

## New Directorate To Focus On WIPP

The future of the nuclear power in this country is dependent upon a number of factors, technical and political, but most observers agree that unless a satisfactory answer is found to the problem of radioactive waste disposal that future is at best uncertain and—more likely—nonexistent. And if the nuclear power option is abandoned, then a grim energy picture becomes even grimmer.

The situation causes Orval Jones, head of the newly formed Nuclear Waste and Environmental Programs directorate (5300), to be both concerned and enthusiastic about his new job. WIPP (the Waste Isolation Pilot Plant for disposal of radioactive waste) occupies center stage. A site to the southeast of Carlsbad is currently under study. WIPP is slated for the permanent disposal of low and intermediate level radioactive waste from defense projects, with an option for disposal of defense high level waste. Much of that waste is now stored above ground.

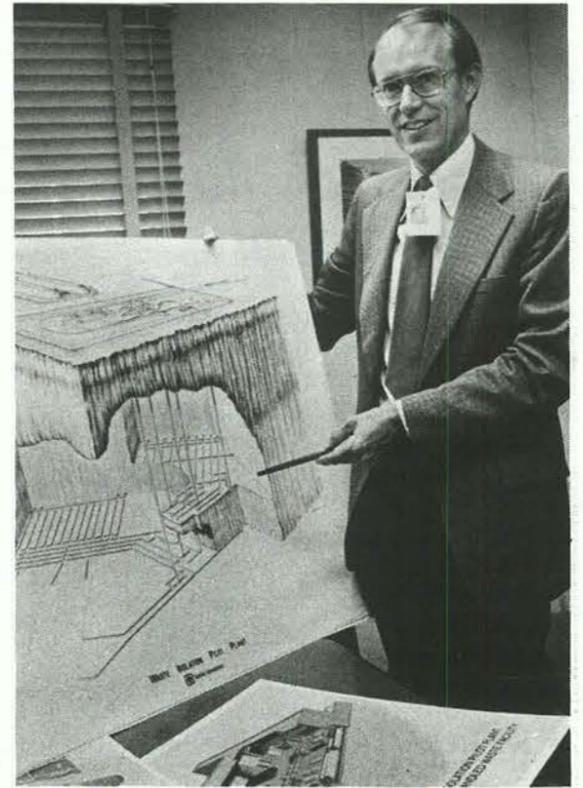
Says Orval, "In Sandia terms, WIPP is like a new Phase 3. Between now and 1985—the projected completion date—WIPP costs would amount to some 330 million dollars. Initially, eight and a half

miles of tunnels are planned in the underground facility, and the surface facilities would be equally impressive. This is a technical project of major proportions which will fully exercise our systems engineering capabilities."

In addition, 5300 is concerned with other nuclear waste storage projects, including feasibility studies of deep-rock geologic formations and the seabed for repositories. Other activities are the beneficial use of radioisotopes for sterilizing sewage sludge and development of environmental technologies.

"The 5300 job," Orval notes, "is to assist in implementing the DOE waste management policy, which emphasizes long-term waste containment in order to ensure public safety. WIPP is a cornerstone of this policy and DOE is depending on us."

The new organization will also work closely with DOE's Nevada Operations Office (NVOO), performing geologic studies at the Nevada Test Site aimed at determining the feasibility of radioactive waste storage within the rock strata at the Site. This work is, in a sense, a backup to the WIPP project.



Orval Jones & WIPP (Waste Isolation Pilot Plant)



# LAB NEWS

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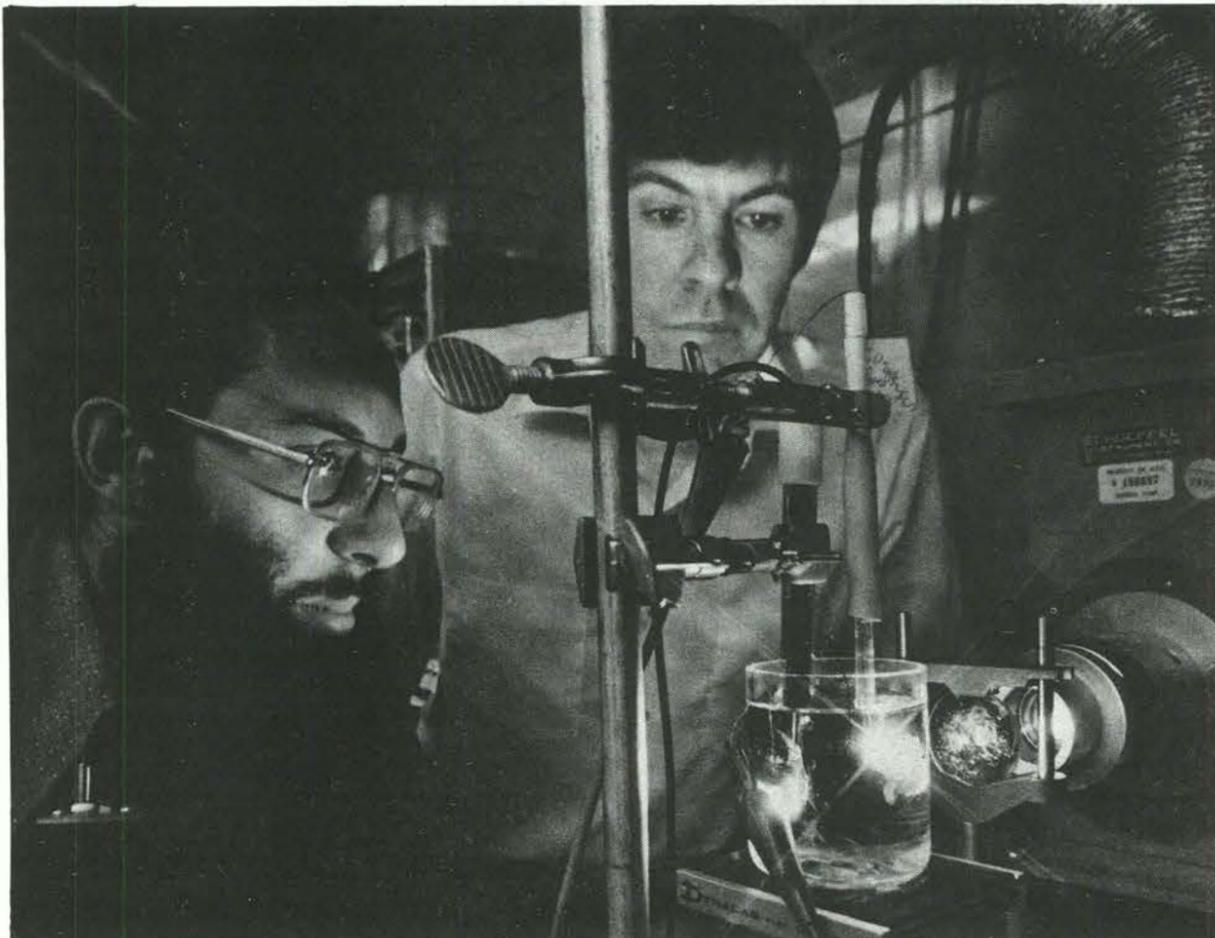
SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA

## New Warhead Authorized

A Phase 3 has been authorized by DOE's Division of Military Application (DMA) for development of a warhead for the SM-2 missile. The program, to be given a W81 designation, is being assigned to Ben Bader's Development Division 4337 under DM Gene Ives (4330).

The nuclear system is LASL-designed. The SM-2 is a Navy fleet defense missile that operates in a surface-to-air mode. The missile contractor is General Dynamics.

## Sandia Researchers Study Novel H-Production Method



PHOTOELECTROLYSIS CELL is studied by Dave Ginley and Mike Butler (both 5154) to improve efficiency in the production of hydrogen using solar energy. The light beam strikes a semiconductor anode, causing electrons to flow to a cathode where hydrogen is produced from the aqueous electrolyte. Sandians' work is aimed at improving materials and efficiency in the cell.

Mike Butler and Dave Ginley of Solid State Materials Division 5154 are performing basic studies in solar photocatalyzed chemical reactions which have important applications in the production of hydrogen.

In a world marked by dwindling supplies of fossil fuels, many scientists believe that a hydrogen economy may evolve. Hydrogen as a fuel has many advantages—it burns with no pollution, its only waste product water; it can be stored as a gas or liquid or in the solid state as metal hydrides with densities as great as that of liquid hydrogen; and it is one of the most plentiful elements on earth.

Hydrogen also has drawbacks—it's explosive when mixed with oxygen, extremely corrosive to metals and it's expensive. It is now produced by reforming natural gas or by electrolysis from water, a process taking tremendous amounts of electricity.

At present, the cost of hydrogen is one of the limiting factors in the conversion of coal to liquid fuel.

Mike and Dave may change all that.

[Continued on Page Five]

# Could You Save A Life?

You hear a commotion in the next office and find a middle-aged friend has keeled over and now lies unconscious on the floor. It will be several minutes before medical help arrives. What do you do?

If you know the answer, you may just save your friend's life. With training in cardiopulmonary resuscitation (CPR), your timely application of CPR to your friend can keep his or her heart and lungs working until medical help arrives. The Journal of the American Medical Association has this to say about CPR: "Well-documented studies have established that the proper combination of artificial respiration and external cardiac compression can sustain a victim of sudden cardiac arrest for a reasonable period."

Sandia Medical is solidly behind CPR training. As physician Judy Ewing points out, "The ideal would be one CPR-trained person in every office or lab—it's a matter of coverage. You need someone close by when the heart attack occurs."

Currently, over 400 Sandians have taken the Labs-sponsored CPR training. The 4-hour course is offered in-hours. Sign up by completing the coupon below and returning it to Medical—3322. Someday your CPR training may mean life, not death, for someone close to you.

