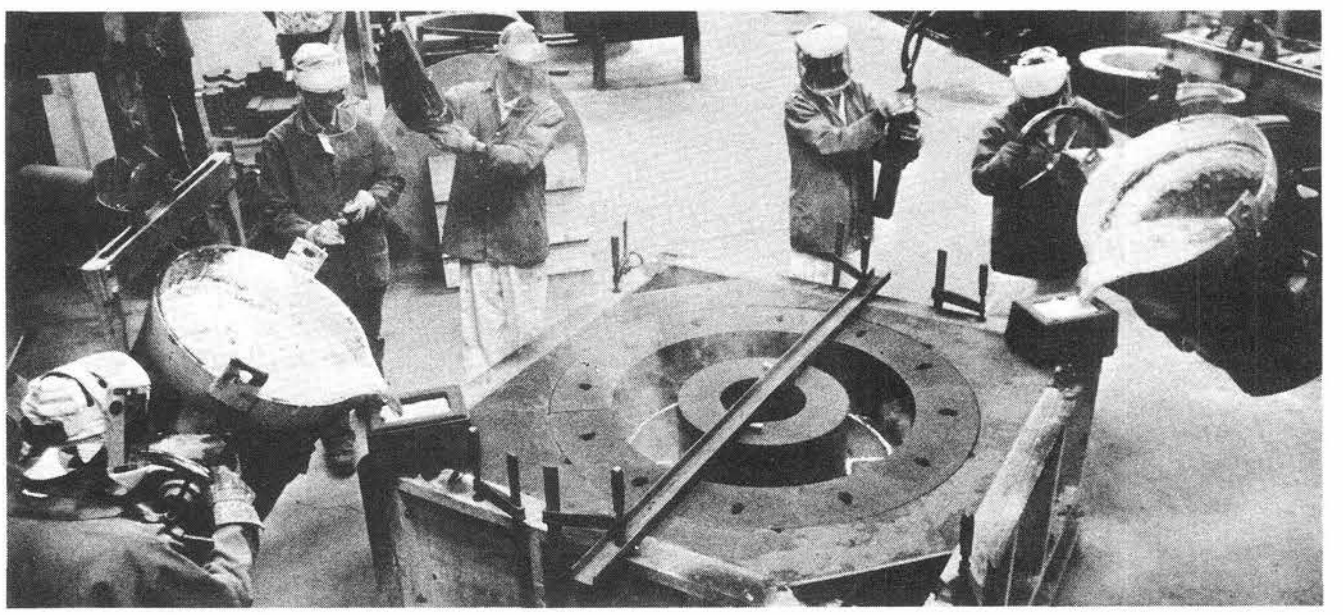
[*Continued Next Page*]

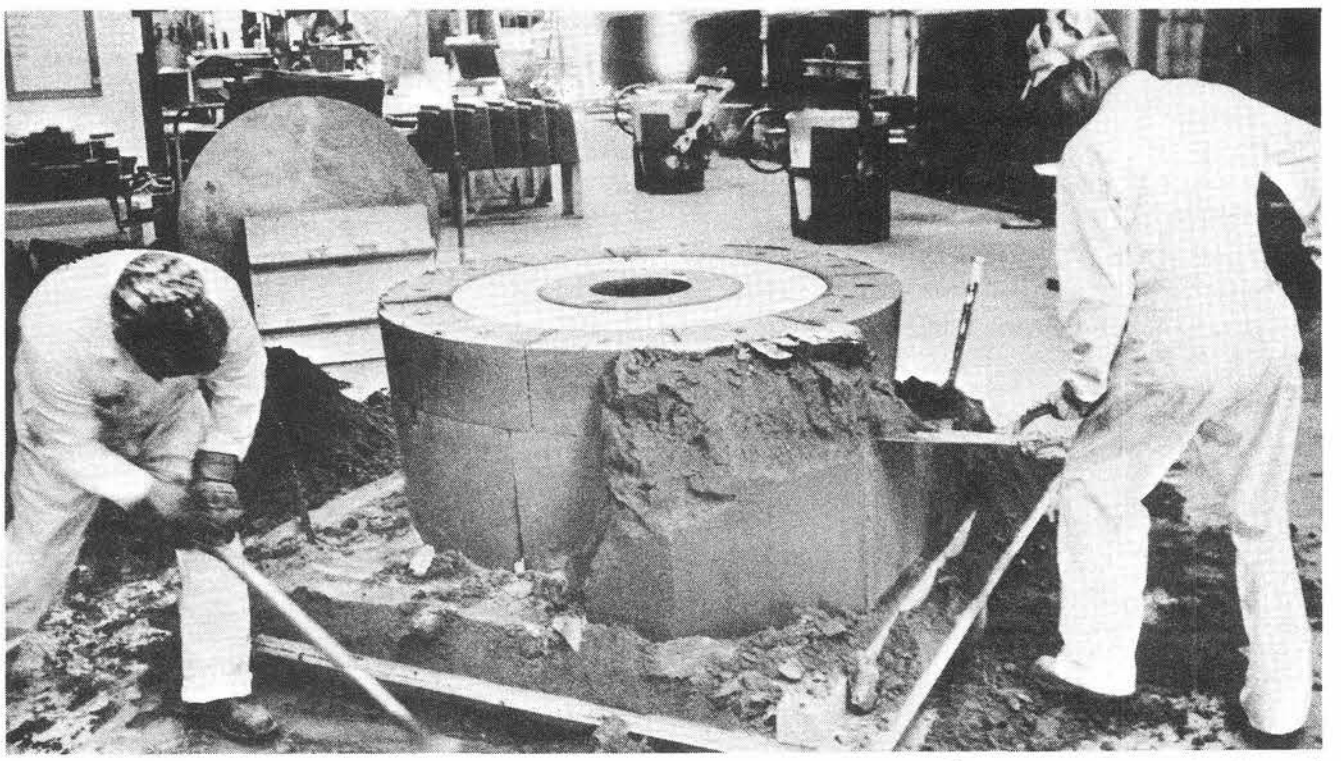
SANDIA LAB NEWS

VOL. 30, NO. 7 MARCH 31, 1978

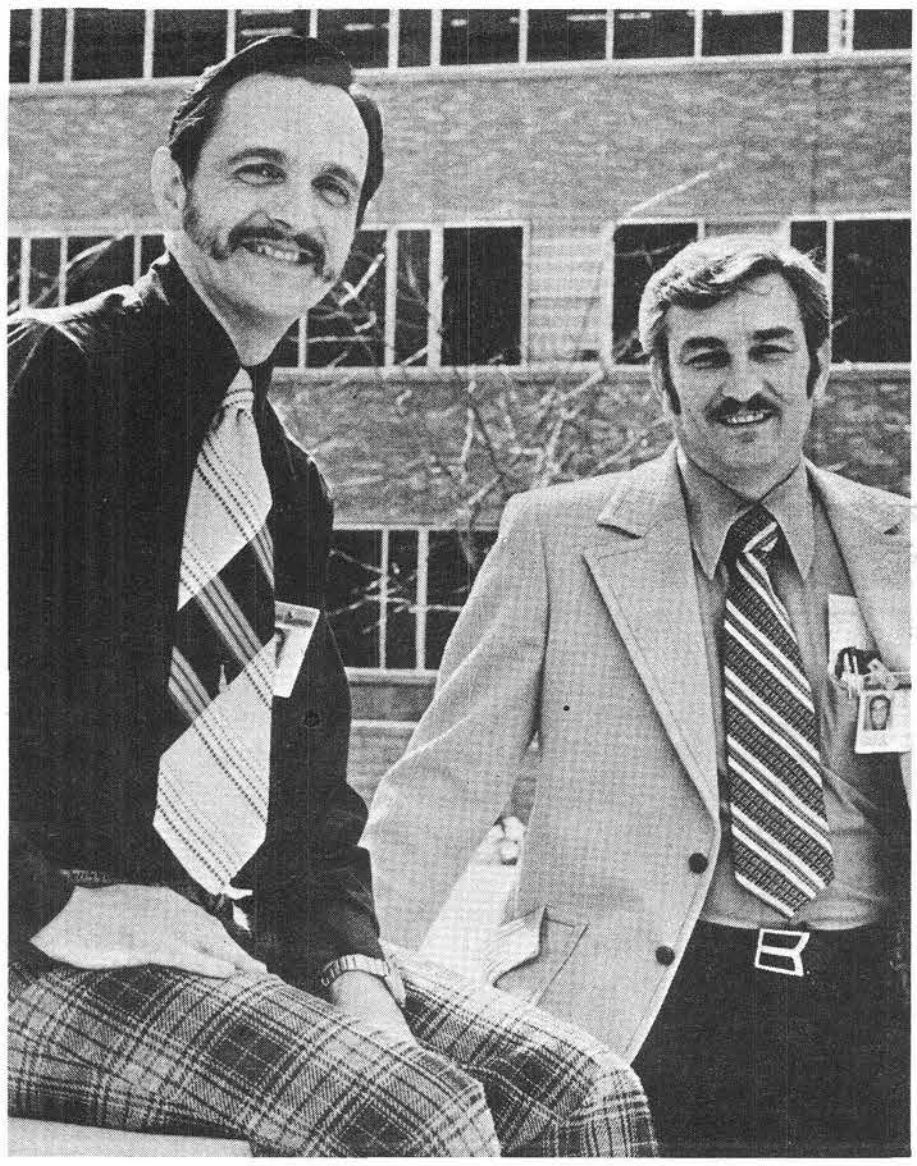
SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA







NOT EVERY DAY in this age of miniaturization of components does Sandia's foundry (org. 9573-5) perform pours of 1600 lbs. or more. Recently, however, the foundry poured 17 large tracking camera mounts for use with new instrumentation at Tonopah Test Range and White Sands. In top photo, left, C. B. Torres checks the packed sand mold. Top right is the pour. From overhead bridge cranes hang two ladles containing 800 lbs. of molten aluminum alloy (1500°F). From left are Bruce Higgins, Manuel Martinez, Ramon Armijo and Don Quayle. Above right, Torres and Quayle "shake out the sand" from the cooled casting. Above left, supervisor Harold Payne checks the finished and sandblasted casting. It has been machined and mounting holes bored and will now be painted. Mounts were designed by Joe Llamas of Photometrics Division 9412.



ALLEN STANLEY (3313) and TOM WORKMAN (2150)

Supervisory Appointments

ALLEN STANLEY to supervisor to Health Instrumentation Division 3313, effective March 16.

Allen joined Sandia in June 1967 as a staff member in Division 3313 where he has worked primarily with radiation monitoring systems. Before coming to the Labs, Allen worked at McDonnel Aircraft on the Gemini Program, performing design and systems analyses on the voice and radar communication links.

Allen has a Bachelor of Religious Education degree from Malone College in Canton, Ohio; a BS in physics and EE from Youngstown University; and an MS from the Yale School of Medicine in radiation physics. He is a member of the New Mexico Health Physics Society.

Off the job, Allen enjoys hiking, hunting and fishing. He and his wife Becky have three children and live in the NE Heights.

TOM WORKMAN to manager of Electronic Technology Department 2150, effective April 1. Tom joined the Labs in June 1960 as a staff member in an electrical and mechanical components group. In 1968 he was named division supervisor in this group. Tom's responsibilities were chiefly in the PAL program, working on multiple-code coded switches and aircraft control equipment. In 1976 he transferred to the weapon systems organization where he worked on the B61-5 and Tiger II programs. Since last fall, Tom has been supervisor of Command and Control Division 4323 which has responsibility for the emergency disablement systems and aircraft monitor and control systems.

Tom earned a BS in EE from Ohio State and an MS, under Sandia's TDP program, at UNM. Off the job he enjoys playing softball, fishing, hunting and camping. He and his wife Donna have five children and live in the NE Heights.

LAB NEWS

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don graham ass't. editor

chuck cockelreas & norma taylor write
bill laskar does picture work
so does russell smith

bruce hawkinson & lorena schneider report livermore

Events Calendar

Through April 23—"Lullaby," Barn Dinner Theatre, 281-3338.

Mar. 31, April 1, 2, 6-9—"Oklahoma!" Albuquerque Civic Light Opera, 344-2317.

April 4—"Land of the Rio Grande," Audubon Wildlife Film Series, Popejoy Hall, 7:30 p.m.

April 13—Lecture by former Sen. Sam Ervin, Popejoy Hall, 8 p.m.

Patent Awarded For Hydrogen from Magma Process

DOE recently was awarded a patent for a process to produce hydrogen directly from the reaction of molten rock (magma) and water. (LAB NEWS, Dec. 2, 1977.) Developers of the concept are Clyde Northrup (5824), John Galt (5100), Terry Gerlach and Pete Modreski (both 5831).

An almost endless supply of hydrogen may be produced by pumping water, including seawater, into bodies of subsurface magma. Carbon monoxide and methane are also produced by the same technique.

Hydrogen produced by the process is the result of a chemical reaction between the water and the hot ferrous material in the magma. The addition of biomass, primarily plant cellulose, to the water significantly increases the amount of hydrogen produced.

Hydrogen, a high quality fuel, is currently produced primarily from natural gas. The new concept offers the promise of a future economical source of the fuel.

Continued from Page One

Deep Steam

We'll work with industry to build the prototype steam generator and then perform field tests with the oil industry.

"The other approach will be to make the existing surface steam generation process more economical by improving its thermal efficiency. If thermal losses can be reduced, then higher quality steam can be delivered to deeper reservoirs.

"Sandia will be asking for proposals from industry," Dick says, "and funding promising developments. Industry is excited about this program and the oil companies are very interested."

In-house, besides the overall management of Deep Steam, Sandia will participate in the development and evaluation of the down-hole steam generator; will undertake a materials development program aimed at improving down-hole packers, seals, drill pipe insulation and other components used in recovery operations; develop models for computer analyses in the project, and will do system analysis and economic studies. Field tests of developed concepts are expected to begin in two years.

Overall project responsibility resides in the Geo Energy Technology Department (5730), managed by Hap Stoller.

"I'm enthusiastic about the project," Hap relates. "It means we now have a direct responsibility to DOE to help it achieve its oil production goals through improved energy technology. Further, our participation means that Sandia is involved in all the liquid fuels programs, with work being done in the coal liquefaction area, in the oil shale program, and now in Project Deep Steam. We can make meaningful contributions where it counts—helping to ameliorate the shortage of liquid fuels."