To: Medical—3322

I am interested in a future class in cardiopulmonary resuscitation (CPR).

Name \_\_\_\_\_

Org. \_\_\_\_\_ Ext. \_\_\_\_\_

(You will be notified concerning class schedules.)

## LAB NEWS

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CHRIS OLSON (1758), JAKE JACOBS (1760), seated, and HENRY DODD (5743).

## Supervisory Appointments

HENRY DODD to supervisor of Systems Analysis Division III 5743, effective Nov. 1.

Henry came to the Labs in 1969 as an MTS in the Environmental Test Department. For the past four years he has been concerned with systems analyses work. Responsibilities in his new position include systems analysis in the solar applications area.

Henry earned his BS in aerospace engineering and a PhD in engineering mechanics from the University of Kansas. Off-hours he coaches an AAU track team, enjoys skiing, backpacking and running. In fact, Henry has been running to and from work for several years. He and his wife Nancy have two boys and live in the NE Heights.

\* \* \*

JAKE JACOBS to manager of Facilities Protection Department II 1760, effective Nov. 1. Since joining Sandia in 1959, Jake has worked with a weapons project group and with re-entry vehicle and aerospace power projects. He was also on a two-year leave-of-absence with Bellcom in Washington, D.C., where he worked on systems development for the Apollo project. Returning to the Labs' aerospace power program, he was promoted and supervised an Advanced Component Development group. More recently, he has done Safeguards work and, for the past year, has worked on a security system for Pantex.

Jake earned BS and MS degrees in ME at the University of Nebraska—his MS under Sandia's EAP. He attended George Washington University for two years working

towards a doctorate in applied math. Jake enjoys sporting events, fishing and reading. He and his wife Dolores have three sons—two serving in the U.S. Army, and one at home. They live in the Northridge Addition in the NE Heights.

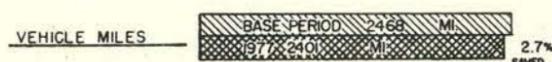
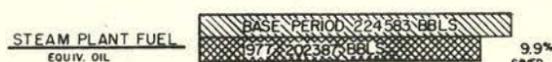
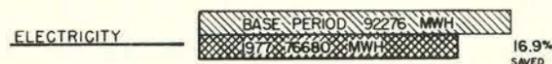
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CHRIS OLSON to supervisor of Safeguards Evaluation Division 1758, effective Nov. 1. At Sandia for 12 years, Chris has spent most of that time on weapon systems studies and, more recently, on tactical weapon studies. Two years ago he helped compile a special study on safeguards for NRC and, last year, worked on a DOD report on security, survivability and safety.

Chris earned a BS in math from St. Mary's (Texas), his MS, also in math, from the University of Kansas and, under Sandia's Education Aids Program, his PhD in probability statistics from UNM. He is a member of local chapters of the American Statistical Association and the American Nuclear Society. Chris is a runner and, in addition, enjoys playing and coaching soccer, gardening, hunting and fishing. He and his wife Margaret have three boys and a daughter and live in the North Valley.

### ENERGY SAVINGS

COMPARED WITH USAGE IN BASE PERIOD—JULY 1972 THRU JUNE 1973  
CURRENT REPORTING PERIOD ENDING SEP '77



## Solar Energy Information Exchange with Russians

Al Skinrod (8132) and Frank Biggs (5231) recently participated in a seminar at Ashkhabad, USSR, on the problems of utilizing solar energy. Other U.S. attendees included representatives from ERDA (now DOE), LASL, NASA, National Science Foundation and various American universities.

The seminar focused on three areas of effort—solar heat supply, solar power stations and direct conversion.

Al served as co-chairman of the solar power station sessions and during these sessions presented two papers, "Comparative Analysis of Solar Central Receiver Power Plants," and "Survey and Analysis of High Temperature Thermal Storage Methods for Solar Power Systems." Frank also presented two papers, "A Parameter Study for a Central Receiver Power Station," and "HELIOS, a Computational Model for Solar Concentrators." The Sandia movie on the solar central receiver program was included in the program.

Before the seminar the group met with Soviets at the Ministry of Power and Electrification in Moscow where they were told about Soviet plans to build a solar plant in the Crimea, about 700 miles south of Moscow.

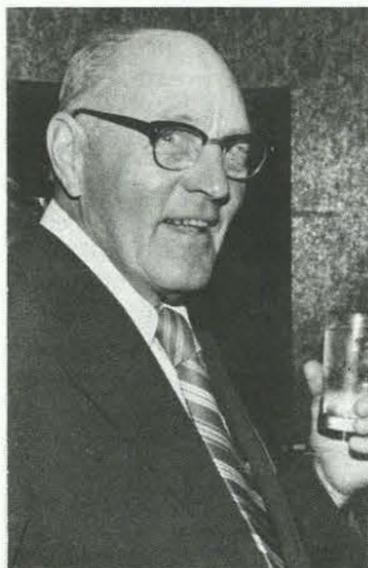
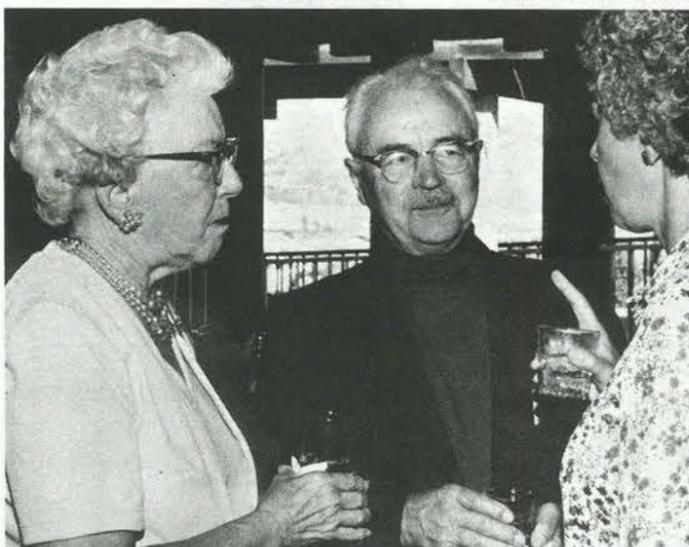
Following the seminar, a meeting was held at the Krzhizhanovsky Power Institute where solar power station research is done.

# LIVERMORE NEWS

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## Death



Glen Funk, a mechanical engineer in Structural Design Division 8157, died Oct. 17, after a short illness. He was 59.

Glen worked at Sandia/Livermore since Jan. 1959.

Survivors include his widow (Lillian, 8433), four sons and a daughter.

## LEAP Campaign Goes Over Top

The 1977 LEAP campaign is a resounding success. Final results show employees responded by contributing a total of \$57,877, about 5.2 percent over the \$55,000 goal. The amount represents more than a nine percent increase over last year.

Employee participation was 84.2 percent, with the average gift per contributor \$69.98, up from \$64.32 last year. Of those contributing, 158 gave a LEAP Share (vs 145 last year), while 34 gave a Fair Share.

## Sympathy

To Larry Humphreys (8181) on the death of his father-in-law in Geneva, Idaho, Oct. 15.

**RETIREES MEET**—Many retirees were on hand at the Sunol Valley Golf Club recently for their annual get-together. Recognition for coming the farthest distance went to Paul and Pearl Stewart, both SLL retirees who now live in San Diego. Top row (from left): Emily Burkhalter and husband Crist; Hellmuth Woidtke, with Jay Jost (8423); Ben Aiken. Center row: Wil Miller and wife Dorothy; Irv Ellicott, senior retiree attending, and wife Vera. Bottom row: Ed Healey; Russ Hutchison with President Sparks.

## Congratulations

Chuck Oien (8144) and Carolyn Haynes, married in Corvallis, Ore., Sept. 3.

Marty Abrams (8124) and Marlys Graham, married in Pleasanton, Calif., Sept. 3.

Glenda Scott (8212-1) and Luis Santiago Espino, married in Oakland, Calif., July 22.

Debra Wolverton (8424) and Glenn Melton (8315), married in Tacoma, Wash., Sept. 4.

Rocky Bridges (8159) and Diane

Walker, married in Rochester, N.Y., Aug. 13.

Mr. and Mrs. Joe Iannucci (8326), a daughter, Jill Ann, Aug. 2.

Mr. and Mrs. Mike Nash (8312), a daughter, Michelle Aloyisous, Aug. 27.

Mr. and Mrs. George Thomas (8347), a son, Zachary Efner, Aug. 11.

Mr. and Mrs. John Vitko (8342), a daughter, Alexandra Searles, Aug. 12.

Mr. and Mrs. Lee Radosevich (8132), a daughter, Jennifer Lynn, Aug. 29.

# Judge Files Opinion In Age Discrimination Case

On October 20, United States District Court Judge E. L. Mechem entered an interlocutory opinion in the age discrimination case brought by the Dept. of Labor and private plaintiffs against Sandia. Since an interlocutory opinion is not a final decision of the whole controversy, and since the opinion provides for further proceedings and hearings, it would not be proper for Sandia to comment at this time.

The following are excerpts from the interlocutory opinion, under headings used by the Court, which briefly characterize its contents:

## RECRUITING AND HIRING

"There is nothing inherently suspicious about on-campus recruiting programs. The available labor market for Sandia technical staff would be expected to come from recent graduates at all degree levels, in addition to the most recent exposure to advanced education, new techniques and new discoveries in the fields of science, this group would be job hunting while those in the protected age group normally would be established in more permanent positions and advanced to positions attributable to their age and experience. Age discrimination cannot be inferred from facts which show that 90% of new hires are younger than the protected age group [ages 40 thru 64]. This pattern does not show a significant disparity from what would normally be expected in the market place. No evidence was presented to show

whether applicants in the protected age group had less success in finding employment at Sandia than applicants generally. *Hazelwood School District*, supra at Note 13. Considering all this evidence together, I hold that plaintiffs have not established by a preponderance of the evidence that Sandia has discriminated against individuals from forty to sixty-five years of age in recruiting and hiring policies and practices."