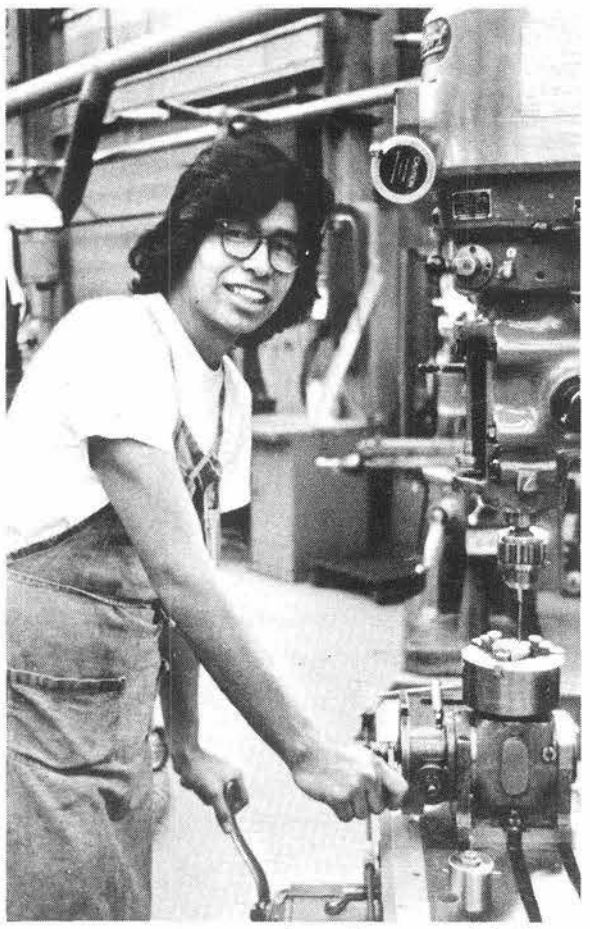
Sandians Chair Central Solar Systems Review

Some 1500 attendees, including representatives from 11 private utility companies, participated in the Department of Energy's semi-annual review of solar thermal central power systems held this month in San Diego.

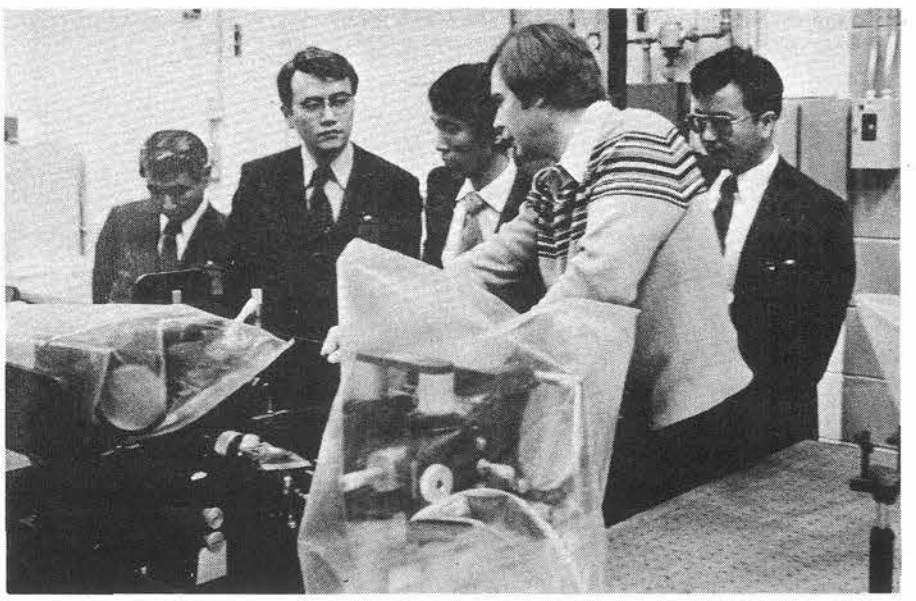
Bob Hughey, program coordinator for DOE/SAN's Solar Energy Division, opened the two-day meeting with an overview of DOE's current solar programs and plans. Chaired the first day by Al Skinrood (8132) and the second day by Bill Wilson (8131), the meeting centered around a series of DOE contractor presentations on the development and application of solar central power.

The meeting sessions included five Sandia papers: Al presented "Overview of the Solar Thermal Central Power Systems Program"; Bill, "SLL's Heliostat Development Facility"; Vic Burolla (8424), "Storage Fluid Testing and Analysis"; Ray Berg (5842), "Heliostat Dust Buildup and Cleaning Studies"; and Bill Marshall (5719), "Solar Thermal Test Facility."

Especially encouraging, notes Al, is that utilities from states other than California participated—Florida, Texas, Oregon, Arizona, New Mexico and Nevada. For the first time, attendees represented a foreign country. From Spain were Dr. J. M. Valero de Lerma, General Manager of Aplicaciones de la Energy; Joe Luis Hidalgo, head of Energy and Thermal Control Department, CASA; Luc De Gruitjer, Tecnicas Reunidas; and E. Sommer, Foster Wheeler, Iberia.



NEW MACHINIST on the job in Model Shops Division 8423 is Adam Sandoval, the latest graduate of SLL's apprenticeship program. Requirements under the program include four years of on-the-job training plus related academic courses which he completed at Hayward Vocational School.



TOYOTA VISITORS— Four engineers from Japan's Toyota Motor Company toured SLL's combustion research labs on March 6. They are watching Sheridan Johnston (8352) demonstrate a direct injection, stratified charge engine simulator designed to provide flow visualization and laser Raman spectroscopy of the engine processes. Accounting for an eighth of the world's yearly volume of automobiles, Toyota is interested in the use of lasers as a diagnostic tool in combustion research.

LIVERMORE NEWS

VOL. 30, NO. 7 LIVERMORE LABORATORIES MARCH 31, 1978

New Computer Codes Aid Solar Decision-Making

New technology, such as solar-powered electricity generation, carries with it varied challenges. One is to determine the amount of energy a given solar-powered plant will produce in a year. Another is to define the cost per unit of energy generated. Jim Woodard and Joan Brune, both in Pat Eicker's Systems Studies Division 8326, have constructed computer codes that give insight into such questions.

Their work is part of an effort that began when SLL was chosen to manage DOE's Solar Central Receiver Program. An early task was to evaluate three industrial contractors' conceptual designs for a pilot plant (the 10 MW solar central receiver installation to be constructed near Barstow) that could be scaled up to commercial power plant size. "The trick was to decide how to tell whether a design was a good one," says Pat. "For example, how much extra is it worth paying for a component that performs above its baseline requirements? Our division worked closely with the engineers in the solar divisions, with the people with experience—the utilities—and with the economists in the academic world who design the cost effectiveness models used by the electric utilities.

One of the new programs is called STEAEC (Solar Thermal Electric Annual Energy Calculator). Jim Woodard discusses the use of the model: "You input all the significant data about each of the elements of a solar central receiver plant—collectors, receiver, piping, thermal storage, electrical generators—add weather and insolation data for a year, and come up with an annual energy production figure."

Which data are significant? And how significant? How much, for example, does it matter that a receiver has to start cold each morning? If receiver A performs better than B when it's calm but only half as well as B when the wind blows, should you pay a premium price for A?

"Quantifying the value of the storage subsystem is a difficult task because of its role in the interaction of a solar plant with a utility network," Jim says.

The annual energy production figure that ends Jim's STEAEC is one of the inputs to Joan's BUCKS (not an acronym, but a fitting label for a computer routine that ends in a dollar figure).

"BUCKS is an adaptation of economic theory accepted by utilities," she notes. "It's unique in that we applied it to solar-powered plants so we could make comparisons among the cost figures coming in with the various contractors' design concepts. The contractors realized the necessity for such a program and are now comfortable with such terms as 'capital recovery rate,' 'effective cost of money,' and 'levlized busbar energy cost.'

"The code can be used to scale costs for plants of different size than designed by the contractors. It's also useful in calculating the 'sensitivities' common to any new technology—a given cost affects the final dollar outcome, but how much?"

Both codes were discussed at a workshop held for solar contractors and utility operators. And both are now available to the interested public through Sandia's Mathematical Program Library. Much of the computer programming involved in the programs was performed by Gordon Miller (8325).

Joe Hankins (8326) and Pat Leary (8322) have developed a computer model which evaluates the performance of the mirror field. This code will be the subject of an upcoming article.

Sympathy

To Jean Stuart (8256) on the death of her mother-in-law in Rushville, Mo., Feb. 21.

BOB HOPPER, DIRECTOR OF PLANT ENGINEERING 9700, *came to Sandia in* 1948. In Plant Engineering his entire career, he's seen it all happen, been personally involved in the tremendous growth of the Labs. More projects are now under design or construction than at any time in Sandia's history.

The Directorates

9700: Plant Engineering

Bob Hopper, Director of Plant Engineering, retires in April after nearly 30 years with Sandia, which makes this an ideal time to feature 9700 in our directorate series. In a real sense, Bob's career spans the entire history of the Labs. He was hired in 1948 as a staff member—the fourth member of a four-man crew in Plant Engineering.

"When I came to work," Bob told us, "Sandia was a very small, primitive operation—no paved streets, no sidewalks, no paved parking lots. And only two permanent buildings—808 and 835, and we were protected by Army MP's in wooden towers."

The intervening years have seen a lot of changes and tremendous growth. Permanet office, laboratory and shop buildings, test facilities, utilities, streets and roads have been built. Area III, Livermore and Tonopah were built from the ground up. Bob, Director of Plant Engineering for 22 years, has been overseer of it all—the buildings, the construction, the modifications, the maintenance, the installations. If you measure growth in square footage, Sandia (in the 30 years Bob's been here) has grown from a few small, mostly temporary buildings to over 3½ million square feet of floor space.

When he talks about Sandia, Bob can't help exuding a proprietary enthusiasm, a warmth of feeling: "My job has been great from the beginning. When I come to work in the morning, I look around and get a real sense of pride. Plant Engineering has handled basic design on it all—Areas I, II, III, IV, V, Coyote Canyon, Livermore, Tonopah."

We asked Bob to be more specific. "In a nutshell," he told us, "we construct and we maintain. On a day-by-day basis, our designers work with the rest of Sandia to insure they get the kind of facilities they need. We prepare budgets for new construction and work with architects and contractors. We also handle modifications and maintenance.

"Test support is another job," Bob points out. "One of our recent projects was the full-scale truck and locomotive crash test series. We did all the construction for those tests—the targets, the burn tank, the camera towers. We even painted the locomotives and the cask car.

"We also do all plant engineering at Tonopah. And we work with Livermore on major construction projects. In the beginning we did it all. Now we simply consult and pass Livermore proposals on to DOE."

In terms of maintenance, Bob states that Sandia's plant is in the best shape ever. "It's our preventive maintenance," Bob explains. "In most cases we prevent problems before they arise. We have a telecon system to provide a fast response to trouble calls."

Has work in Plant Engineering changed over the years?

"Yes, immensely—ever since Sandia got into the energy business. We've worked on the total solar facility and done engineering on the solar power tower and the solar irrigation project out at Willard. And we're concentrating more on energy conservation measures. We currently have more projects under design or construction than at any other time in our history. These projects include the $21.5 million 5 MW solar thermal test facility, the $14.2 million electron beam fusion facility, the $8.3 million nuclear safeguards security laboratories, and over $3 million of smaller general plant projects. Over the years we've managed to remove many of the old World War II buildings. Because of high maintenance requirements, we hope to remove some more—and we will, if we get an expected $13 million Systems Research and Development Laboratory in FY 1980."

Summing up, Bob says: "We've been busy for the past 30 years, and I certainly don't see any let up in the future. In fact, I think we'll see more and more construction. And, of course, we'll continue to upgrade the plant."

How about retirement? "Travel," Bob says. "And fishing."

After breaking into a rural Boy Scout retreat in Mendham County, New Jersey, thieves made off with an item that proves thieves really haven't any. They stole a Norman Rockwell painting entitled, "On My Honor."

Electronic Seal Developed For International Agency

An electronic seal which readily reveals tampering has been designed and built at Sandia Laboratories. A series of laboratory tests on working models is now underway before 10 of the seals are sent this spring to the International Atomic Energy Agency (IAEA) for field test.

Development of the seal is sponsored by the federally funded Program for Technical Assistance to IAEA Safeguards. A major goal of IAEA, headquartered in Vienna, Austria, is timely detection of attempts to divert nuclear material from peaceful uses to the manufacture of nuclear weapons in Nuclear Non-Proliferation Treaty countries.

The seal is the size of a padlock and opens and closes like one. It employs a 900-strand fiber optics loop as its shackle; both ends connect to a complex electronics package which includes a loop integrity sensor, display generator, tamper-responding container, and batteries. A single-digit liquid crystal display on the seal's face allows an inspector to tell at a glance whether the seal has been violated.

When a seal is in use, the loop integrity sensor transmits 16 light pulses—each 16 microseconds in duration—into one end of the fiber optics loop each second. If the pulses reentering the electronics package from the other end of the loop do not correspond to the pulses transmitted, the display generator registers a violation by automatically changing the display sequence.

Each seal is programmed to display unique sequences made up of different letters and numbers. For each seal, digit changes will occur at selectable intervals—once every 1, 2, 4, 8, 16 or 32 hours.

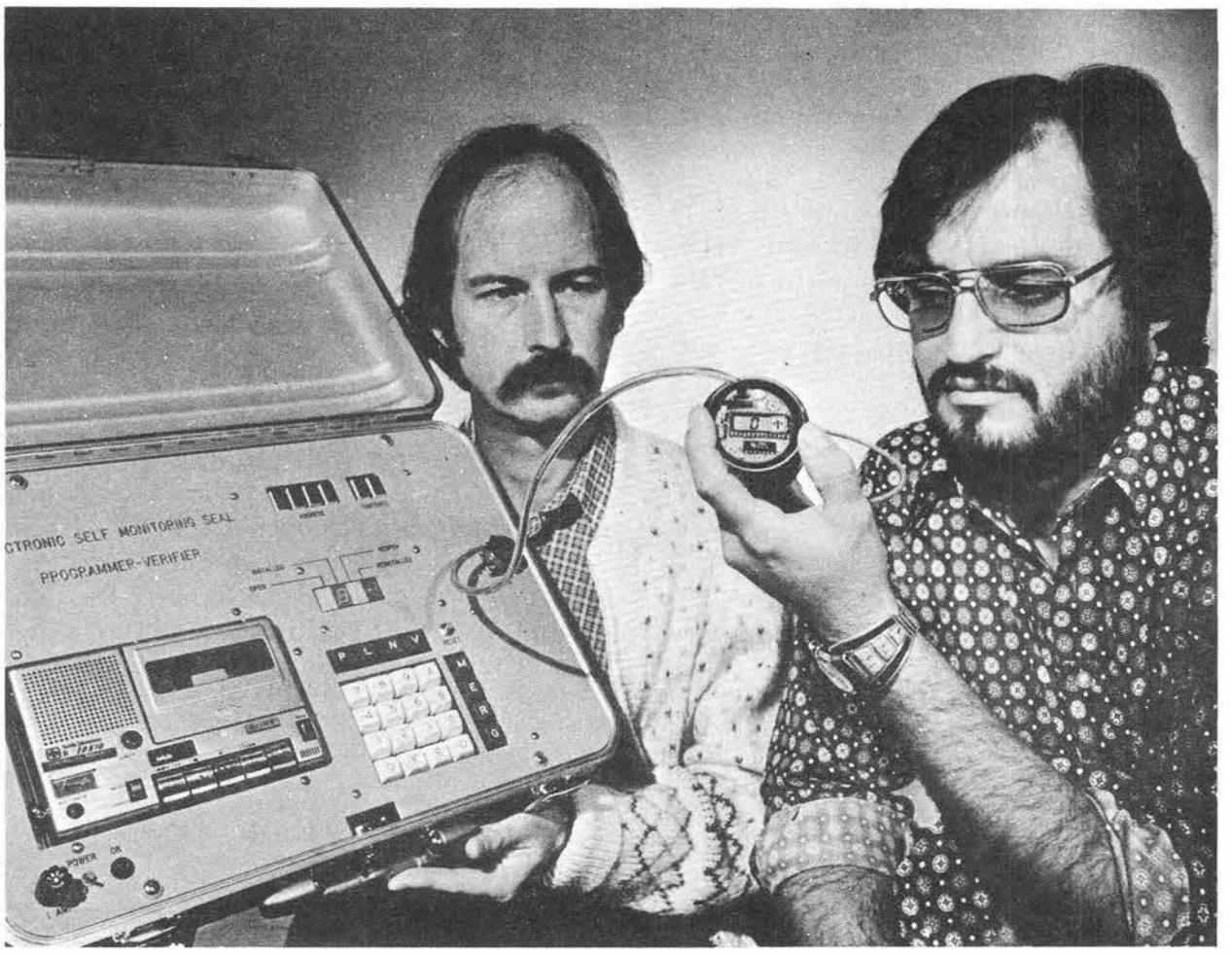
This sequence, or "code," will be prerecorded in an electronic verifier maintained by the IAEA or an authorized inspector. During routine checks of the seal, an inspector can see if the digit displayed on the seal's face corresponds with that in the verifier. Also, by studying a complete record of past displays, an inspector can determine approximately when a violation occurred.

About 100 million codes are possible, and more that 131,000 display changes will occur in each seal before a code is completed.

The seal is designed to allow one authorized opening and closing. "For instance, a seal may be attached to a surveillance camera located in a hallway leading to an SNM storage vault," says Jim Campbell of Systems Studies and Engineering Division 1754. "The one authorized opening and closing can be used when the camera needs a film change."

The seal can also be removed and reprogrammed as it nears the end of its digit sequence or when new batteries are needed.

The display generator, loop integrity sensor, and batteries are enclosed in the tamper-responding container. If any attempt is made to gain access, the power circuit will be interrupted and the seal's display will become blank.



SELF-MONITORING electronic seal and accompanying programmer-verifier unit are displayed by Jim Campbell and John Aragon of Systems Studies and Engineering Division 1754. The devices were developed as part of the Labs' international safeguards program.

"Without the tamper-responding enclosure, an adversary could gain access to the display generator and possibly determine the programming information necessary to predict the future sequence of displays," Campbell says.

The seal's electronics package utilizes the largest complementary metal oxide semiconductor integrated circuit (CMOS) ever made in Sandia's semiconductor development laboratory. The ¼-inch-square chip contains more than 1,800 transistors and 15 inches of connecting metal. The circular electronics package is about 2½ inches in diameter and 1½ inches thick. The fiber optics loop can range in length from 12 inches to 120 inches.

Laboratory tests currently being conducted on the seals are basically quality assurance checks—making sure batteries last as long as expected (six months or longer), inducing premature aging to check for failure, and subjecting the units to a series of vibration and temperature tests (seals must operate in temperatures from 0°F to 125°F).

When these tests are completed, 10 units, along with a programmer and verifier package, will be sent to the IAEA, which will install the seals at selected locations.

Four Apprentices Graduate Early

Four Sandia apprentices graduated recently, completing the five-year programs in only four and a half years. The graduates maintained an "A" average throughout their laboratory and out-of-hours course work.

Dan Appel and Scott Reed (both 9571) completed the Materials Processing Technology program; Tom Heine and Paul McKey (both 9561) completed the Mechanical Standards Technology program.

Certificates of Completion, both Sandia Laboratories and State of New Mexico, were presented to the graduates by Luke Heilman (9500) at a ceremony at the Sandia Exhibit Center attended by families of the graduates.

PACA Needs Help

The Peoples Anti-Cruelty Association of New Mexico is a volunteer group, funded by donations, whose objective is to provide new homes for abandoned animals. Marion Wilde (5244), a member of the group, explains that the association acquired a kennel last December which has accommodations for 125 animals. The kennel has reached its capacity and PACA needs homes for dogs and cats. PACA does not destroy healthy animals; they believe all animals are adoptable.

Persons wishing to acquire a pet, make a donation, or attend one of PACA's monthly meetings can call Marion, 293-2652, for information.

Vacuum Society Symposium

The New Mexico Chapter of the American Vacuum Society is holding its 14th Annual Symposium April 11-13 at the Four Seasons Motor Inn. President Sparks will present the keynote address at the opening session at 8:30 a.m. April 11. In addition to technical sessions, the three-day meeting will feature a related industrial display. A shuttle bus, free, will leave Sandia Bldg. 800 on the hour during the meeting for those who wish to visit the exhibit. For more information, call Warren Taylor (2551), 4,7539, or Paul Holloway (5825), 4-8749.

Voter Registration at Labs

Registrars from the League of Women Voters will be at the Labs on Friday, April 14, from 8:30 a.m. until 4 p.m. They will be located in the main corridor of Bldg. 800.

New voter registration will be made for anyone who will be 18 on or before the June 6, 1978, primaries. Registration changes are required for those persons who have moved or who have had a name change since they last voted. Anyone who has received a purge notice from the office of the County Clerk will need to re-register. (Failure to vote in two successive general elections will result in the removal of your name from the registration records.) No documents are required for any of these actions; the act of registering to vote establishes your residency.

feedback

Q. The enclosed Tech Library "Recall Notice" represents a continuing problem. I have returned the previous 2 notices, both with an explanation that the book was returned the 3rd day after I received it, by putting it in the company mail. But they just keep grinding out these computer notices regardless. This is not an isolated incident.

A. Book recall notices are presently sent out beginning at the fifth week after a loan has been made. When a borrower designates on the recall notice that he or she has already returned the book being recalled, circulation personnel check the shelves and appropriate listings in an attempt to locate it. If the book cannot be located, it is charged to "lost" after a one or two week interval. It has been our experience that many such "lost" books show up within this interval.

Beginning immediately, library circulation personnel will charge to "lost" these books which are not locatable as soon as a recall notice is received marked to show that the book has been returned. This action will prevent any further recall notices being produced. If any such book should subsequently turn up, the "lost" charge will be removed.

K. A. Smith—3100

Q. Since moving to bldg. 880 I've noticed a poor response to the request to turn off lights at the end of the work day.

When I leave I see many large rooms with all lights on and nobody there.

How about a "pep talk" to 880 people?

A. Light reduction at the close of the work day is part of the Energy Monitors' standard instructions. However, the janitors begin their cleanup activities at 5:30 p.m., and this requires lighting until 9:30 p.m. As the janitors progress through the buildings, they switch off all lighting as they leave and place a "reminder" on the desks of those whose area or desk lights were found turned on. Finally, during patrol duty hours, the Security Force is responsible for turning off any lights that might have been missed.

A visual check of the Laboratories after 9:30 p.m. assures that the major portion of all interior building lighting has been turned off.

Thank you for your interest in the advancement of our Energy Conservation program at Sandia.

D. S. Tarbox—3400

Sympathy

To Richard Stratton (1312) on the death of his mother in Orem, Utah, March 8.

To Hazlet Edmonds (3511) on the death of her sister in Kansas City, Mo., Feb. 22.

To Louis Narvaiz (2614) on the death of his father in Albuquerque, March 27.

Q. Since so many Sandians are interested in their good health and physical well-being these days, why not some out-of-hours classes in yoga, basic nutrition and exercise, body mechanics, aerobics, and the like?

A. Your suggestions are timely. In the past few months, the out-of-hours program has offered courses in how to stop smoking and how to develop a healthy back. Both courses had the sponsorship of the Medical organization and the Education and Training department. Another course (consisting of six lectures) on physiology and health is now being offered under similar sponsorship.

In addition to the above, the Coronado Club is offering physical fitness activities for both men and women. A physical fitness class for women is underway now, and if there is sufficient demand, more will be offered in the future.

Watch the Lab News and the Weekly Bulletins for announcements regarding these activities and others that may come up in the future.

J. R. Garcia—3500

Q. What is Sandia's position on dissemination of nuclear survivability information? During division safety and security meetings we've seen films on letter bombs, hostage survival, etc. But nothing on nuclear survival.

A. Sandia's position on the dissemination of information regarding Civil Defense (our program is called Emergency Preparedness) is to provide information and training to all employees through an organization of Emergency Preparedness Sector Chiefs. This organization is made up of employees appointed to these jobs by their Directors. A sector is composed of a building or a group of buildings having common hazards but limited by geographical boundaries. Each sector has established plans for all conceivable emergencies, whether national or local in scope.

I have enclosed a current listing of the Emergency Preparedness Sectors which gives the name and phone numbers of the employee responsible for each sector. If you are unable to get satisfactory information from your Sector Chief, you may call the Emergency Preparedness planner in Division 3441, telephone 4-3471.

D. S. Tarbox—3400

A Minnesota *judge* turned down Michael Dengler's request to legally change his *name* to "1069" on the basis that such a change would "hasten the day in which we we all become lost in faceless numbers." It must have been a difficult decision, considering Dengler's lyrical explanation: "I am part of the whole of life, which is one," he told the judge, "and zero shows my relationship with time in movement through life. Six is equal to the relationship I have with the universe in my understanding of space. Nine stands for the relationship I have to essence in the difference in the meaning when actualizing the spatially ever-present nature of life."

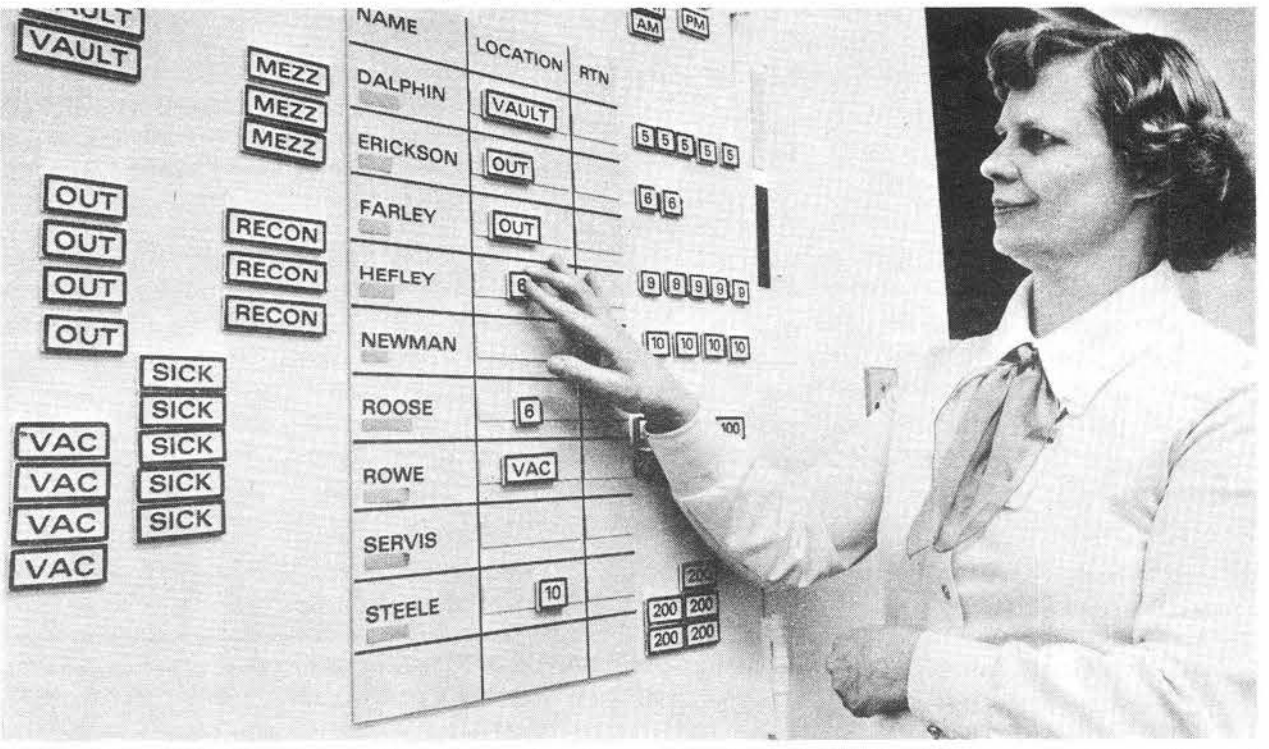
sandia PEOPLE Report

JANICE SHARP (9753) handles the Telecon desk for Plant Maintenance, processing more than 150 requests for service daily. She asks that callers first state the kind of service they need, then give their name and organization. This helps her choose the correct work order form to use—mechanical, electrical, typewriter, etc. For calculator or typewriter repair, she needs the S or B number of the machine. Telecon also schedules furniture moves; the Motor Pool, 4-8048, handles material movement. Call 114 for telephone repair.

MOUNTAIN MAN Don Papineau (3171) is a member of the New Mexico Mountain Men Fraternity, a group interested in the history of New Mexico in the 1840's. The organization meets several times each year for a "rendezvous" with tomahawk throwing contests and black powder shoots. Crafts are another interest—members sew their own costumes, make decorative beadwork and weapons. If you'd like to join, call Don, 243-2036, for more info.

AMIGOS DE LAS AMERICAS is raffling off this classic '55 Chrysler C-300 in suport of their training program for youthful paramedics. Each year they send 25-30 young men and women to Latin America on one-month tours. Parents pay one third the cost, Amigos raises the rest through raffles, art auctions and garage sales. Tickets from Rex Steele (2515), shown here, or Harry Rouckus (9654), Russ Curtis (3433), Herb Loemker (1244) or Helen Davison (1300).