## SALARY ADMINISTRATION

"... Money is allocated to each vice president for use within his organization. The allocation is split so that a sum certain is to be spent within the age bands or PERD groups used in the performance review. The allocation is further split so that some funds are allocated to each salary seat (generally three per octile, e.g., High, Medium, Low). This salary practice is the one identified in the contested issues of fact, Section C of the Pre-Trial Order. There is no evidence of adverse impact on the protected age group. The only testimony was that the policy prevented a tendency to shift money to employees with about ten years PERD [Professional Experience in R and D] to assure that they would remain with the company. Under the PEP [Position Evaluation Plan] plan, money allocated for salary adjustments enters the system simply by changing the dollars per point equation. The result is the new control rate."

"The stretch out practice was last applied in April, 1972 directly affecting salaries of protected age groups employees on each payday through sometime in April, 1973."

"The Secretary is entitled to recover for amounts deemed to be unpaid minimum wages or unpaid

overtime compensation as provided in 29 U.S.C. 216. The Secretary may not recover for violations occurring prior to March 20, 1972. Whether individuals were adversely affected by stretch out after April, 1973 will be decided when evidence of damages is presented."

## THE 1973 REDUCTION IN FORCE

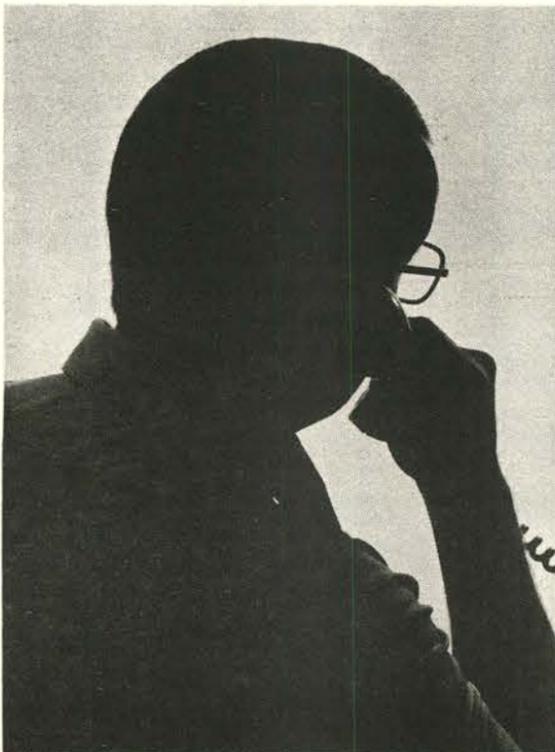
"I hold that the plaintiffs have established by a preponderance of the evidence that individuals in the 52 to 64 age range were selected for layoff in a pattern which proves that Sandia has engaged in discriminatory conduct."

"It had been previously decided that individual claims in the private action would follow the trial on pattern or practice issues. Individuals age 40 to 51 who filed consents in the private action may present their individual cases that age was a factor in their selection for layoff. They, however, have the burden of putting on a prima facie case of discrimination and must carry the burden of proof. Consent plaintiffs laid off between March 23, 1973, and October 18, 1973, in the 40-51 age group must also prove that the notice requirement should not bar their complaints. These burdens must also be carried by individuals ages 40-65 who filed consents and who were laid off involuntarily prior to the March, 1973, reduction in force."

"... Sandia may present evidence showing that each individual was selected for layoff based on reasons other than age, subject to further evidence by the Government or consent plaintiff showing that reasons are pretexts for unlawful discrimination. *Teamsters*, 45 USLW at 4516."

## Self Nomination

# The Only Way To Go



A NEW JOB may be as close as your friendly record-o-phone. Each Thursday, job opportunities throughout the Labs are announced in a Weekly Bulletin. If you're qualified you can nominate yourself by dialing 4-2465.

There are about as many reasons for changing jobs as there are people who would like to. Some seek greater opportunities for growth. Some feel stymied, frustrated, at the end of their promotional possibilities.

But whatever the reason, many companies provide little or no opportunity for movement, lateral or otherwise. Their rule of thumb for the individual (and it generally is an unwritten one) is taken directly from the English poet, John Milton, who sadly observed that "they also serve who only stand and wait."

Not so at Sandia. Once a week, on Thursdays, week in and week out, the Sandia Labs Weekly Bulletin spreads the word of job opportunities throughout the Lab.

Supervisors must nominate people on their staff for promotion, but most jobs fall into the category of self nomination. Quite simply, that means if you're qualified for a job, all you do is pick up the phone and dial 4-2465. That plugs you in to the record-o-fone in the Personnel and Employment Division.

If you're like most of us, a recorded message will probably paralyze your auditory system, so here, for study and advance preparation, is the message you'll be given: "To nominate yourself for a posted opening, please give the following information: The supervisor with the vacancy and the job title, your name as it appears on your personnel record, E number, organization and phone extension. Please begin now."

Once the job is posted, you have until noon a week from the Friday following publication to nominate yourself. If your qualifications are good, you can count on a call from the concerned supervisor, an interview and possibly a new job.

The system is simple and I know it works. For the past 12 years I've been a Writer/Director in the Motion Picture Production Division. Late in September I nominated myself for an opening as a writer on the *Lab News*. The transfer was effective on October 15.

And here I are writing my first story.

chuck cockelreas

Nov. 4—Chamber Orchestra of Albuquerque Recital, First United Methodist Church, 4th and Lead SW, 8:15 p.m.

Nov. 5—"Man of La Mancha," KHFM 6:30 p.m.

Nov. 5—Classical guitar concert sponsored by the Parks and Recreation Dept., Old Town Plaza, 1:30 p.m.

Nov. 5, 6—"A Lion For Androcles," Albuquerque Children's Theatre, Popejoy Hall, 1:30 and 3:30, 277-3121.

## Events Calendar

Nov. 6—UNM Jazz Ensemble, Rodey Theatre, 8:15 p.m.

Nov. 10—Vienna Choir Boys, First United

Methodist Church, 7:30 p.m., 243-5646.

Nov. 11, 12—"La Traviata," Albuquerque Opera Theatre, Popejoy Hall, 243-0591.

Nov. 15—Dr. N. Scott Momaday, UNM Speakers Committee Lecture Series, Woodward Hall, 8 p.m.

Through Nov. 27—"Absurd Person Singular," Barn Dinner Theatre, 281-3338.

## Take Note

Third seminar on microprocessors and LSI devices will be held Tuesday, Nov. 8, in Rm. B5 of the Coronado Club from 8:30 to 11 a.m. Speaker will be Wayne Dickenson (INTEL) who will discuss the INTEL microprocessor system. From 1 to 5 p.m. INTEL representatives will be available to answer questions.

\* \* \*

Harry Weaver (2354) was chairman of a symposium on Hydrogen and Helium in Metals, held at the Laboratories on Oct. 13 and 14. Numerous Sandians from SLA and SLL presented papers on the subjects of hydrogen in metals, helium in metals, and hydrides.

\* \* \*

Larry Young of Safety Engineering (3442) was host to a group of French visitors who came to Sandia to exchange views on safety aspects of solar energy facilities. Larry, a physiologist, reports that the French were particularly interested in problems relating to flash blindness. The French have been in the solar field for a number of years, and further information exchanges are planned.

\* \* \*

Corry McDonald (9636) will moderate at a noontime presentation on the Labs' Technology Utilization Program on Wednesday, Nov. 9, in Bldg. 815. The TU Program aims to facilitate transfer of unclassified technology generated in the weapons program to the outside world. Following a short presentation, technology transfer will be discussed, and ideas and innovations relating to the subject will be welcomed. A repeat of the session is planned for Nov. 22, same time and place.

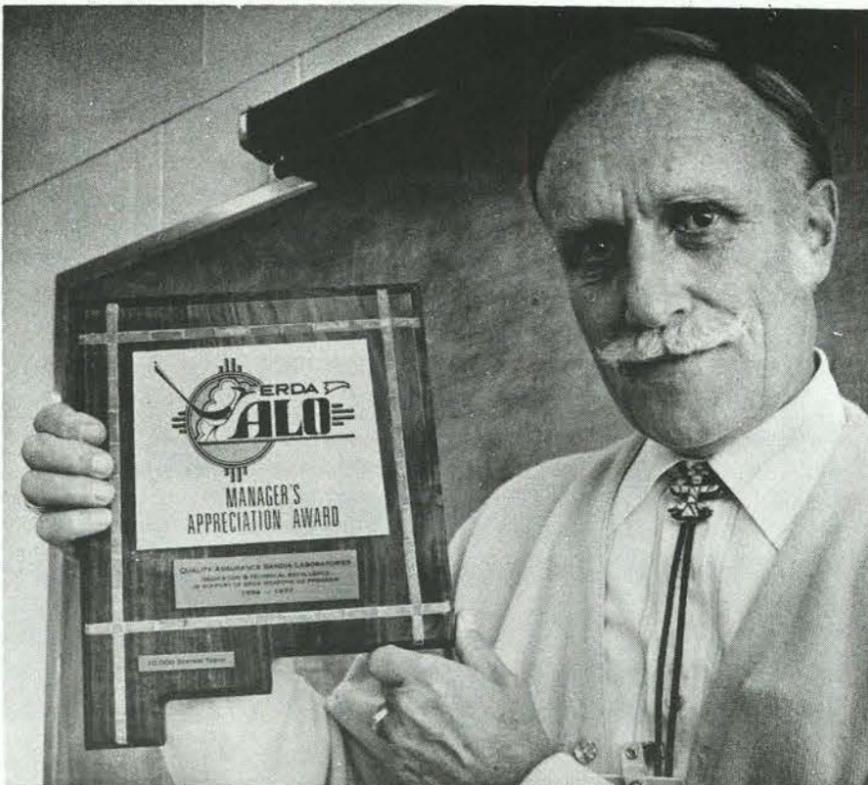
## Payroll Figures Announced

The Sandia Labs payroll for fiscal year 1977, just ended, amounted to \$122.6 million at Albuquerque and \$19.3 million at Livermore. For FY '76, these figures were \$105.8 million for Albuquerque and \$16.9 million for Livermore. Salaries of some 75 Sandia employees at Nevada Test Site and Tonopah Test Range (Nevada) are included in the Albuquerque figure.

At the end of FY '77, 7264 persons were on roll, including 992 at Livermore. The total is about 240 more than at the end of FY '76.

Assets of the Department of Energy's (DOE) installations operated by Sandia totaled \$368.2 million at the end of FY '77, compared to \$350.5 million in FY '76. These figures represent undepreciated value of buildings and facilities at Albuquerque, Livermore and Tonopah Test Range.

Purchases by Sandia in New Mexico amounted to \$45.6 million for FY '77. More than 98 percent of the amount, or \$45 million, went to Albuquerque firms. Purchases from other DOE contractors are not included. Purchases in the state in FY '76 amounted to \$44.9 million.



10,000 IS A LOT—Director of Quality Assurance Luke Heilman holds award bestowed by ERDA (now DOE) in recognition of the 10,000 weapon system test conducted as part of the Stockpile Evaluation Test Program. The accompanying letter states: "This achievement could not have been realized without the dedication and expertise that exists with the Sandia QA organization." The QA stockpile testing program is now in its 20th year.

[Continued from Page One]

## Novel H-Production Method

Hydrogen can also be produced by solar energy from water using a simple apparatus called a semiconductor photoelectrolysis cell. A quantum of sunlight strikes a semiconductor anode causing an electron (negative charge) to flow through a wire to a carbon cathode, having a positive charge (hole) on the anode. A caustic water solution forms the electrolyte. The positive charges on the anode surface interact with the electrolyte to produce oxygen gas and (charged) hydrogen ions, thus partially decomposing the water. At the cathode the electrons neutralize the charge on the hydrogen ions, completing the decomposition and producing hydrogen gas.

It sounds simple and inexpensive, and it is. There are problems, however. The prototype cell is very inefficient, producing only minute amounts of hydrogen. In most cases, external power is needed to start the process and keep it going.

The Sandians have examined the basic properties of the photoelectrolysis cell and developed two mathematical models which will help improve the efficiency of future cells.

By basic studies, we mean basic. Both PhD degree holders, Dave is a chemist, Mike a physicist. They issue statements like this:

"Recently, we have shown that the

threshold voltage for hydrogen production is a function of the electron affinity of the semiconductor and, consequently, can be related to the electronegativities of the constituent atoms. Based on results for a series of titanates, we have shown that a smaller electron affinity for the photoanode results in improved zero bias operation. The model predicts that the rare-earth orthoferrites should have improved zero bias operation characteristics."

The models do two things—(1) define characteristics of optimum materials for the semiconductors, and (2) enable efficiency studies through a number of operational modes, including operation with zero bias (no external power applied to the circuit) and at various external power levels. The work points the way to building an efficient system, perhaps one using photovoltaic solar cells to provide the external power source for economic operation.

"Based on the modeling results," Dave says, "we are now in the process of fabricating electrodes that we feel will give enhanced performance. Our studies include the construction of multi-layer electrodes as well as the synthesis and development of promising new materials. We hope to build a continuously operating system to demonstrate that photoelectrolysis is a promising source of hydrogen."

## Sympathy

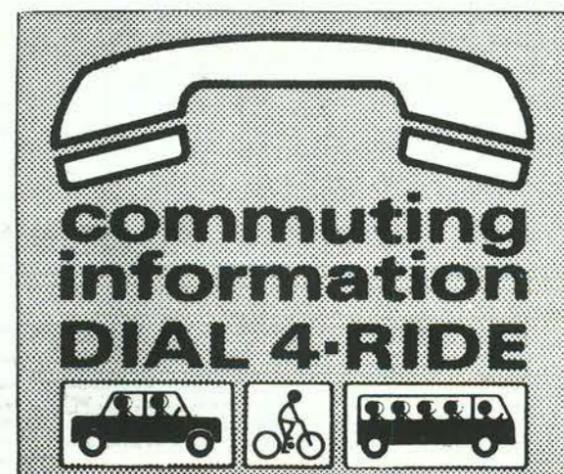
To Hervey Hawk (1244) on the death of his father in Albuquerque, Oct. 8.

To Les Cole (9563) on the death of his mother-in-law in Utah, Oct. 21.

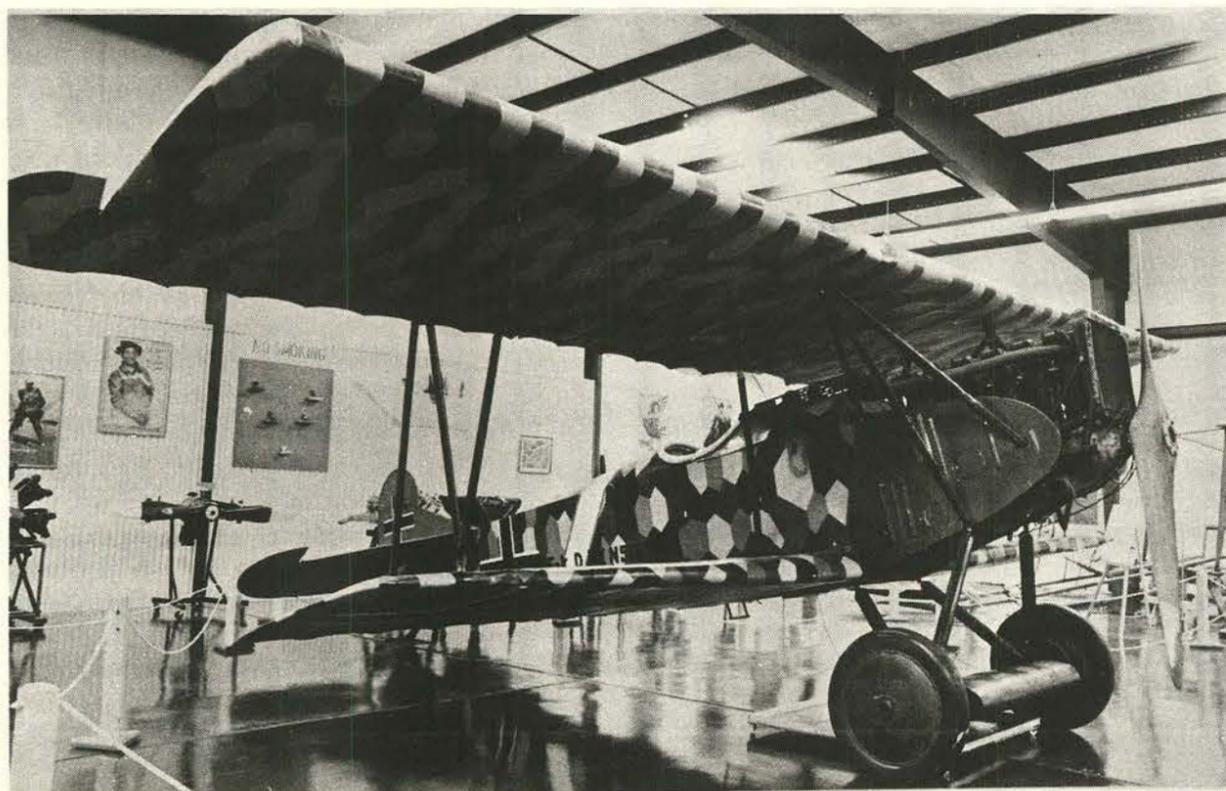
To James Van Meter (9472) on the death of his mother-in-law in Belen, Oct. 18.

To Laurence Ann Roberts (2153) on the death of her father in Houston, Oct. 16.

To Bob Colgan (3153) on the death of his stepdaughter in Albuquerque, Oct. 29.



## Vista New Mexico



## Wings of Yesterday Museum

In this age of nostalgia, lovers of antique airplanes should enjoy the "Wings of Yesterday" air museum located at the Santa Fe Municipal Airport. The museum presents a history of aircraft up to WWII combat bombers and fighters. Among the aircraft in the display are a Fokker D-VII from WWI, a Stinson Tri-Motor early airliner (1931) and a Crosley Moonbeam biplane (1928). Some 14 aircraft are in flyable condition and one is usually flight demonstrated each day. These photos show an inside view of one of the display hangars (top), and Fokker D-VII (left), a WWII Grumman Wildcat (lower left) and a B-25 medium bomber (lower right). A tour of the museum takes about two hours, admission is \$2.



# Speakers

R. B. Pettit (5842) and B. L. Butler (5844), "Laser Ray Trace and Bi-Directional Reflectometry Measurements of Various Solar Concentrators"; R. S. Berg (5842), "A Survey of Mirror-Dust Interactions"; G. W. Treadwell (5712) and N. P. Grandgean (5711), "Annual Performance Comparisons of Parabolic Trough and Flat Plate Collectors Based on Measured Isolation"; M. W. Edenburn and E. Boes (both 5719), "Sandia Laboratories' Photovoltaic Concentrator Development Project," and "Average Solar Radiation Available to Various Collector Types," the Concentrating Solar Collector Conference Exhibit Workshop, Georgia Institute of Technology, Sept. 26-28, Atlanta.