SANDIANS at a recent radio-controlled model airplane meet in Phoenix admire a model MB5, WWII British fighter, built by Dan Parsons (ret.), third from left. The plane weighs 9½ lbs., has 56-in. wingspread, retractable landing gear, can hit 100 mph in flight. Sponsored by the One-Eighth Air Force of Phoenix, the meet included competition in aerobatics and appearance. From left are Pete Rand (5813), Bill Laskar (3162), Dan, and Jess Wright (9523).



ROSE ANN SCHULTZ, a visually handicapped typist working in the Technical Library, now has a sign-out board which she reads with her fingers. Rose Ann answers the phone for nine people and this board, with names and various library locations in raised letters on magnetic strips, allows her to transfer callers to the appropriate locations. John Gardner (3144) initiated the idea; Janet Jenkins (3155) and T. A. Allen (9573) worked together on the design and fabrication.

Lightning Arrestor Connectors

The Current Goes Directly to Ground

Ed Ehrman (2154) has spent several years of his professional life making sure lightning turns left at the bulkhead and goes directly to ground. The reason is simple: direct or nearly-so lightning strikes can cause malfunction of weapon instrumenation—and possible even major destruction.

How could lightning get to weapon components?

"There's a ready made path," Ed points out. "Cabling from the weapon skin connects to internal components—that's how we check the weapon's state-of-health. Lightning gets into the weapon through the cable connector on the weapon skin. To keep it from damaging anything inside, we've developed what's called a LAC, a Lightning Arrestor Connector.

"There's nothing new here," Ed told us, "though the connector, itself, is different from most. Lightning arrestors have been used for years to protect houses, barns, whatever. But the lightning isn't arrested at all—that's something of a misnomer. It's actually detoured safely to ground. And that's exactly what the LAC does."

Design goals for the LAC are these: "to shunt lightning currents to the weapon case ground without disintegration and to limit voltage on all pins to less than 2000 volts during and after lightning strikes."

"Fortunately, the LAC doesn't have to be usable as a connector after a lightning strike," Ed comments. "The connectors can be zapped with up to 200,000 amperes of current in an actual strike—and that kind of current plays havoc with both the cabling and the connector."

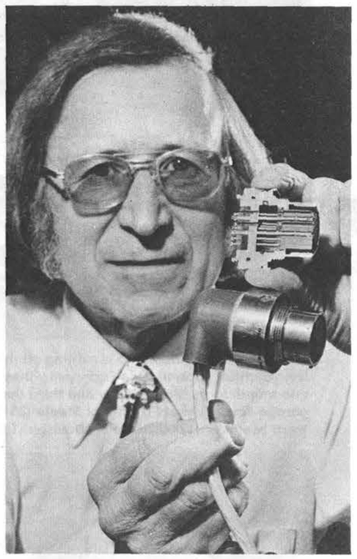
The LAC's are modified versions of commercially available multi-pin connectors. A conducting web (a thin metal disk with holes) slips over the connecting pins. Dielectric (nonconducting) sleeves separate connector pins from the conducting web.

"The higher the dielectric constant of the sleeve," Ed explains, "the more the electric field is crowded into the air gaps. The objective is to create a voltage stress which will short circuit the air gap and detour the lightning to ground. The energy in the lightning strike partially vaporizes the pin and web materials. This coats the dielectric sleeve with metal and shorts the connector to ground."

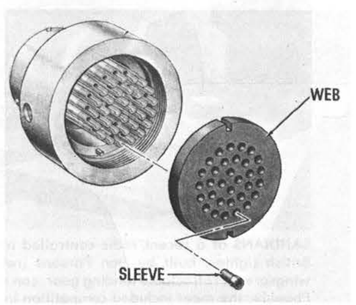
Are our weapons now safe from lightning?

"The LAC's have worked as designed in every test," Ed says. "They've shorted out below 2000 volts in simulated lightning strikes having currents at least as high as 240,000 amperes and under voltage rise rates as high as 500,000 volts per microsecond. In one test, a LAC protected a missile against three successive 200,000 ampere pulses. The LAC was destroyed but it protected all the vital internal components."

To date there are 12 different LAC designs, one to three of which are used in a dozen different weapon programs. In addition to Ed Ehrman, a number of others have been (or are) deeply involved in the LAC program: Arlen Cooper (2331) proposed the use of the dielectric sleeve; Harry Olson (2145) and Lee Allen (4311) were major contributors to the building and testing of the first LAC model. Bob Nelson (2154) is currently designing a LAC that short circuits at 1450 volts; John Brainard and Larry Andrews (both 2154) are doing research to better define the breakdown mechanism (which will lead to improved designs). Henry Black (2154) oversees production.



ED EHRMAN (2154), one of the principal developers of LAC, Lightning Arrestor Connector, shows internal weapon cabling and cutaway of the LAC. If lightning zapped weapon through external skin connector, the LAC would short out on surface of conducting web and current would go to case ground—thus protecting internal components downstream from cabling.



THIS EXPLODED VIEW of the Lightning Arrestor Connector shows conducting web and dielectric sleeve. The non-conducting sleeve crowds electric field into air gap between connector pin and conducting web. Breakdown arc partially vaporizes pin and web materials, causing a dead short which protects vital internal weapon components.

In South Korea, comedians are walking on egg shells. The government has cracked down on TV and radio comedy, insisting that all jokes that might offend be censored. Government screening committees review all comedy material (and display their own prejudices in the process). The only jokes approved these days deal with animals, beggars, thieves and noisy neighbors.

Speakers

L. R. Dawson (5154), "An Optically Triggered Double Heterostructure Linear Bilateral Phototransistor," IEEE International Electron Devices Meeting, Dec. 5, Washinton, D.C.

K. T. Gillen (5813), "Combined Environment Accelerated Aging Model Applied to Electric Cable Material," Materials Science and Materials Chemistry Special Seminar Committees, Westinghouse R&D Center, Jan. 30, Pittsburgh.

M. G. Thomas (5731), "Overview of Results from the Sandia Coal Liquefaction Program," Department of Mining & Fuels Engineering, University of Utah, Jan. 30, Salt Lake City.

K. W. Mitchell (5133), "CdS/CdTe Photovoltaic Heterojunctions for Solar Energy Conversion," Jan. 31, Santa Monica, Calif.

G. L. Kellogg and J. A. Panitz (both 5114), "Field Desorption Surface Studies of Samples Exposed to the Plasma in PLT," DMFE Coatings Workshop, Jan. 31-Feb. 1, Albuquerque.

R. M. Jefferson (5430), "The Facts of Energy or Our National Confusion," 36th Annual American Dehydrators Assoc. meeting, Feb. 1, Maui, Hawaii.

R. M. Biefeld (5154), "Life in the Lab After College," UNM and Arizona State University, Feb. 9 and 10, Albuquerque and Tempe.

K. L. Hiebert (5122), "An Extension of Newton's Method to Systems of Equations and Inequalities," Division C-3 Seminar, Feb. 13, LASL.

L. C. Beavis (2353), "The Importance of Chapters to the National American Vacuum Society," Symposium on Current Energy Research and Development, AVS, Feb. 13, Tampa.

D. W. Ballard (9351), "Nondestructive Evaluation of LWR Spent Fuel Shipping Casks," Conference on NDE in the Nuclear Industry, Feb. 13-15, Salt Lake City.

H. M. Dodd (5743), "Systems Analyses of Storage in Specific Solar Thermal Power Applications," SERI Storage Applications Workshop, Feb. 14, Golden, Colo.

H. M. Bivens, R. W. Barnard, D. H. Jensen and W. A. Stephenson (all 2355), "Status of Sandia's DFN Uranium Logging Project," NEA/IAEA Workshop on Uranium Borehole Logging, Feb. 14-16, Grand Junction, Colo.

J. W. Braithwaite (5831), "Corrosion Problems Associated with Terminal Nuclear Waste Storage," W. B. Jones (5835) and J. C. Swearengen (5846), "Mechanical Stability of Ultrahigh Strength Steels; G. A. Knorovsky (5833), "Autocatalytic Nucleation of Burst Martensitic Transformations"; R. W. Rohde (5832) and J. C. Swearengen (5846), "Deformation States of Metals—A Study of Pure Aluminum"; S. M. Myers (5111), "Processing Materials with High Energy Ion Beams"; F. G. Yost (2151), "Characterization of Pb-In Soldered Interfaces in Hybrid Microcircuits," Annual meeting of AIME, Feb. 26-March 3, Denver.

B. Epstein (UNM) and D. L. Hicks (5162), "Comparison Between Two Error Estimation Procedures," First Annual Workshop on the Information Linkage Between Applied Mathematics and Industry, Feb. 23-25, Monterey, Calif.

K. W. Mitchell (5133), "High-Concentration Photovoltaic Solar Cells," Materials Science and Engineering Colloquium, Feb. 24, Stanford University.

R. E. Akins (5443), "Field Measurement of Performance of Wind Energy Conversion Systems," Conference on Wind Engineering Research, University of Florida, Feb. 26-March 1, Gainesville.

P. H. Holloway (5825), "Applications of Surface Analysis for Electronic Devices," 29th Pittsburgh Conference—Advances in Applied Surface Analysis I Symposium, Feb. 28, Cleveland.

D. Woodall (5215) and C. Schaffer (UNM), "An Electrostatic, Ion/Electron Spectrometer for Laser-Produced Plasma Measurements"; R. J. Leeper (5242), invited paper, "The Sandia Laboratories Diagnostic System for Particle Beam Fusion Experiments," 2nd Topical Conference on High Temperature Plasma Diagnostics, March 1-3, Santa Fe.

D. S. Ginley (5154), invited paper, "Solar Energy Conversion with Photoelectrochemical Cells," NASA, Johnson Space Center, Feb. 27-28, Houston.

D. J. Sharp and D. M. Mattox (both 5834), "Application of a Kaufman Ion Source for Low Energy Hydrogen Ion Bombardment Studies," US DOE-DMFE/Sandia Workshop on CTR First Wall Coatings, Jan. 31-Feb. 2, SLA.

J. L. Irwin (1323), "HPBN Development," Advances in Reentry Thermal Protection Technology, Feb. 15-16, Los Angeles.

P. Luette (1132), "An Experiment to Study the Radiation Properties of a Power Distribution System and VLF Transmission Through the Ionosphere," 1978 DASP Workshop, Feb. 27-29, Edmonton, Alberta, Canada.

M. J. Norris (5120), "Authentication," Department of Mathematics Colloquium, University of Arizona, Feb. 9, Tucson.

H. S. Levine (5824), "Conversion of Fuel Hulls to Zirconate Ion Exchangers for Stabilization of Wastes from the Thorium Fuel Cycle"; H. R. Yoshimura (5433), "Crash Testing of Spent-Nuclear-Fuel Shipping Systems"; L. W. Scully (5341), "Engineering Considerations for the Waste Isolation Pilot Plant"; R. G. Dosch (5824) and W. W. Schulz (RHO), "The Use of Titanates in the Decontamination of Alkaline Defense Wastes," '78 Waste Management Fuel Cycles, March 5-8, Tucson.

A. C. Switendick (5151), "Factors and Limitations Contributing to the Amount of Hydrogen in Hydrides"; D. F. Cowgill and J. M. Harris (both 2353), "Depth Profiling Techniques for the Investigation of Incomplete Hydriding"; L. C. Beavis (2353), "Thermodesorption as a Means of Measuring Properties of Metal Hydrides"; W. J. Kass and R. P. Wemple (both 5846), "High Pressure Differential Thermal Analysis and Acoustic Emission of Selected Hydrides"; C. J. Northrup (5824), A. A. Heckes (2515) and L. D. Baudoin (9655), "Hydride Engines: A Solar/Hydride Water Pump," Hydride Symposium, March 8-9, SLA.

T. W. Hoover (1716), "Department of Energy (DOE) Transportation System for Nuclear Materials and the Role of State Law Enforcement Agencies," Carnahan Conference on Crime Countermeasures, March 17-19, Lexington, Ky.

L. F. Shampine (5122), "What Everyone Solving Differential Equations Numerically Should Know," Joint Institute for Laboratory Astrophysics, University of Colorado, March 8, Boulder.

B. Morosin (5154), "Structure of an Exchange-Coupled Binculear Vanadyl (IV) Complex"; J. E. Houston (5114), invited paper, "Chemical State Information from Peak-Shape Analysis in Auger Electron Spectroscopy"; D. R. Jennison (5151), "A Practical Theory of Molecular and Cluster Auger Lineshapes"; A. Owyoung (5214), "CW Stimulated Raman Spectroscopy"; D. W. Schaefer (5814), "Entangled Polymers: Polystyrene in Butanone"; B. T. Kenna and K. D. Murphy (both 5824), "The Separation of ^{137}Cs from Nuclear Waste"; R. G. Kepler (5810), "Saturation Remnant Polarization of Polyvinylidene Fluoride"; J. A. Borders (5111), invited paper, "Quantitative Materials Analysis by Rutherford Backscattering and Nuclear Reactions"; M. G. Thomas (5731), "Hydrogen Consumption in Non-Catalyzed Coal Liquefaction"; B. Granoff, M. G. Thomas, P. M. Baca and G. T. Noles (all 5731), "Effects of Mineral Water on the Hydroliquefaction of Coal," American Chemical Society meeting, March 12-17, Anaheim, Calif.

D. B. Boozer and R. B. Worrell (both 1758), "A Method for Determining the Susceptibility of a Facility to Sensor System Nullification by Insiders," 10th Annual Southeaster Symposium on System Theory, March 13-14, Miss. State Univ.

H. T. Davis (5121), "A Competing Risk Model for Reduction in Life Expectancy from Radiogenic Latent Cancer," Symposium on Late Biological Effects of Ionizing Radiation, International Atomic Energy Agency, March 13-17, Vienna, Austria.

J. T. Henderson (1222), "An Optimum Repair Level Analysis (ORIA) Developed for the BISS Program," AFCMD QA Seminar, March 14, KAFB.

G. E. Brandvold (5710), "Vertical Axis Wind Turbine Status," and "Solar Irrigation Program Status," New Delhi ISES Conference, Jan. 16-21, New Delhi, India.

K. Haskell (2613), "Data Fitting with Insufficient Data," Rio Grande ACM Winter meeting, Feb. 10, Las Cruces.

M. J. Clauser (5241), "Targets for Heavy Ion Fusion," Symposium on Relativistic Heavy Ion Research, March 7-10, Darmstadt, West Germany.