J. Chang (5244), M. M. Widner, A. V. Farnsworth, Jr. (both 5241), R. J. Leeper (5242), T. S. Prevender (5834) and L. Baker (5241), "Neutron Production From Advanced REB Fusion Targets"; T. H. Martin, D. L. Johnson and D. H. McDaniel (all 5245), "Super Power Generators"; C. L. Olson (5241), J. P. VanDevender (5245) and A. Owyong (5214), "Ionization Front Accelerator Feasibility Investigations"; P. A. Miller (5244), L. Baker, J. R. Freeman (both 5241), L. P. Mix (5242), J. W. Poukey and T. P. Wright (both 5241), "REB Propagation and Combination in Plasma Channels"; S. Humphries, Jr. (5244), "Problems of Intense Ion Beam Transport"; L. Baker, M. J. Clauser (both 5241), S. A. Goldstein (5244), J. R. Freeman, R. J. Leeper, C. W. Mendel (5244), L. P. Mix, A. J. Toepfer, F. C. Perry (all 5242), and J. N. Olsen (5244), "Electron Beam Driven Implosions"; J. J. Ramirez, R. S. Clark and K. R. Prestwich (all 5246), "Design and Development of a 350 kV, 100 pps Electron Beam Accelerator"; G. W. Kuswa, S. Humphries, D. J. Johnson (all 5244), R. J. Leeper and J. R. Freeman, "High Power Magnetically Insulated Radial Diode"; D. H. McDaniel (5245), J. W. Poukey, K. D. Bergeron (both 5241) and J. P. VanDevender (5245), "Power Flow Studies of Magnetically Insulated Lines"; M. M. Widner, M. J. Clauser, J. W. Poukey, J. P. Quintenz (all 5241), E. J. T. Burns, L. P. Mix, F. C. Perry, A. J. Toepfer (all 5242), S. A. Goldstein, J. N. Olsen (both 5244), and J. A. Halbleib, Sr. (5231), "Electron Deposition in Thin Targets"; R. B. Miller (5244), "Ion Acceleration in a Moving Virtual Cathode," 2nd International Topical Conference on High Power Electron & Ion Beam Research & Technology, Cornell University, Oct. 3-5, Ithaca, N.Y.

G. A. Samara (5130), invited paper, "The Hydrogen Bond in Ferroelectricity and the Role of High Pressure Research"; C. E. Land (5133), "Photoferroelectric Effects in PLZT Ceramics," The Fourth International Meeting of Ferroelectricity, Sept. 18-23, Leningrad, USSR.

F. P. Gerstle, Jr. (5844) and M. Moss (5842), invited paper, "Thick-Walled Spherical Composite Pressure Vessels"; D. B. Longcope and S. W. Key (both 1281), "On the Verification of Large Deformation Inelastic Dynamic Calculations Through Experimental Comparisons and Analytic Solutions"; J. L. Jellison (5833), "Attachment of Stratapax<sup>®</sup> (Compax) by Diffusion Bonding for High Performance Drill Bits"; C. F. Huff and A. L. McFall (both 5735), "Investigations Into the Effects of an Arc Discharge on a High Velocity Liquid Jet"; M. M. Newsom (5735) and J. H. Scott (5700), "A High Performance Core Bit Utilizing the Stratapax<sup>®</sup>, Man-Made Diamond"; J. H. Gieske (9352), "Ultrasonic Data Acquisition, Analysis, and Display by Minicomputer Aided Techniques"; L. J. Keck and C. L. Schuster (both 5733), "Shallow Formation Hydrofracture Mapping Experiment," ASME Energy Technology Conference, Sept. 18-23, Houston.

J. W. Reed (5443), "Meteorological Studies for Wind Power—A Progress Report," 3rd Biennial WECS Conference, Sept. 19-21, Washington, D.C.

M. J. Clauser and L. Baker (both 5241), "Effects of Turbulence on the Rayleigh-Taylor Instability," 11th European Conference on Laser Interaction with Matter," Sept. 19-23, Oxford, England.

G. Yonas (5240), "Sandia's Recent Results in Particle Beam Research," 8th European Conference on Controlled Fusion and Plasma Physics, Sept. 19-23, Prague, Czechoslovakia.

S. T. Picraux (5111) and F. L. Vook (5110), "Channeling Location Studies of Implanted D in Si," 7th International Conference on Atomic Collisions in Solids," Sept. 19-23, Moscow, USSR.

O. J. Burchett (9352), "Application on NDT to Non-Standard Problems," Amarillo Section of ASQC, Sept. 22, Amarillo.

J. A. Cooper (2331), "Shedding White Light on Lightning," Amateur Radio Caravan Club meeting, Sept. 12, Albuquerque.

D. R. Jennison (5151), "Correlation Effects in the Solid State: Electron Energy Bands of TiO and the Auger Spectra of Silicon," Georgia Institute of Technology, Sept. 21, Atlanta.

G. W. Arnold (5112) and J. A. Borders (5111), "Microstructure, Diffusion, and Near-Surface Crystallization in Ion-Implanted Glass"; G. W. Arnold, "Characterization of Ion-Induced Damage in Fused Silica," 1977 Joint Fall Meeting/Nuclear and Basic Science Divisions, American Ceramic Society, Sept. 25-28, Hyannis, Mass.

J. A. Cooper (2121), "Transformations for Monitoring Digital Patterns," EASCON, Sept. 25-28, Washington, D.C.

D. W. Bushmire (2152) and J. F. McDowell (2111), "Process Controls to Increase the Effectiveness of Beam Lead Devices in High-Rel Applications"; A. W. Mullendore, G. C. Nelson and P. H. Holloway (all 5825), "Surface Sensitive Analytical Techniques for Failure Analysis," Advanced Techniques in Failure Analysis Symposium—1977, Sept. 27-29, Los Angeles.

H. T. Davis (5411), "Simulation of Random Variables from an Estimated Distribution," 3rd ERDA Statistical Symposium, Oct. 1, Hanford, Richland, Wash.

J. L. Mitchiner (5742), "A Dynamic Net Energy Approach to Evaluating Future Energy Systems," Lawrence Symposium on Systems and Decision Sciences, Oct. 2-4, Berkeley, Calif.

R. L. Ward (5441), "Methods to Inactivate Enteric Viruses in Wastewater Sludge," National Meeting of Water Pollution Control Federation, Oct. 2-7, Philadelphia.

A. G. Beattie (9352), "A Digital Data Analysis Technique for an Ultrasonic Ablation Gauge," 9th National SAMPE Technical Conference, Oct. 4-6, Marietta, Ga.

F. G. Blottner (1261), "Computational Requirements for Three-Dimensional Flows," Workshop on Future Computer Requirements for Computational Aerodynamics, Oct. 4-6, Moffett Field, Calif.

K. E. Mead (5811), "A Materials Compatibility Information Data Bank," Fifth ERDA Compatibility Meeting, Oct. 4-6, Mound Laboratory, Miamisburg, Ohio.

R. E. Allred (5844), "Transverse Behavior of Composite Flywheel Materials"; R. O. Woods (5715) and F. P. Gerstle, Jr. (5844), "Sandia Flywheel Development Program"; E. D. Reedy, Jr. and F. P. Gerstle, Jr. (both 5844), "Design of Spoked-Rim Composite Flywheels," 1977 Flywheel Technology Symposium, Oct. 5-7, San Francisco.

J. A. Wisniewski (5122), "A Linear Algebraic Equation Polyalgorithm for the CDC 6600 and 7600"; J. D. Stauffer (2113), "LOGMASC Control Language—A Language for User Interface with Design-Rule Checking

and IC Mask Analysis Programs," Rocky Mountain Regional ACM Conference, Oct. 7, Albuquerque.

A. D. Swain (1223), "Estimating Human Error Rates and Their Effects on System Reliability," Cycles de Conférences sur la "Fiabilité et disponibilité des systèmes mécaniques et de leurs composants," Electricité de France and Commissariat à l'Énergie Atomique, Oct. 7, Jouy-en-Josas, Paris, France.

L. P. Robertson (1756), "Hawaii," Zonta Club, Sept. 8, and Adult Fellowship Group, First Presbyterian Church, Sept. 25, Albuquerque.

E. C. Boes (5719), "Solar Energy," Northwest Kiwanis Club, Sept. 21.

G. W. Donohoe (1734), "Intrusion Detection," Albuquerque Tips Club, Sept. 27.

J. A. Kenagy (9580), "Metrication," Rocky Mountain Iron Workers Apprenticeship and Training Conference, Sept. 30, Albuquerque.

M. Scott and H. A. Watts (both 2613), "Computational Solution of Nonlinear Boundary-Value Problems Via Quasilinearization and Orthonormalization," Symposium on Computers in Chemical Engineering, Czechoslovakia Academy of Sciences, Oct. 5-9, Vysoké Tatry, Czechoslovakia.

J. M. Hueter (3521), "Creativity—Choice or Chance?" Instrument Society of America, Sept. 1; "Creativity in Industrial Apprenticeship," Rocky Mountain Apprenticeship Conference, Sept. 29, Albuquerque.

D. B. Hayes (2513), "A Shock Initiation Model for Porous HNS Explosive," Naval Surface Weapons Center, Aug. 15, Silver Spring, MD.