D. E. Amos (5122), "Numerical Inversion of Laplace Transforms," ACM-SIGNUM meeting, March 8, Albuquerque.

D. W. Powers (5311), "Paleorifting along the Gregory Rift of Kenya and Ethiopia," Geology 401 seminar, March 9, UNM.

E. M. Brault (2601), "Data Base - A Catalyst for Change," Federal ADP Council, March 9, KAFB.

W. C. Slemmer (2116), "What is a Microprocessor?" Microprocessor and LSI Technology annual spring symposium, March 10, Albuquerque.

M. L. Knotek (5155), "Electron Stimulated Desorption from Ionically Bonded Systems by Core Hole Auger Decay," seminars, March 15, Los Alamos, March 24, Murray Hill, N.J.

D. L. Hicks (5162), "The Mathematics Course for Engineers and Scientists at Sandia Laboratories: A Self-Paced, Modular, Multimedia Approach," Southwest Regional Section of the Mathematical Association of America, March 17-18, NMIMT.

R. M. Jefferson (5430), "Nuclear Reactor Safety," West Mesa Civitan Club, Feb. 15, Albuquerque; "Our Powerless Society," Adams Middle School science club, Feb. 22, Albuquerque.

R. E. Atkins (5333), "Wind Energy Research," ASCE Student Chapter, UNM, Feb. 8.

L. P. Robertson (1758), "Hawaii," Adams Middle School science club, Feb. 8; "Thailand—People, Culture, Transportation, Religion," Host Lions Club, Feb. 14, Albuquerque.

H. C. Monteith (5411), "The Blessings and Curses of Nuclear Power," Albuquerque Science Teachers Association, Feb. 14; "ESP and UFO Research," Northwest Kiwanis Club, Feb. 15; and "UFOs and Their Mission to Earth," Cleveland Jr. High School science class, Feb. 16, Albuquerque.

K. L. Swanson (9636), "Think Metric," La Mesa Adult Club, Feb. 17, Albuquerque.

F. Biggs (5231), "Central Receiver System," Albuquerque Museum Society, Feb. 19.

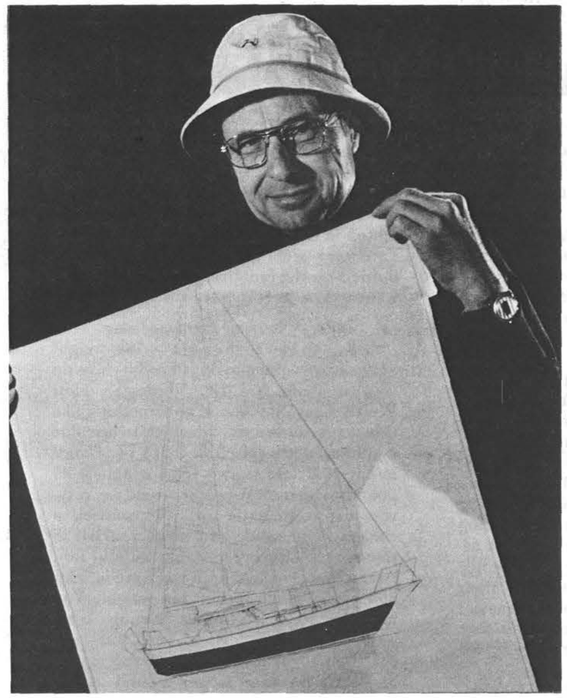
V. L. Dugan (5740) "Prospectus on Some Non-Nuclear Energy Technologies," WE Engineering Symposium, Feb. 21, Greensboro, N.C.; WE Engineering Seminar, Feb. 22, New York City; and WE Engineering Symposium, Feb. 23, Princeton, N.J.

N. J. DeLollis (5813), "Travel in Italy," Downtown Optimist Club, Feb. 24, Albuquerque.

R. S. Claassen (5800), "Materials Problems in Solar, Nuclear and Storage of Energy," 5th Energy Technology Conference, Feb. 27-March 1, Washington, D.C.

M. W. Sharp (2644), "COM Applications at Sandia Laboratories," COMpass '78, March 1, San Francisco.

W. H. Smyrl and S. L. Pohlman (both 5831), "Determination of Corrosion Parameters by Digital Impedance Analysis"; J. W. Braithwaite (5831), "The Corrosion Behavior of Metals in Terminal Nuclear Waste Storage Environments," NACE/CORROSION '78 meeting, March 6-10, Houston.



KEN CORDES (1739) and "Tuesday"—the sloop he'll sail while world cruising.

Early Retirement

What A Way To Go!

A recent LAB NEWS survey reveals that 68.3% of Sandians think it would be a neat idea to world cruise on a sailboat after retirement. (Actually, we grabbed a few people in the hall and most of them said, "Hey—that's a neat idea!")

Most of us let it go at that, but now we have the genuine article: Ken Cordes (1739), who retires next month, has sold his house, got rid of the furniture and other stuff, has bought a sailboat, and he and Mrs. Cordes plan shortly to embark. Objective: world cruising.

Now age 56, Ken made the decision a few years back to take early retirement. "The kids are grown, and I want to try my hand at something else. For a while I was going to build underground houses—that's another story—but Liola said 'no way' to that, so I said, 'OK, then how about world cruising on a sailboat?' She said, 'yes' and things just progressed from there."

They sold the house and moved into an apartment. With the house money, Ken contracted for the building of a 30-foot Rawson pilot house sailboat in Seattle. Now ready, the boat incorporates a 40 hp Diesel engine for auxiliary power.

The Cordes plan to get their sea legs on Lake Washington (near Seattle) and to get additional experience on the waters of Puget Sound. Then it's north along the inland waterway to Alaska, back south in September to San Francisco Bay and on to San Diego to prepare for the first open ocean journey: Hawaii.

Ken is not exactly a novice in long-distance sojourning. He's flown a single engine private plane across the Pacific, and his military flying experience includes a tour as a meteorological officer.

We've got a promise from Ken that he'll keep LAB NEWS posted on their adventures. In the meantime, bon voyage!

The Verdesca Diet: Slow But Sure

Ed. Note—The news is out: exercise alone will not cause you to lose much weight. It's true, however, for most people, that exercise does dampen the appetite, and when that natural non-urge is combined with a sensible diet, then results may be spectacular. Here's one approach to diet whose long-term consequences make a great deal of sense. It's written by Dr. Arthur Verdesca of the WE Headquarters Medical Staff.

Some time ago one of these articles carried the suggestion that, for some people, being overweight wasn't that bad. The current medical thinking still agrees that, in the absence of high blood pressure, high blood fats and diabetes, being overweight may not necessarily be among the significant risk factors in causing cardiovascular disease. (This is always assuming that we are dealing with people who are less than 30 percent above their ideal weight. For those who are heavier than that, weight loss, even in the absence of the above factors, is definitely indicated medically.)

The question now arises, how does one lose weight if one wishes to do so for medical or just psychological or cosmetic reasons? As all of us who have been or are overweight know, this is far from easy to do; but, it can be done—in many ways. Unfortunately, the results, while definitely achievable, are often not permanent. That's one of the reasons for the recurrent popularity of the various fad diets that hit the best seller lists. Though almost all are successful in bringing weight down (even some of the more bizarre and definitely not medically recommended ones) the problem is that, within a few months of stopping the diet, the weight begins to creep back up and, in many cases, one is back where one started.

Try for one pound per month

One of the basic facts to keep in mind is that every fat person didn't get that way overnight. It took months, if not years, of regular ingestion of more calories than one was burning up in order to accumulate that excess weight. If one keeps that in mind, it helps reconcile one to the concept that the weight loss should be in as physiologic a manner as the weight gain was: that is, slow but steady. Most overweight persons haven't gained 25 pounds in one year and, therefore, they shouldn't try to lose 25 pounds in one year. This is another way of saying that even 2 pounds a month may be too rapid and, therefore, too unnatural, a way of losing weight. One pound a month weight loss is perhaps the lower limit if one wants really to call it a weight loss program. Anyone who has to lose only 4 or 5 pounds doesn't have a really major weight problem in the first place so much of what follows here is not for him anyhow.

Second, and this may be the most important factor to be pointed out, is that one must almost want to lose weight more than anything else in the world. It requires dedication through thick and thin (pun intended), a willingness to put up with the diet when you are feeling depressed and low and tired, the courage to turn down a fattening dessert when it has been presented in the most appetizing fashion you have ever seen in your entire life, that borders on the fanatical. But, if you really want to lose weight, you will.

Weigh yourself every morning

O.K.—so you really want to lose weight and you are willing to do it slowly—how do you go about it? "Dr. Verdesca's Slow Weight Loss Diet" would go something like this. Let's say you have decided to lose one pound a month (after all that's 12 pounds in one year and in two years is almost 25 pounds which most people would be very, very happy to settle for). Get yourself a cheapo weight scale and weigh yourself in the altogether every morning without fail. At the first of each month you have at least 30 days in which to lose the weight. You may by some fortuitous dieting combination do so in 5 days. Fine! Just keep that weight off for the rest of the month and start on your second pound at the beginning of the next month—not sooner. If, on the other hand, you are coming up on the 25th day of the month and you haven't lost that pound, drastic measures may be in order but you have got to get that pound off in that month. Even if it requires one day of almost total starvation (which is indeed very hard to do and not generally recommended because it is not very healthy in the long run anyhow).

Do you avoid carbohydrates? No! Do you avoid proteins? No! Do you avoid fats? No! Just eat a balanced diet every day; but, less of it. Of course, for the person who is a sweets eater, cutting out that form of carbohydrates while still eating his usual complex carbohydrates, such as starches in bread, potatoes, etc., will result in a nice quick weight loss but many a fattie is not a sweetie: he likes his bread and spaghetti and meat and potatoes and so then the recommendation is to eat less of everything. True, you have to lose 3500 calories worth of energy in order to lose a pound but, when you buy in any bookstore a calorie weight table of foods, you will see how little is required to be omitted from one's diet in order to lose 3500 calories over a period of an entire month. But, since this is such a slow weight loss, constant vigilance is the watchword. Don't let yourself coast into forgetting that you must continue to watch everything you eat.

Develop new eating habits

This 3500 calories a month weight loss really requires a minor but very real adjustment in your basic way of eating and, after 10, 20 or 30 months of it, it becomes a way of life. You will usually find that you can keep your weight at whatever level you wish afterwards because you have developed new eating habits.

What about water pills? Won't they help you lose weight? No! They help you lose water and they have dangerous side efects anyhow. What about pep pills? Won't they help you lose weight? For some people, yes, probably for a very short time but their side effects are so bad and their addictive potential so real that the cure is worse than the disease. What about thyroid pills? What about them? They are good if you have an underactive thyroid. If you don't, you're wasting your money. You may be hurting your body's matabolism and your heart, and you will lose little, if any, weight anyhow. What about intestinal surgery for obesity? This is a hazardous procedure. It has many serious metabolic complications, and it should be used only when all other treatments have failed, and obesity is an *imminent* threat to life. Otherwise, the operation is to be avoided.

It can be done. It's a pain. It's lonely. It's hungry. But, after a while, it gets to be beautiful when you finally see that you can do it, that the weight is coming off. The satisfaction for this becomes such a positive reinforcing factor that it will help carry you through some of the worse "downs" that you will have throughout the weight loss period.

If you continue to eat a balanced diet throughout your weight loss period, there is really no need for vitamin supplements. But it won't hurt if you take a daily vitamin and, contrary to what everybody in the world knows for sure, a daily vitamin will not increase your appetite and will not make you gain weight.

Fat may be where it's at, but think thin and win.

COMPUTER STUDENTS—Liz Chavez (2633), Stacy Harris (2614) and Patti Ruiz (2631) are Work Experience Trainees. The Labs started the WET program about six years ago in the computing directorate with the purpose of giving seniors in high school some on-the-job experience. Liz, Stacy, and Patti attend Albuquerque High mornings, then come out to Sandia for the afternoons.

Fun & Games

New Activities—Bob Giersberg, manager of the C-Club recreation program, announces several upcoming events of interest to Sandia joggers, runners, racketball enthusiasts and basketball players.

RACKETBALL TOURNAMENT—an early-morning, double elimination event; play starts April 17 in the Base gym. Pay $5 registration fee before the April 12, 4 p.m. deadline.

FUN RUN—starts 9 a.m. Sunday, April 9, at the Kirtland-east track. Events include 4-laps time prediction, 6-mile open, 2-mile youth (under 15) run, 2-mile women's road run, 2-mile men's slow run. Prizes will be awarded for top six places in each event. Show up at the track before 9 a.m. and pay $1 fee to enter.

RUNNERS and JOGGERS will organize at a meeting Tuesday, April 4, at 4:45 p.m. at the Coronado Club. A recent survey of runners indicated the desire for a formal organization.

FAST PITCH SOFTBALL— more players are needed. Call Bruce Whittet (9654), 4-4380, manager of a Sandia fast pitch team.

A BASKETBALL LEAGUE for summer play at the Rio Grande High School gym is being organized by the Bernalillo County Parks and Recreation Department. Plans call for a 10-game schedule and two tournaments. Individual players and teams are needed.

For additional information on any of these activities, call Bob Giersberg, 4-8486.

* * *

Tennis—The Sandia Tennis Association offers a program of play in men's and women's singles and doubles, as well as mixed doubles. Activities include ladders, tournaments, tennis parties, and low cost clinics. All Sandians and DOEans (and spouses) are eligible for STA. For more information, send your name, organization and phone number to either Bill Kennish (5742) or Joe Tillerson (5162).

* * *

Biking—Ron Malpas, SBA president, dropped by to report the results of his discussions with the KAFB Base Safety people. "They're reasonable people," Ron says. First, they agreed that the Base regulation for making a left turn might just be a little inappropriate, and that the more sensible approach is that given in the city traffic code. For SBA'ers leaving by the Wyoming Gate and heading west, the military request that the biker avoid the four lanes of traffic at the gate and cross Wyoming farther south at the school traffic light. Proceed then through the housing area to the gate, dismount and walk the bike through the visitor parking area. Ultimately, they hope to establish a bikeway through this parking area, making it unnecessary to dismount. Finally, emergency gate closures apply to cyclists (and pedestrians) as well as to motorists.

Four bikes have been stolen in the past six months within the Tech Area. None was particularly valuable, so the owners hadn't secured the bikes with locks. Moral: lock your bike up—no matter where. And, if the culprit(s) reads this, we urge you to return the bike(s), Security takes a dim view of theft, whether it be of government or personal property.

* * *

Running—Albuquerque Roadrunners have a full schedule of runs for the spring season. On Sunday, April 2, the Roadrunners meet at Burton Park (Carlisle & Kathryn SE) at 1:30 for a number of events ranging from 1 to 5 miles. And, on April 16, they meet at Bataan Park (Tulane and Lomas NE) at 1:30 for a similar program. You don't have to be a member—just show up. (We're a little put off by the Roadrunners' definition of pace: "Slow - 7 + minutes per mile... Intermediate - 6 to 7 min/mile... Fast - 6 min/mile or better." We'd need a new category, "Glacial," for our zippy 9 min/mile pace.)

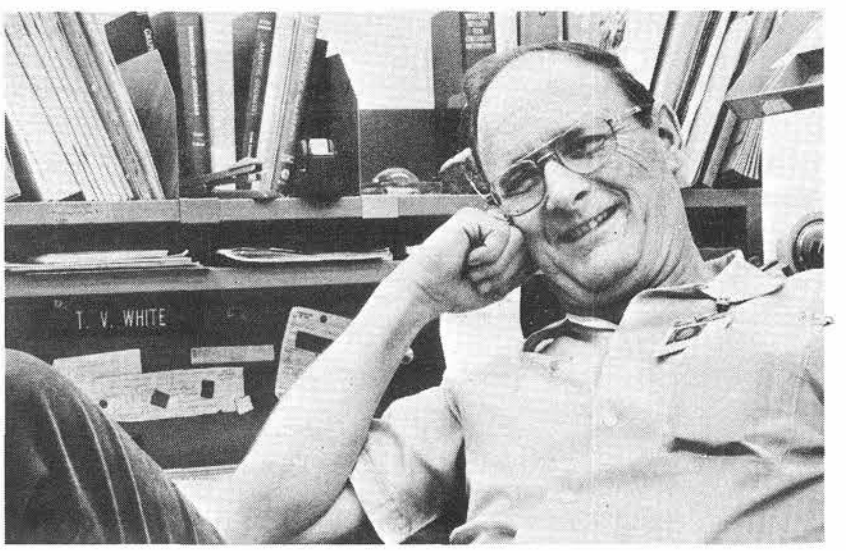
Now it can be told: Herb Caen in the *SF Chronicle* reports the real meaning of ADIDAS—All Day I Dream About Sex!

* * *

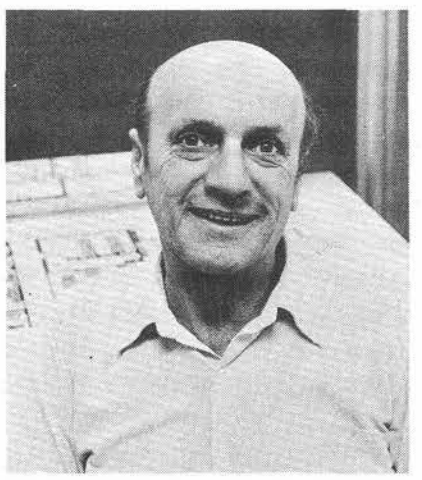
Women's Softball—A manager is needed for an already-formed and practicing women's softball team, C league. Call Pam Morenus (2516), 4-3265, or Tom Massis (2516), 4-1540.

Retiring

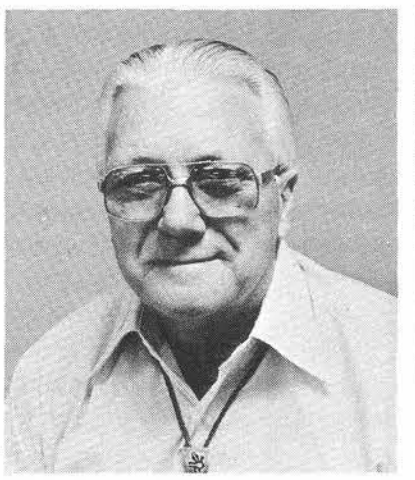
Les Cole (9563)



Vincent White (9655)



Mike Kuliasha (9751)



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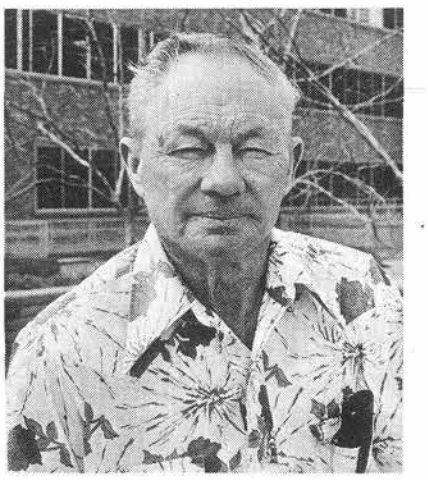
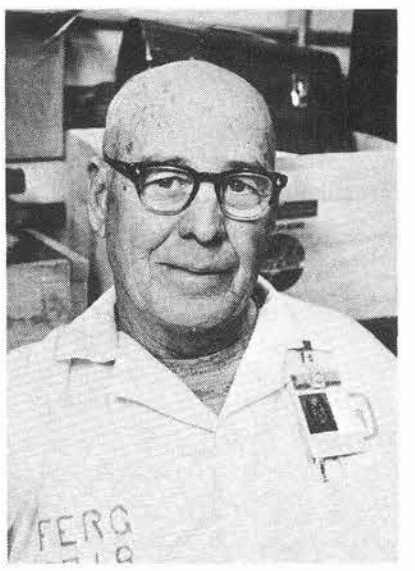


Ralph Carter (3172)

Piffie Chavez (3423)



Joe Ferguson (9718)

Art York (1222)

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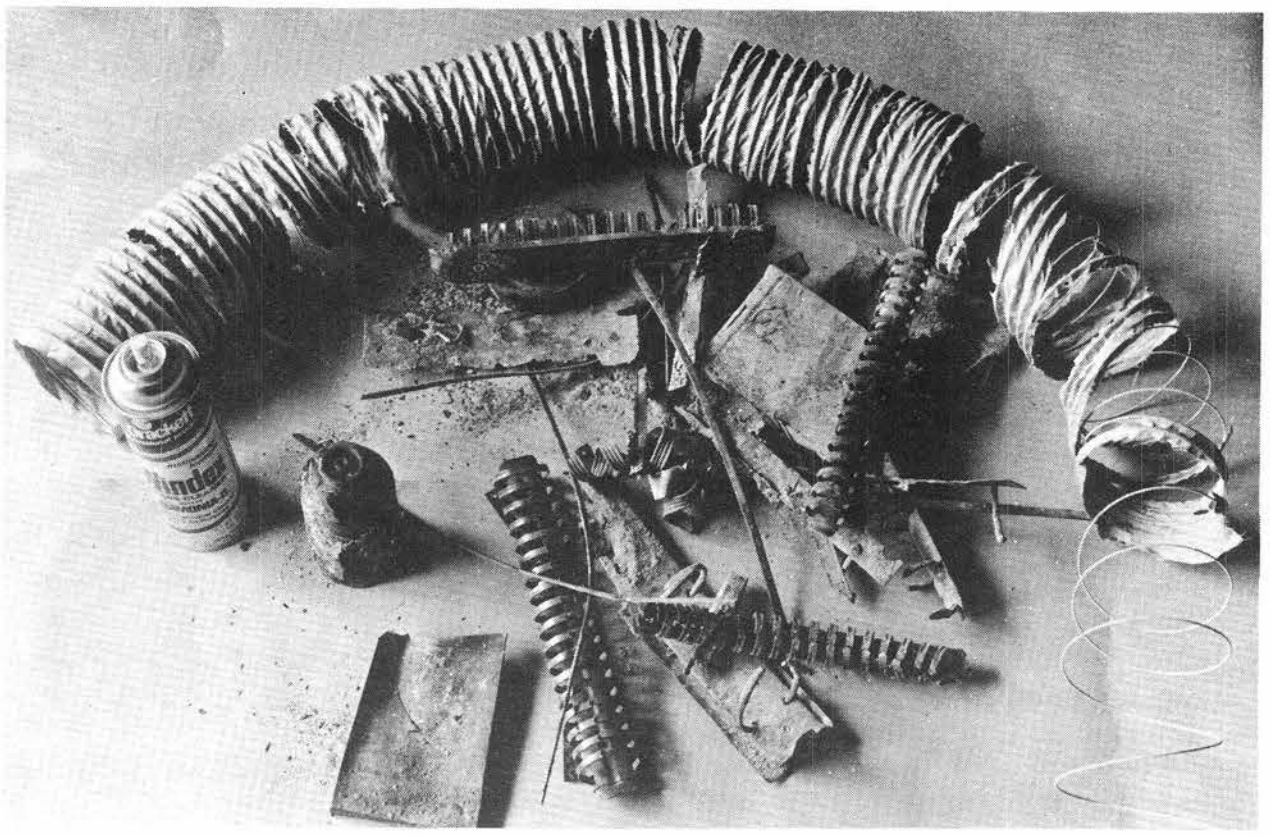


CLASSIFED WASTE? This batch of trash was recently pulled from the furnace where classified material is burned. The coil hose looks like the remains of a vacuum cleaner. Note the notebook binders and pressure spray cans. This kind of stuff is hazardous to the operator burning the waste. Please, put only classified paper in the classified burn bags.

HEADS UP! Hats Make Dramatic Comeback

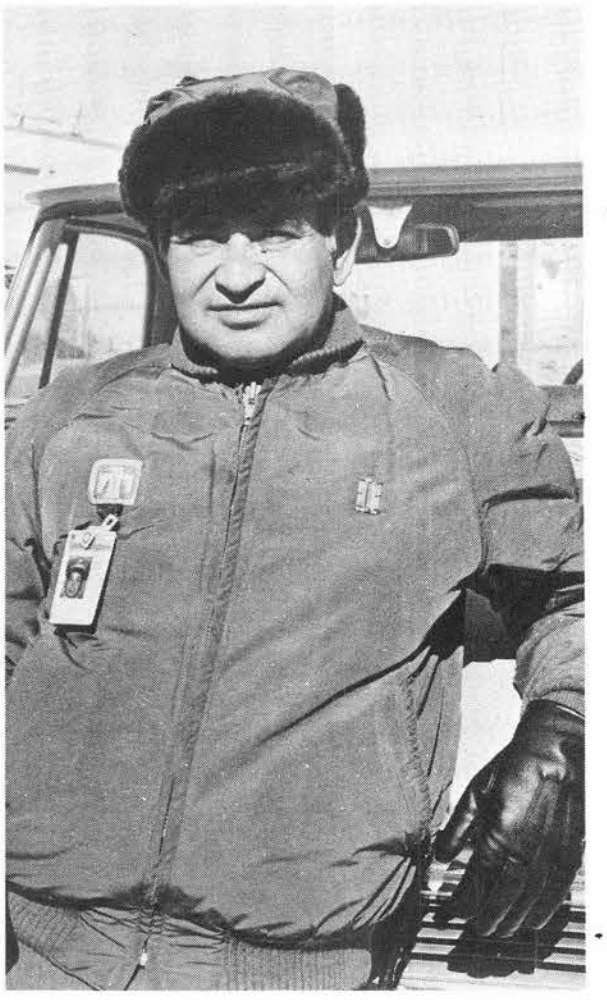
In the 20's and 30's a man wasn't a man without a hat. He wore one everywhere except in the house. (Every house had a hat rack.) Remember Dad's? He had a gray or brown workaday snap brim. On Sundays he wore the pearl gray job — wide brim turned down in front, up in back. Then came WWII and these were traded in on GI issue. And the GI haircut. After the war, men stopped wearing hats (except cowboys, of course) and the brush haircut stayed stylish through the 50's. Then came the 60's with hippies and long hair. We're still in the aftermath of that. But men are wearing hats or headgear again. Lots of them, and lots of different styles. Here are some that caught the eye of LAB NEWS photographers Russ Smith and Bill Laskar.

Bill Doyle (3433)

Norm Scott (3433)

Brian Finley (1223)

Mike Rex (3522)



Ermenio Mata (3430)

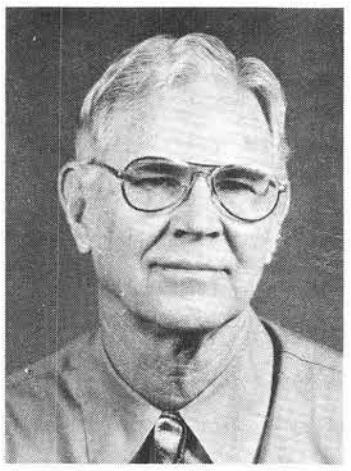
Martin Rhodes (9636)

Paul Leonard (3421)

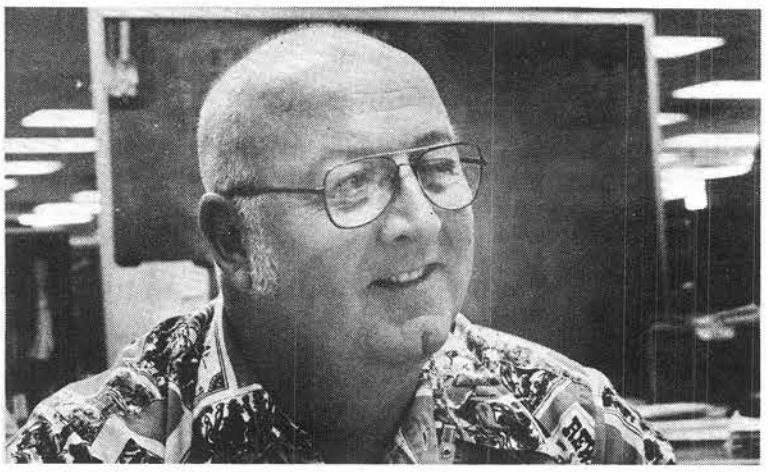
Ken Miller (3153)