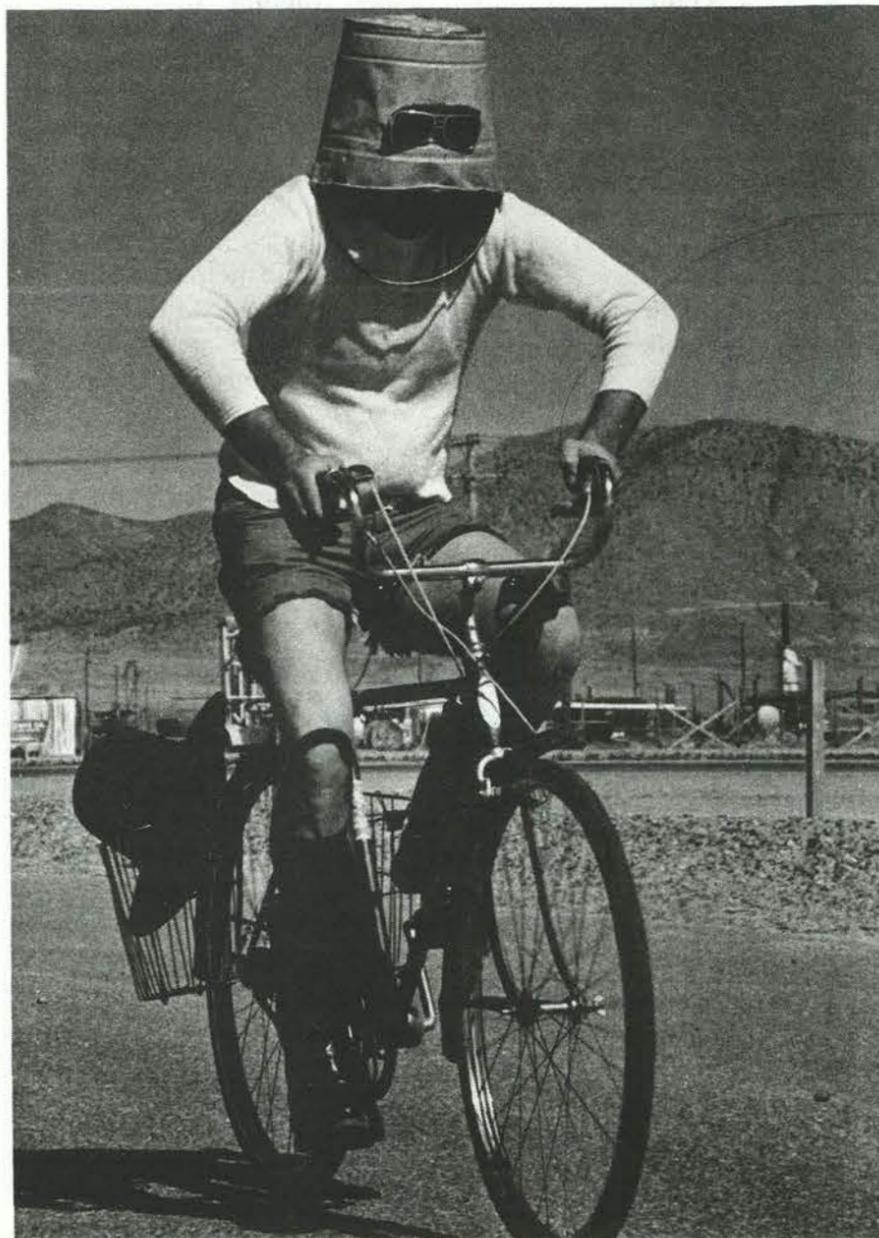
J. D. Keck (2521), "Ferroelectric Ceramics for Pulsed Power Supplies," Ceramic Engineering Seminar, Univ. of Mo., Sept. 7, Rolla.

J. R. Wayland (1141), "Modeling of Rainstorm and Plume Interaction for Atmospheric Release of Effluents," American Meteorological Society, Sept. 14, Albuquerque.

G. A. Samara (5130), "Recent Advances in the Study of Structural Phase Transitions in Solids," Brookhaven National Labs, Sept. 15.

H. G. Jeblick (3442), "Teaching Safety Awareness to Security Personnel"; L. L. Young (3442), "Solar Energy Research at Sandia Laboratories with Unique Health and Safety Parameter," National Safety Congress, Oct. 17-20, Chicago.

K. J. Willis (3152), "Atex System," Publication Managers of ERDA Contractors Conference, Oct. 3-4, Gatlinburg, Tenn.



IT'S not the Black Knight, just our resident wild one, the Psycho-Cyclist. An inveterate do-it-yourselfer, he figures the full-face helmet should be better than those inverted cereal bowls. But today's bike helmets reflect thoughtful design and more and more thoughtful cyclists are wearing helmets — they want to continue having thoughts.



ROBERT CHAVEZ (2611), founder of The Living Spirit Singers, and choir members Gloria Padilla (5162) and Dora Lovato (2625). The 50-plus member choir is rehearsing for their next musical to be presented during the Lenten season.

## Robert Chavez Directs 'The Moving Spirit Singers'

Robert Chavez, a programmer analyst in Engineering Information Systems Division 2611, is founder, producer and director of "The Moving Spirit Singers." The choir has over 50 young people and adults as members.

Robert played guitar in a dance band for several years and has played the guitar at Catholic masses for six years. As a composer of religious music, he has performed in musicals at various churches with a number of singing groups.

"I formed the Moving Spirit Singers because I think of the effect of music in church as inspirational," Robert says. "We perform in churches of all faiths, as well as in hospitals and for other groups. The fellowship between the singers and our different audiences enhances our performances."

The group produces one musical a year.

They spend six months rehearsing and preparing the musical and then perform it for the next three months. Their first production was "Alleluia!" in which Robert was narrator. The cast of 30 gave 42 performances. Last year they presented 25 performances of their second musical, "Living Witnesses."

Robert, a tenor, sings with the choir and does solo numbers, plays the guitar and acts. Maria, his wife, is in charge of their sound system. "We all help out," he says. "We're all volunteers and we have about a 75 percent turnover with each production. We perform for donations only. Sometimes we break even."

The group is now rehearsing for their production of "Celebrate Life," which opens during the Lenten season. Dora Lovato (2625) and Gloria Padilla (5162) are also choir members.

## Patent Awarded For Vault Barrier

DOE was awarded a patent recently for a barrier for safes or vaults which resists penetration by hand tools and cutting torches. Inventors are Bill Hoover (8314), Keith Mead (5811) and Henry Street (5844).

The barrier is essentially a sandwich of mild steel, silicone rubber and epoxy-impregnated firebrick. The silicone rubber is a particularly effective cushion backing for the firebricks, making a hammer and chisel attack very difficult. In addition, the rubber filler with its ablative nature slows cutting rates with a torch through the steel to less than 1/4-inch per minute. A thin protective layer of ash forms on the rubber

when it is heated with a torch. This ash must be removed before further penetration of the rubber by the torch is possible.

During one test of the barrier material, so much heat was required that one torch overheated and became inoperative. An entire 80 cu. ft. oxygen tank was used up making one 12-inch cut. The rubber was also found to be highly resistant to both a water cooled diamond cut-off wheel and a standard abrasive wheel.

Intent of the invention is to slow entry into the vault until the intrusion is discovered by security devices or security people. It was developed as part of Sandia's Safeguards program.

## Labs Linked By Computer

Two computer links—one between SLL and Sandia's Scientific Computing Center in Bldg. 880 and one between Sandia and LASL—have recently been installed to provide faster service and greater capacity for users.

Livermore, Sandia, previously limited to two CDC 6600 computers, now has access to two 6600's and a 7600 with their mass storage system at Albuquerque. Problems of large structural analysis and the molecular and atomic properties of materials may now be processed more rapidly at Albuquerque.

Sandia now has access to the LASL time sharing system which uses three 7600's and a Cray machine, the largest capacity scientific computer commercially available. Large volume, long running programs may now be executed quickly using the LASL system.

Both links use commercial telephone lines but include "scramblers" or encoders during transmission and receiving so that classified data may be sent over the links.

Jack Hudson of Paul Lemke's Scientific Software Division 2641 is responsible for the software at the Albuquerque end of the SLL/SLA link. Terry Heidelberg of Arnold Schuknecht's Computing Division 8323 is responsible for the software at Livermore's end. Hal Short (8327) has responsibility for communications hardware at the Livermore end of the channel. William Bennett (2641), Ron Domres (2641) and Sam Thompson (5166) are converting codes from the Sandia system to run at LASL.

Jim Porter in Division 2633 handled coordination between Sandia and the telephone company. Don Schroeder's Division 2648 worked with the National Security Agency on installation and operation of the encoders.



BETTER TURN AROUND TIME is now achieved by Milt Clauser (5241) for his electron beam fusion program by using the new Sandia-LASL computer link. The link gives Sandia access to three 7600's and a Cray machine in the LASL time sharing system. Also, Sandians at Livermore are now linked to the Scientific Computing Center in Bldg. 880.



## Probably Not (But It May Seem That Way)

It's no longer news that the Air Force is having Wyoming rebuilt from "O" Street the Wyoming gate. What you may not know is that they intend to do it at "double time." [Ed. note: For those who skipped Basic Training, the military term "double time" means not twice as long, but half as long.]

Originally scheduled for completion in April 1978, the hope now is to complete the project by the first of the year. The key to the speedup, according to Bob Slater, Project Engineer of the 1606th Air Base Wing's Engineering Construction Branch, lies in abandoning the original plan to work only on half of short sections of the street and leave the other half open for traffic.

Now, as you all know (some from painful personal experience, others from the Oct. 28 Sandia Bulletin), Wyoming is closed from "E" to "I" and detoured through the military parking lots from "K" to "O". The plan now is to have the entire section of Wyoming from "E" to "O" open to traffic in two to three weeks.



After that, Wyoming will be closed from "E" (Gibson) to the Wyoming gate, although the gate itself will not be closed and traffic will be detoured to Wyoming and "E" by a route not yet specified.

Your best bet for avoiding the chaos is to stay off Wyoming, not an easy step. But since the project is inevitable, our best advice is to grin if you can, and bear it if you can't.