MILEPOSTS
LAB NEWS

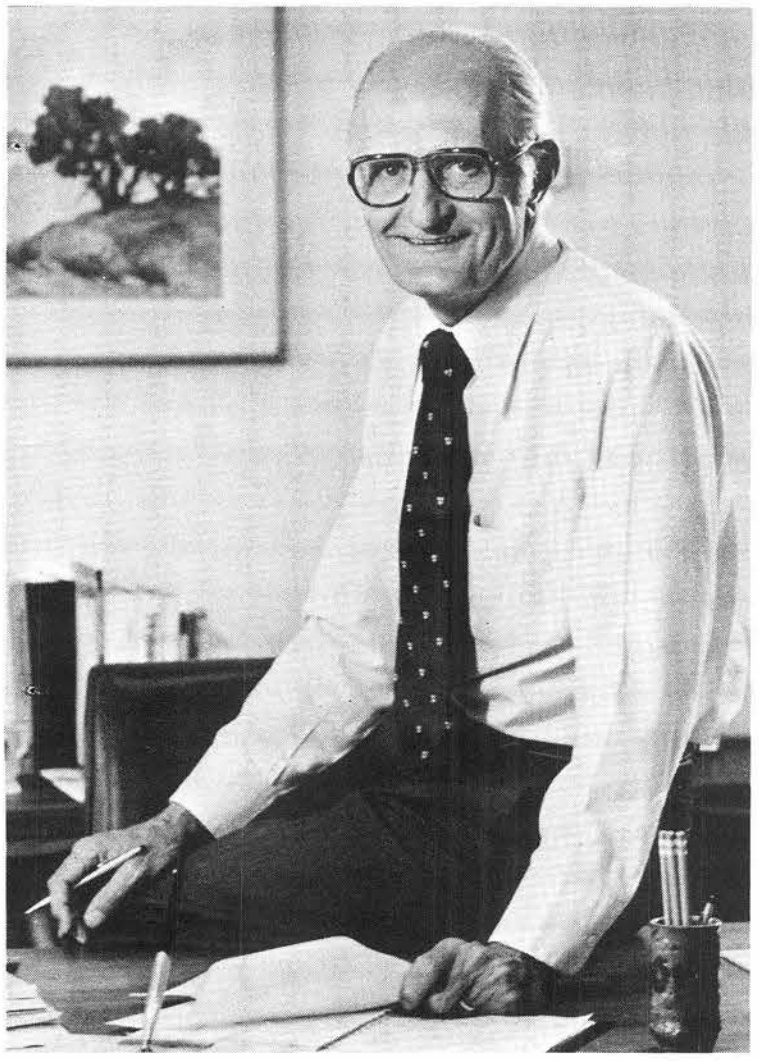
MARCH 1978



Lou Stam - 1321 25



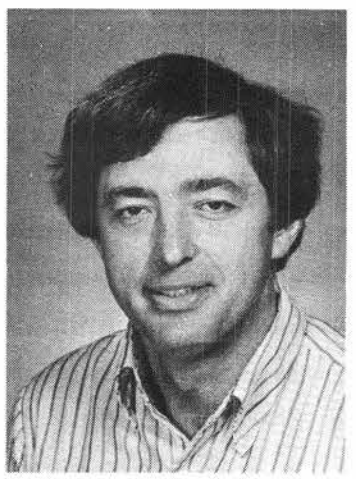
Max Littleton - 9522 25



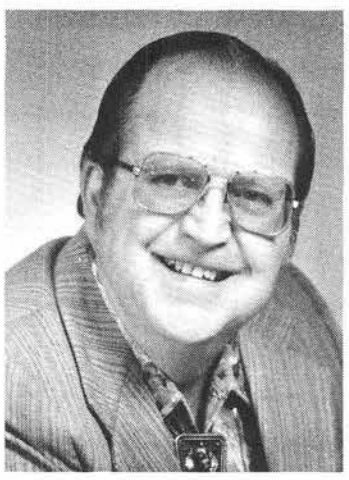
Morgan Sparks - 1 Bell Labs 35

Ray Clark - 3010 25

Garry Green - 8183 25



Harry Weaver - 2354 10



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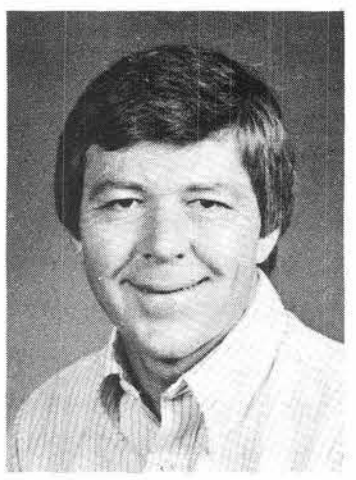
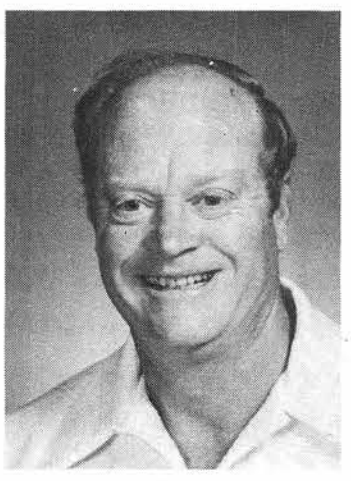
Harold Maciolek - 4325 25

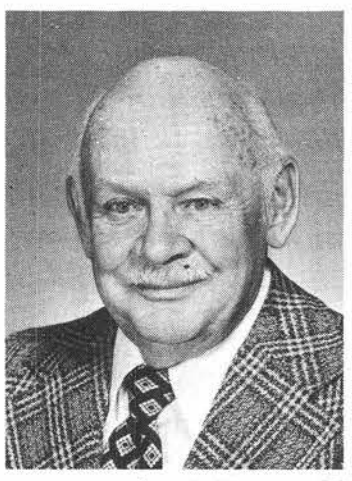


Carl Longerot - 2113 20

Al Fite - 4337 30

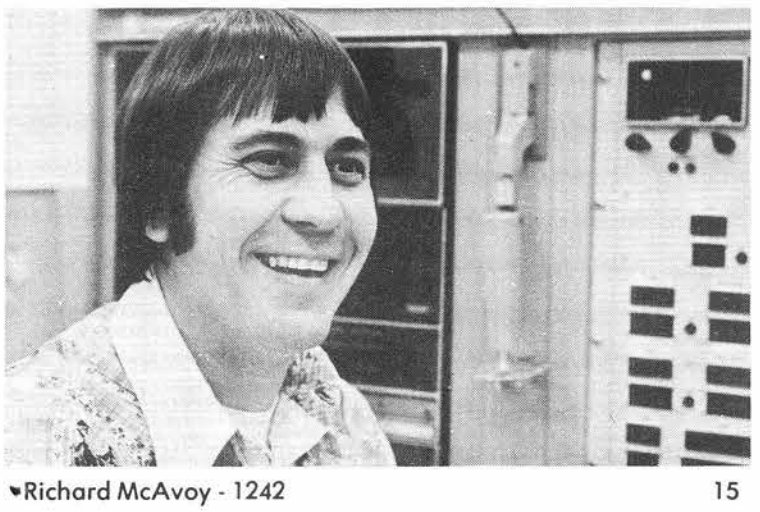


Vernon Marsh - 9633 15



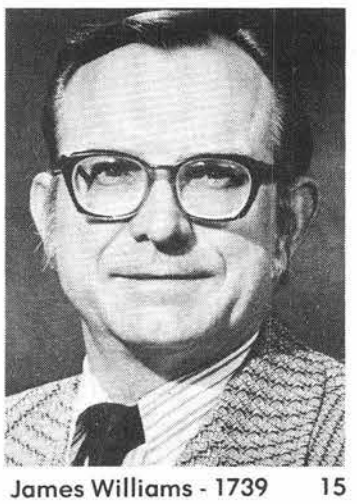
Gene Newlin - 6011 25

Gene Daniels - 9652 25

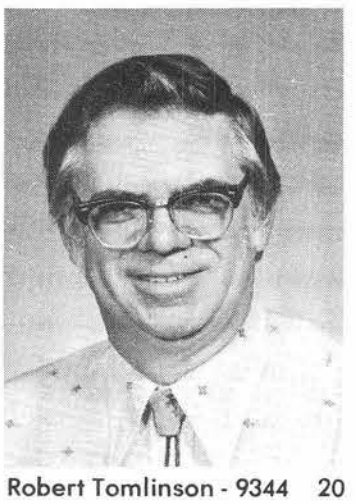


Richard McAvoy - 1242 15

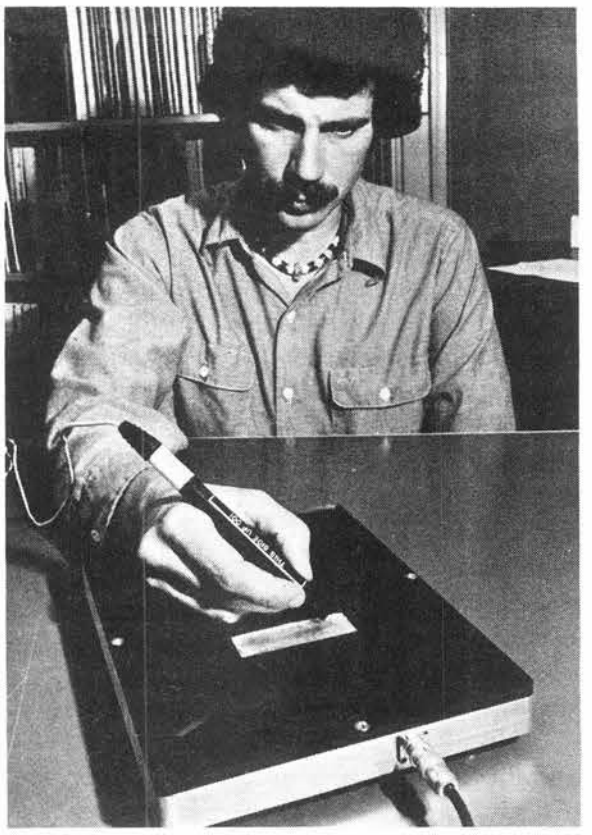
Janice Robertson - 9400 20



James Williams - 1739 15



Robert Tomlinson - 9344 20



J. B. SNELLING (5133) demonstrates a recently-patented ballpoint pen and writing tablet which produces a unique electronic profile of an individual's handwriting. It could be used as part of a controlled access security system.

Patent Granted to Handwriting Checker

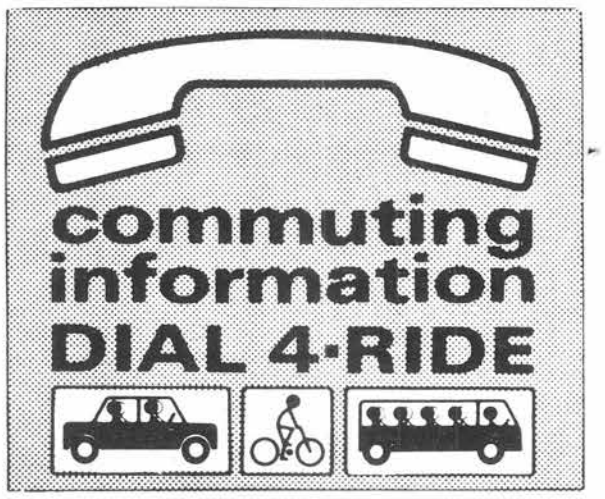
DOE was awarded a patent recently for an instrumented ballpoint pen and writing tablet which produce a unique electronic profile of an individual's handwriting. Inventors are Errol EerNisse, Cecil Land and J. B. Snelling of Solid State Device Physics Division 5133.

The inventors of the pen and tablet believe the instruments can be incorporated into signature verification systems to help control access to areas where personnel identification is required. In addition to federal security areas, the system could be used by banks, department stores and other commercial institutions.

The pen and tablet are relatively simple, their key elements being piezoelectric ceramic components which produce voltages in response to an applied pressure. Such ceramics are used in phonograph pick-up elements to convert needle movement into input electrical impluses for a hi-fi amplifier.

In the pen and tablet, the ceramic transducers produce signals which reflect both the movements and the pressures which are produced by an individual as he writes his signature. The combination of these signals creates a unique profile of a person's handwriting which can be processed by a computer and then compared with a file signature retrieved from the computer's memory.

Preliminary tests indicate that the pen and tablet are highly reliable, producing distinctive handwriting profiles which will be difficult, if not impossible, for a forger to duplicate. In addition, the instruments are compact, rugged and simple to build and service.



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MISCELLANEOUS

MOTORCYCLE TOURING LEATHERS: Bates pants w/zipper pockets, size 38; Sears jacket, size 42, both black, $50 for both. Reed, 268-7484.

ELECTRIC CLOTHES DRYER, apt. size portable; fold-n-roll ping pong table; 17' Grumman canoe; 3HP Johnson outboard motor; goose decoys; tent, alum. cots. Hunnicutt, 881-7692.

TWIN SIZE maple bed w/bookcase headboard & matching 3-drawer chest, $130. Miller, 255-6838.

GE DELUXE 18-lb. washer w/mini basket, 1½ yrs. old, avocado, $190; new lg. metal kitchen cabinet, white, $30. Paul, 299-6387.

SKI RACK CARRIER for car top, $12. Smailer, 881-7981.

ICE CREAM FREEZER, manual, $5; Whirlybird seeder, $2; small barbeque serving cart, $7.50. Worrell, 299-0381.

TWIN BEDS w/box springs, matching chest of drawers; dbl. chest of drawers, student desk, coffee table. Chavez, 298-0674.

SKIS: 140cm Heads, 135 cm; semi-BMX bicycle; elec. football; chemistry set, etc. Madden, 296-1082.

FIREPLACE Energy Mizer, w/glass doors, $399; upright freezer, $125; refrig., $25; Craftsman router & table, $45; Hoover vacuum, $15; wireless intercom, $10. Asprey, 296-6673.

DOUBLE BEDS w/mattresses & box springs, $70 & $60; table lamp, $20; girl's bike, $30. Wymer, 299-0717.

LEICA CL (not Lieca-Minolta) w/40mm f.2 Summicron C lens, soft case, $300; lens Leitz Elmarit R 90mm f2.8, case, $350. Mattox, 821-3945.

NIKON FTN photomic camera w/ latest model 50 mm f/2 Nikkor lens, $285. Laval, 898-9112.

CAMPER ICE BOX, $20; truck tire, 1200x16.5, half tread, $30. Stephenson, 299-3914.

FREE: Cactus, dig it & it's yours. Shoaf, 296-6166.

MOVIE PROJECTOR, dual reg. 8 super 8, zoom lens, stop frame, reverse, all metal construction, model M-85 Kodak, $90. Marchi, 299-3653.

BROILER-OVEN, elec., counter-top, uses household current, full size oven capacity, $60. Schmitz, 883-3959.

PIANO, upright, $500 or best offer. DeVargas, 266-2183.

KLIPSCH Cornwall 3-way speaker, $80. Martin, 255-8030.

FISHER STEREO amplifier, 40-watt, $50. Diem, 294-3838.

TV sweep marker gen, scope, tubes, misc. parts. Buksa, 898-1282.

FLYING EIGHT CLUB seeks responsible individual to purchase existing full membership. $20/mo.; wet rates: C-150, $12/hr.; C-182, $22/hr. Schkade, 293-7453.

2 3'x5' EAST INDIAN RUGS, both $100 or best offer. Baer, 293-7165.

SWING SET, $45. Marder, 268-9643 after 5.

GE ELEC. RANGE w/dbl. oven, coppertone, $75; twin size roll-a-way bed & mattress, $35. Smythe, 869-3864 or 247-9209.

SOFA & LOVE SEAT, approx. 8' & 5' respectively, gold velveteen, removable cushions, $250 for both. Lindsay, 299-2737.