## Hanna IV Experiment Starts

The in situ coal gasification program—to burn underground coal in place and bring combustible gas to the surface—continues near Hanna, Wyoming, this week with the start of the Hanna IV experiment.

Feasibility of the concept was demonstrated in previous successful experiments in this DOE-funded program. The Hanna II test revealed that the underground burn spreads over a wide area between two wells (one pumping air into the burn, the other recovering the produced gas) and that the coal seam is completely consumed. Gas recovered was 1.8 times the amount of air pumped in. Heating value of the gas was 180 Btu/scf, sufficient to fuel surface generators for the production of electricity.

Hanna IV will be an attempt to link and gasify along three wells in a straight line. The coal seam is about 10 metres thick and about 100 metres below the surface. Over 220 tons of coal per day will be gasified for a period of six to eight months. The recovered gas will have the energy equivalent of 15 MWe, enough to meet the power requirements of a town with a population of 15,000. Any number of these "modules" would be combined in future commercial use.

Sandia supports DOE's Laramie Energy Research Center on the project and provides extensive instrumentation to characterize the burn—efforts that will lead to future process controls for the in situ recovery of coal, oil shale and other fossil fuels. Dave Northrop, supervisor of Geotechnology Research Division 5732, is project leader.

"At Hanna IV," Dave says, "we're fielding extensive instrumentation in 31

wells in the test area. Several techniques will be used—special thermocouple circuits, a passive acoustic system, a high resolution seismic survey, and direct excitation electrical potential and electrical resistivity measurements.

"In addition, we're also fielding gas sampling canisters to determine gas compositions and pressures in the coal seam, and a "slifer" technique adapted from NTS nuclear testing to measure overburden subsidence."

All instrumentation will go to a newly-developed field data acquisition system to provide on-site, real-time data during all phases of the experiment. Data gathered should map the progress of the burn and provide a comprehensive understanding of events in progress.

Experimenters include Lew Bartel (5732), assistant project leader, Paul Hommert (5732), Ray Reed (1116), Bob Seavey and Tom Dobecki (both 5733), and Tom Schultheis (9421).

Field project engineer is Jack Beyeler (1125). On-site personnel include Steve Winters and Rich Sanderville (both 1125) and Dink Adkins (1123). The field data system was developed by George Davidson (5732) and Ken Kimball, Harvey Ogden and Emily Young (all 1125).

Project funding for FY78, \$1.25 million, includes extensive monitoring of Hanna IV and preparation for Hanna V to be conducted in FY79.

D. L. Hicks (5162), "Operator Splitting," Abq. Chapter of ACM/SIGNUM, Oct. 24, Albuquerque.

D. R. Johnson (2152), "The Effect of Multiple Refiring on the Adhesion of Thick Film Conductors"; D. W. Palmer (2151) and C. Hickam (5736), "Semiconductors in 300°C Hybrid Microcircuits"; J. T. Grissom, W. M. Rigby and H. C. Olson (all 2145), "Hermetic Packaging Studies for Hybrid Microcircuits and Semiconductor Devices," ISHM '77 International Microelectronics Symposium, Oct. 24-26, Baltimore.

J. D. McClure (1282), "INTEC—The Sandia Laboratories in-hours Technical Courses Program," '77 Conference on Frontiers in Education, IEEE & ASEE, Oct. 24-26, Univ. of Illinois, Urbana-Champaign.

T. R. Guess and F. P. Gerstle, Jr. (both 5844), "Biaxial Testing of Graphite/Epoxy and Kelvar 49/Epoxy Composite Tubes"; W. B. Jones (5835), R. Taggart and D. H. Polonis (both Univ. of Wash.), "Superconducting Properties of (Hf,Zr)-Nb and (Ti, Zr)-Nb Ternary Alloys" and "Beta Decomposition of (Hf<sub>x</sub>Zr<sub>1-x</sub>)<sub>80</sub>Nb<sub>20</sub> Ternary Alloys," 1977 TMS-AIME Fall meeting, Oct. 24-27, Chicago.

P. D. Thacher (2552), "Laser Power and Solar Irradiance," Electro-Optics/Laser '77 Conference & Exposition, Oct. 25-27, Anaheim, Calif.

P. B. Rand (5813), "Elastomeric Syntactic Foams for Stress Relief of Electronic Components," Cellular Plastics Division, 23rd Technical Conference, Oct. 26, San Francisco.

## Speakers

G. A. Carlson and W. H. Sullivan (both 5423), "Application of Ultrasonic Thermometry in LMFBR Safety Research," 1977 Ultrasonics Symposium, Oct. 26-28, Phoenix.

W. E. Warren (5162), "Application of Chebyshev Polynomials and Gauss-Chebyshev Integration to Crack Problems in Elasticity," Mathematics Dept., NMSU, Oct. 27, Las Cruces.

P. Yarrington (5166), "An Approximate Method for Calculating Surface Loads on Earth Penetrators," Symposium on Future Trends in Computerized Structural Analysis and Synthesis, Oct. 30 - Nov. 1, Washington, D.C.

G. C. Allen (5433), "Issues in the Design of Waste Transport Systems," MIT Nuclear Engineering Seminar, Oct. 31, Cambridge, Mass.

T. M. Massis, P. K. Morenus (both 2516), R. M. Merrill (5821) and D. H. Huskisson (5822), "The Stability and Compatibility of Titanium Hydride/Potassium Perchlorate During Actuator Aging," Conference on Compatibility of Materials with Explosives Propellants and Pyrotechnic, Nov. 1-3, LLL.



# Retiree News

Our last report on the literary life of Franklin Barnett, a retired Sandian now living in Prescott, Ariz., was in July 1973. Franklin's *Dictionary of Prehistoric Indian Artifacts of the American Southwest* had just been published; the book is now in its third printing.

This week, Beaumaris Books of Tempe, Ariz., is publishing a novel by Franklin. *Crooked Arrow* is the story of prehistoric Indians of the Southwest during the late 1200's. While the characters—a young hunter and those who surround him—are fictitious, their lives, activities and way of life reflect artifacts uncovered by Franklin and Joan, his wife, during archaeological digs.

In addition to writing, Franklin has taught southwestern archaeology and field excavation courses at the college level. He has worked with museums in setting up Indian Rooms and has contributed artifacts to several institutions.

Because of his extensive contributions to southwest archaeology Franklin was recently elected a member of The Explorers Club of New York City.



RETIRED SANDIAN DAN PARSONS served as contest director at the 22nd Annual Fun-Fly, Oct. 29 and 30, sponsored by the Albuquerque Radio Control Club. Dan is holding a six-foot model of a WW II P-38 fighter.

## feed back

*Q. Recently it seems that there is an effort to curtail Coronado Club use, for examples, no more noon hour beer, and the total removal of noon lunches in future plans. The fate of Friday Happy Hour and dinner also seems questionable.*

*How come?*

A. The "state of health" of the Coronado Club has never been better; membership is at an all-time high, activities are broad in scope and well received by members, and the club's financial status is sound. The only change contemplated is the cessation of noon meals when the new cafeteria opens, probably in May, 1978. There are no plans to curtail Friday and Saturday night functions of the club. The club's Board of Directors have been pursuing food service with several excellent local catering companies, and these companies will be used in the future to provide food service at club functions.

With respect to your question on the bar, the Coronado Club's Board of Directors opened the bar at noon a few years ago to provide customers the opportunity to have a beer or glass of wine with their lunch. The Board has been monitoring the use of the bar at noon time for several months and reached the conclusion that it was not economical nor in the best interest of the club membership to continue this operation. Thus, the Board took action to close the bar at noon.

To dispel your concerns, I am happy to report that the club has never been better or more widely used by the membership and all plans are to continue in this direction.

Max Newsom  
C-Club President

### Retiree Job Reference Service

## Want A Job? Sign Up Below

Almost daily, people drop by the LAB NEWS office to look through the 40 resumes in the Retiree Job Reference file. The service was initiated in August 1974. Its aim: to put Sandians and DOE people who need jobs done in touch with those Sandia retirees who could do them. Many using the service are themselves retirees.

Here's how it works. The retiree fills out

the form on this page and mails it to the address shown. The forms are on file in the LAB NEWS office (Bldg. 814, Rm. 6) for Sandians to refer to.

Retirees who are already signed up should complete a new form to update any previous information. If extra forms are required, call LAB NEWS, 264-7841.

RETIREE JOB REFERENCE SERVICE					(November 1977)
Circle one or more:					
Appliance Repair	Auto Repair	Carpentry	Child Care	Electrical	
General Handyman	Hauling	Housework	Painting	Plastering	Plumbing
Radio/TV Repair	Typing	Yardwork	Other _____		
Name (print) _____			Phone _____		
Address _____		City _____		Zip _____	
Describe your skill(s). Mention relevant training, experience, licenses, references (optional), etc.					
_____					
_____					
Do you have your own transportation? _____					
Do you have your own tools? _____					
Comments _____					
Signed _____			Date _____		
Mail to: LAB NEWS, Div. 3162, Sandia Labs, Albuquerque, NM 87115					

## Lean & Mean, Longhorns Stomped Through Old West

The saga of the Longhorn has its beginning in the 16th century. The Spaniards brought cattle with them to New Spain and, subsequently, to the Southwest. Wherever the Spanish introduced cattle, some of the offspring soon ran wild. As American settlers moved west these wild cattle were absorbed into the immigrants' herds. And thus evolved the Longhorn—a mix of wild Spanish cattle and domesticated pioneer stock.

The Longhorns adapted well to the Southwest. Tall, strong and lean, with sharp hooves and powerful horns, this new breed could endure cold, hunger and thirst. Their speed, agility and wariness were coupled with keen senses and a mean disposition, a combination that sometimes made life difficult for the cowboy. Once the ornery critter was subdued, however, the other animals settled down. All these attributes made the Longhorn especially suited for trail driving.