EDGER, TRIMMER, Black & Decker model 8220, $30; white 40" gas range, $35. Liguori, 256-3613.

WARDS Hawthorne tent trailer, $250. Rebarchik, 299-1385.

BABY BED & foam mattress, $30. Barnette, 298-9227.

YELLOW COUCH w/matching chair, $125; king bed, $95; turntable, $28. O'Malley, 821-0196.

GOLF CLUBS, irons, woods, bag, new grips, $35; golf shoes, new 9½ D, $7. Sheives, 821-9285.

FISHING FLIES: custom tied, most patterns, 3/$1; muddler minnows, 45 cents ea. Swanson, 299-7833.

21" J.C. PENNEY color TV console, $50. Kolesar, 293-8367 after 5.

FIVE CALIPERS, B&S, Starrett, Lufkin, Perdieus; 2 dividers, K&E, General; surface gage, Starret; T-handle tap wrench; hold downs & blocks. Easton, 256-7717.

PONTOON BOAT, 12'x19', w/camper, sleeps 5, 20 HP Merc. O.B., life jackets, etc., full canvas cover, on Navajo Lake, $1250. Smatana, 299-6278.

AQHA Reg. chestnut filly, 3 yrs. old, professionally trained, excellent English Show & Hunter prospect, $2000. Love, 293-0536.

DOG PEN, 55'x5' chain link fence, gate, posts, complete, $75; turntable, Garrard zero-100c, Ortofon cartridge, $100 or make offer. Wilcoxen, 821-1621.

BATHROOM SINK w/faucets & wall mounting bracket, $15; 1 pr. removeable trailer mirrors, $5. Luikens, 881-1382.

TRANSPORTATION

'71 FORD Maverick Grabber, 2-dr., AT, 6-cyl., R&H, $575. Padilla, 296-2346.

'73 HONDA 500, 4-cyl. cycle, $900 or offer. Johnson, 836-3164.

'76 MIDAS mini-home, 19', sleeps 6, 10,000 miles, $9995. Shepperd, 268-5557, 1302 Dakota SE.

'72 CHEV. ½-ton, 350, 4-spd., lwb, $1895 or best offer. Ortiz, 877-6883.

'73 DATSUN 240Z, 4-spd., AM-FM, AC, radials, $3300. Higgins, 268-0145.

'72 MAZDA RX-2, white w/green trim, $1000. Davis, 298-4530.

'72 DATSUN pickup, 1300 miles on rebuilt engine, about 24 mpg in town, captain's chairs, mags, push bar, best offer. Muller, 299-1012.

'72 CHEV. Beauville sportvan, V8, 110" wheelbase, positraction, ¾-ton, 58,000 miles, Wards AC, std. trans., PS, PB. Huff, 296-7977.

'75 PLYMOUTH Duster, loaded, CB, 318 V8, low mileage, $450 under book value, will accept older truck in trade. Arana, 299-1214.

'72 450 HONDA, elec. start, $650. Romero, 268-7303.

'70 CAMARO, PS, AC, AT, new paint, completely rebuilt 350 engine. Prevender, 299-5253.

'69 BUG w/'73 1700cc engine, $695; '76 Kawasaki KZ750 windjammer III, $1450. Banach, 293-6583 after 7 p.m.

'69 CHEVY wagon, V8, AC, AM-FM, AT, PS, $1000. Johnson, 836-3164.

'74 EL CAMINO Classic, shell, PS, PB, AC, AT, tinted windshield, tilt steering, air shocks, best offer over $3000. Wilhelmi, 255-4932.

'71 FIAT 128, 2-dr. sedan, low mileage, $1200. DeLollis, 299-5384.

10-SPD. BICYCLE, 27", $80 or best offer. DeVargas, 266-2183.

MOTOR HOME, 27' Travco, competely self-contained, PS, PB, $1000 under book. Gall, 1-834-7307.

'76 OLDS Delta 88, 4-dr., fully equipped. Buksa, 898-1282.

'71 CHEVY Camaro, new paint, best offer. Castellano, 265-8219.

'69 PLYMOUTH Road Runner, pearl white, 383 engine just rebuilt, new carpet & upholstery, 4-spd., mag wheels, $1500. Lucero, 836-5375.

'75 FIAT X-19, 24,000 miles, firm price $3000. Wetherholt, 345-0818.

'75 VEGA, AT, factory air, vinyl top, new brakes, new upholstery, below book. Carr, 296-6882.

'75 SUZUKI T-500 motorcycle, 5500 adult miles, luggage rack, Dunlop tires, $900. Dillon, 881-3843.

DIRT BIKES: '75 Kawasaki 175, Enduro '75 Husky 250 CR, '75 Husky 360 CR, '73 Yamaha 175 Enduro. Lassiter, 298-2461.

'72 IMPALA, 350 engine, AC, AT, PS, PB. Walter, 883-5411.

'74 CHEVROLET Nova hatchback, less than 20,000 miles, new tires, V8, AT, PS, AC, $2595. Reynolds, 299-5157.

'77 GMC ¾-ton van, 35,000 miles, loaded w/equipment, $5695; '77 Kawasaki KZ-900, 5000 miles, $1795. O'Malley, 821-0196.

'73 INTERNATIONAL Travelall 4x4, PB, PS, AT, AC, trailer, tow, package, luggage rack, new paint, new upholstery, $2900. Sheives, 821-9285.

'74 VW BUS, 27,000 miles, AM/FM stereo, new radials, AC, $3900. Rea, 299-9315.

PLYMOUTH coupe, engine out, otherwise good, 1949. Williams, 281-3844.

'76 HONDA GL-1000, red w/silver fairing & bags, full dress w/all top quality accessories, 15,000 miles, $2400. Perryman, 294-6113.

'65 VW squareback 1600, good tires & brakes, $400. Jesperson, 842-8563.

'74 4x4 CHEV. Suburban, AC, PS, C-20 ¾ ton, 48-gal. gas tank, 27,400 miles. Civorola, 296-6666 after 4.

'75 PINTO Runabout, low mileage, white, $2175 firm. Hackley, 299-2333.

'70 PONTIAC GTO, AC, AT, new trans., 2 new tires, air shocks, wide track tires, $795. Barnes, 898-2375.

REAL ESTATE

ACADEMY ACRES, 3-bdr., 1¾ bath, LR, den w/fp, 2-car garage, dbl. glass throughout, landscaped, 1450 sq. ft., $46,900. Hardee, 299-0997.

SOLAR POTENTIAL, lg. adobe home, HW zoned heat, new texture-coated exterior, lg. vegas throughout, 8% REC available. Gall, 1-834-7307.

'77 NASHUA mobile home, 12x60, 2-bdr., $1500 down, take over payments of $116/mo. Ortiz, 242-7202 after 5.

12'x65' MOBILE HOME on half acre in Bosque Farms, well, 1000-gal. septic, underground utilities. Archuleta, 869-6984 after 6.

10 ACRES at Sedillo Hill, ¾ mile north of I-40 off 217 to the west, ½ wooded, ½ open, $2000/acre. O'Malley, 821-0196.

FOR RENT

3-BDR., NE, 1¾ baths, FR w/fp, covered patio, landscaped, $360/mo. McIntire, 294-5884.

3-BDR. tri-level, unfurnished, den, LR, 1¾ bath, carpeted, built-ins, dbl. garage, extras, near Menaul-Juan Tabo, $340/mo. Hessel, 296-9124.

TOWNHOME, 2-bdr., 2 bath, LR, DR, deluxe kitchen, utility, fp, atrium, private patio, garage, Chimney Ridge development. Philbin, 881-6623.

MOUNTAIN CABIN by stream near Mora, available for vacations, $25/week. Cooper, 268-8975.

VACATION CABIN on Vallecito Lake, near Durango, Colo., available by the day or week, modern 3-bdr. w/fp. Croll, 881-7235.

2-BDR. APT., unfurnished, in new 4-plex at 936 Chelwood NE, $205/mo., plus utilities. Schulze, 298-9328.

2-BDR. APT., 321 Tennessee SE, no pets, available April 2, $150/mo. Tobias, 877-0354 after 6.

WANTED

ONE 6.00x13, 4-lug 2 13/16" bolt centers & one 4.80x12, 4-lug, 2 13/16" wheels and tires; 6-gal. outboard gasoline tank. MacDougall, 299-8496.

GOOD TWIN MATTRESS & box springs, cheap. Shoaf, 296-6166.

FOR NEIGHBORHOOD CENTER work: draperies (preferably full length) for use in upcoming play. Shepherd, 296-1238.

CRIB & HIGHCHAIR, reasonable condition & prices. Leisher, 281-5258.

'65 FORD RANCHERO. Watterberg, 294-6759.

LAWNMOWER, push type, 16-18", good condition. Reynolds, 299-5157.

10 OR MORE persons interested in killing Bermuda grass in their lawns or gardens. Beck, 256-3350.

SERVICE MANUAL for 1970 6-cyl. Ford pickup. Hall, 298-8617.

TO BORROW—manual for Living Language Spanish course. Shunny, 265-1620.

LOST AND FOUND

LOST—3-spd. Schwinn bicycle, faded red w/upturned white grip handlebars; silver Cross pencil w/grey ink eraser; Rx sunglasses w/tinted lens; gold Timex watch w/chain bracelet.

FOUND—Rx sunglasses w/silver rims; silver ring w/blue stone; Sun Tram pass No. 1396; 2 small silver rings on earring post; small address book (no cover). LOST AND FOUND, Bldg. 832, 264-1657.

GIB RICHARD, magician extraordinaire, entertains tomorrow at the Club's Variety Night. The family should enjoy the magic and the whimsical movie, "The Incredible Mr. Limpet." It's free to members.

Coronado Club Activities

Roast Beef Tonite, Magic Tomorrow

HAPPY HOUR tonight will see the Club's famous roast beef buffet spread and a group called Los Malcriados wired into the bandstand. Tomorrow, the family should enjoy magical entertainment by Gib Richard, who masquerades as a UNM instructor in EE during the daytime, and a movie about a guy named Limpet who turns into a fish. How about that for magic?

SINGLES will mingle in the El Dorado room next Friday starting at 4:30. Yolanda and a guitar duo will entertain. An organizational meeting will be held to structure the group on April 19 at 4:45. Plan to be there to plan.

CORONADO CLUB retirees will party Friday, April 14, at 4:30 in the El Dorado room. Mike Michnovicz and accordion will entertain.

SANADO CLUB meets April 11 for lunch and the annual members' art show. A fashion show is also part of the 1:30 p.m. event. Make reservations now with Barbara Gunderson, 298-2133. The art will be on display in the Club April 10-11.

TRAVEL DIRECTOR Ed Neidel (2166) has packages to Europe, Hawaii and the Mediterranean plus a raft trip down the Colorado River through the Grand Canyon. See Ed in the lobby tonight between 6 and 7.

BALLROOM DANCING LESSONS, a new series of instruction, are again offered by Mike Haley. The six-week series starts Thursday, April 20, for both beginners and intermediates. Enrollment costs $30 for couples, $20 for singles. Sign up at the Club office.

UPCOMING EVENTS—Casino Night (Las Vegas on the Rio Grande) April 15; Soul Session (atavistic agression) April 29.

Take Note

There's an ancient line about opera, "I really like opera—but I can't take all that singing," all of which is by way of informing you that the opera that *everyone* likes, Carmen, will be presented at Popejoy on May 5 & 6, with a special youth performance on May 3 (Carmen sans sex?). Further, on April 13 at 7 p.m., the Albuquerque Opera Theater presents an educational program on Carmen in the auditorium of the Main Library at 5th and Copper. It's free.

* * *

Peter Modreski (5831) called to report that the 9th annual Gem & Mineral Show is set for April 8 & 9 at the Agriculture Bldg., State Fair Grounds, 9 to 9 on Saturday, 9 to 6 on Sunday. The show features arrowhead chipping, casting, crystal growing, gem cutting, gold panning, mineral testing and more, plus many dealer exhibits. Pete is president of the Albuquerque Gem & Mineral Club this year, Lloyd Keller (4336) is show chairman, and Paul Hlava (5822) is 1st VP. The organization has 200 members, meets on the 4th Monday of each month at 7:30 at St. Timothy's, corner of Copper & Jefferson NE.

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One of the more interesting inquiries addressed to the Labs comes from a medical practitioner in Jackson, Michigan. We surmise the gentleman wished to add to his knowledge of geriatrics: "Please send a copy of your bulletin entitled 'Accelerated Aging in Combined Stress Environments' by K. T. Gillen." Alas, the study relates to the accelerated aging of materials, not people. But then, the doc may be on the right track.

* * *

Russ Curtis of Security Standards and Investigations Division 3433 could use an interpreter—as a matter of fact, he could use a listing of all Sandians who speak a foreign language, any foreign language. Last week he was hard-pressed to find a Vietnamese interpreter in order to converse with a visitor. If you can help Russ by being available "just in case" with a foreign language, call him on 4-4242.

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FRIDAY	SATURDAY
31—HAPPY HOUR ROAST BEEF BUFFET Adults $3.50 Under 12 1.92 *Los Malcriados*	1—VARIETY NIGHT Gib Richards, Magician *"The Incredible Mr. Limpet"* Free to Members
7—HAPPY HOUR BBQ RIBS BUFFET Adults $3.50 Under 12 1.92 *Mellotones* 4:30—Retiree Party	8—TEEN DANCE DISCO 7:30—10:30 *By Sound Productions* Members 50 cents Guests $1

More than 100 classes ranging from belly dancing through ballet, from home fix-it, gourmet cooking and physical fitness through fine arts and crafts courses start next week at the YWCA. The classes, for both adults and youth, are conducted in four locations in the city. For a listing of classes offered or additional information, call the "Y" on 247-8841.

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Ray Powell (VP-3000) recently tendered congratulations to the president of the Albuquerque firm which won first place (after earlier nomination by Sandia) in the Small Business Administration's competition for Small Business Subcontractor of the Year (Region VI). Walter Funk is president of Missouri Research Labs, a firm that started with three employees 13 years ago and now employs 159. The company was given awards in 1976 and 1978 by the National Alliance of Businessmen for its in-house training of Vietnam refugees, needy youths, veterans, and ex-offenders. It will compete in May with other regional winners for national honors during "Small Business Week" in Washington, D.C.

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National Secretaries Week this year will be observed April 23-29 with Wednesday, April 26, designated National Secretaries Day. Locally, the Albuquerque Chapter of the National Secretaries Association is sponsoring a workshop on Saturday, April 22. Speakers are Donald and Elizabeth Bruckner who will discuss self image, work environment and life management. For a registration form to attend, contact Debbie Sheppard (1111), 4-6719. Deadline to register is April 14.