The California gold rush pointed the way for marketing Longhorns. Sheepherders had driven their flocks west to feed the miners, making an immense profit. Cattle could be purchased in Texas for from \$2 to \$15 a head and sold in California for from \$60 to \$150. An estimated 9000 head were trailed across New Mexico to the west in 1854.

The New Mexico range cattle industry opened up in 1866 when Charles Goodnight and Oliver Loving, with 14 cowboys, trailed a herd of Texas Longhorns to Fort Sumner at Bosque Redondo. They sold steers to the Army, Indian Agents, and civilians for 8¢/lb. Cowmen from other areas were soon attracted to the unoccupied grazing lands of New Mexico Territory, but the cattle business wasn't the get-rich-quick scheme many considered it to be. Profits were huge some years, but weather and epidemics could wipe out a ranch. In spite of these problems, the business flourished: in 1870 New Mexico ranches accounted for some 57,000 cattle; in 1880 the figure was up to 340,000 and by 1890 the count was over 1,600,000 head.

In addition to hostile elements, the other threat to cattlemen was hostile Indians. Cowpunchers driving their herds to forts in New Mexico and later on to railroad shipping points in Kansas were constantly on the alert for sudden Apache or Comanche attacks. Their herds also



THESE STEERS are part of the Longhorn herd on the Wichita Mountains Wildlife Refuge in Oklahoma. Steers have the largest horns, sometimes up to a seven-foot spread. Colors vary: speckled, roan, pied, brindle, red, black or brown. These animals have lost their leanness because of abundant grass. A number of Longhorns are maintained by New Mexico ranchers, for sentiment and breeding.

required constant attention. The Longhorns, not far removed from their wild state, had a tendency to stampede. Thunder and lightning, a sudden movement, or even an unexpected sound could touch off a stampede. Once the drive reached the plains, the lean and lanky Longhorns fattened on the deep grass. And when they reached the Kansas towns of Dodge City, Abilene, or Newton, the herds were snapped up by buyers for the beef-hungry East or by other cattlemen who were ranching in the northern plains.

An estimated 10 million Longhorns trailed north from 1866 to 1890. But the day of the Longhorns was numbered. The Chicago market price in 1882 was \$9.35 per hundred weight. By 1887, under pressure by rail-toted new breeds, it had dropped to \$1. The drop in price that year was accompanied by an extremely hard winter, followed by a drought. The industry survived but continued under different conditions. Range land began to

be enclosed with barbed wire, water was supplied by windmill, and railroads, pushing deeper into the west, eliminated the long cattle drives. The true Longhorn began to disappear, replaced by the larger Shorthorn and Hereford breeds which produced a better quality beef.

The Wichita Mountains Wildlife Refuge (near Cache, Okla.), operated by the Bureau of Sport Fisheries and Wildlife, was established in 1927 to preserve the Longhorn. Starting with a small herd, the Refuge has developed the herd to represent the original Longhorns as nearly as possible. Annual sales are held to keep the cattle within the carrying capacity of the range. Every year the sales attract more buyers. Ranchers are once again becoming interested in Longhorns for breeding and increased beef production and for use on marginal range land.

The era of the Longhorn was brief, but its legacy is a treasure of romance, lore and legend. • mt

### Retirees



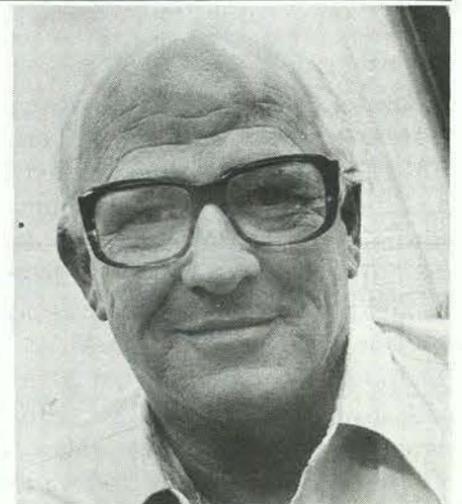
Marion Williams (9718)



Kay U'Ren (2513)



Harry U'Ren (3413)



Carleton Kentfield (9654)

# Fun & Games

**Sandia Runners**—From time to time the LAB NEWS learns of discounts and other deals available for runners, especially runners who are members of a club or association. The information (usually a price list) is too lengthy to include in the paper, and the only list we have of Sandia runners dates back to '75. What we need is an updated list of runners from Sandia and DOE/ALO, that is, an updated roster of the Sandia Runner's Association. Please complete the coupon below and return it to Jim Harrison (4361), who has volunteered to take SRA matters in hand. Note: by runners we mean not only runners, but also joggers, fast walkers and those aspiring to one of these categories.

Sandia Runner's Association  
Membership

Name \_\_\_\_\_

Org. \_\_\_\_\_ Phone \_\_\_\_\_

Home address & ZIP \_\_\_\_\_

Return to Jim Harrison, org. 4361

\* \* \*

**Swimming saga**—As we go to press the Olympic pool is again closed, having gone through an open-closed-open cycle in the last few weeks. This time we are informed that "the contractor is making every effort to complete the [repair] project in 90 days." If you *must* swim, we understand that the public can use the Highland High pool starting at 6 p.m. most days. There is a small charge.

\* \* \*

**So you want a locker**—According to *Commander's Forum* in *Focus* (Oct. 21), people from Sandia and DOE sign up for lockers at the gym between Nov. 7 & 18. To quote: "There will be no locker fees and individual assignment of all lockers will not be made. Approximately 10 percent of the lockers at both gyms will not be assigned and will be used to support patrons on a first come, first served daily basis. . . . We are installing 816 new lockers in the two gyms, which is approximately double the previous amount."

Sandia Security's Bill Martin reports that the military have decided not to reserve any lockers exclusively for Sandia or DOE use. This doesn't mean we won't get lockers, only that we sign up as indicated above and, at the pleasure of MAC, some may be assigned lockers.

\* \* \*

**Sandia Bicycle Assn.**—Ron Malpass (9412), who has succeeded Terry Stalker (1354) as SBA President, called to report the first notable development in his administration: the unilateral decision by the military to revoke the treat-Stop-signs-as-Yield-signs rule that's been on the books for years. We imagine that MAC has taken this progressive step so that SBA'ers won't pick up bad habits on-Base (running Stop signs) that will bring them to grief off-Base. It's probably irrelevant that not one accident has occurred relating to the

running of a Stop sign among the hundreds of SBA'ers who daily commute to the Labs. Needless to say, SBA was not consulted by MAC in advance concerning the new dictum.

Pete Stirbis (1284) writes: "A head count of bike commuters in Dept. 1280 shows that 7 out of 41 people—17%—commute by bike averaging 16 miles per day. Suppose 15% of SLA's 6000 employees, i.e. 900 people, biked to work 16 miles/day. This adds up to 218,000 gallons of gas saved per year, based on 15 mpg for a typical car. In addition, this saves \$490,000 per year in car expense, based on 15¢/mile of operating cost. And we'd all be a lot healthier besides."



**RUNNING SHOES**, at \$30/pair, tend to wear out in one area only while the rest of the shoe remains in good shape. Using liquid rubber, you can build up worn area and prolong shoe life. Build a dam with masking tape to keep gooey stuff in bounds. It takes 24 hours to dry, lasts nearly as well as original sole material.

**Sandia Tennis**—The Tennis Assn. recently sponsored two men's doubles events at the Tennis Complex. Top team in the first event was Ed Jacobs (2351) and Les Shope (2354); runners-up were Derek Snyder (1312) and Bill Kennish (5742). In the second event, a round robin, Eric Reece (1327) and Hap Stoller (5730) were the victors. Snyder and Kennish again took seconds.

New hires or anyone interested in tennis activities are invited to contact Joe Tillerson (4-5575), Kathy Pitts (4-6723) or, at DOE, Vicki Clarkson (4-7119) for information.

\* \* \*

**Ski Touring**—Dave Saylor (5162) is the newly-elected president of the New Mexico Ski Touring Club. The 250-member club sponsors Saturday and/or Sunday cross-country ski outings during the snow season.

\* \* \*

**Sandia Golf Assn. (Women)**—At last month's annual awards banquet at the Paradise Hills Country Club, the winner of the President's Cup was Pat Hefley (3144) and winner of the Association Championship was Elizabeth Chappell (DOE ret'd.). Officers for the '78 season will be: President, Reba Garrison (1320); VP; Dorothy Calloway (2622); Secretary, Dolores Chavez (4111); and Treasurer,

Tess Reis (3212).

\* \* \*

**Bowling**—Oct. 27 was a great night for Jack Strascina (9571) who averages 171 on the alleys. He started his series with a 298, the highest he had ever bowled but heartbreakingly close to a perfect 300. He finished the series with two 202 games for a total of 702. The 298 game is still worth a prize from the American Bowling Congress, a ring marking the occasion.

\* \* \*

**Go-Karts**—The Albuquerque Kart Club invites everyone to a racing event (no charge) Sunday at Triple T Raceway, 11,000 Central NW (at the base of Nine Mile Hill) at noon.

"The karts should hit 100 mph," says Mike Johnson (5216). "If anyone is interested, the club offers help in getting started in an exciting sport." Call John at 4-6408 for more info.

\* \* \*

**Friskies?**—You know, of course, that something called *Ultimate Frisbee* denotes a soccer-like game, played with your garden-variety Frisbee, in which seven people try to pass the Frisbee over a goal line, in-flight and passing from friendly hand to friendly hand. The opposing seven players have a similar notion, and the stage is thereby set for coherent and meaningful competition.

You can see Ultimate Frisbee this entire weekend as the Rocky Mt. Frisbee Assn. stages Ultimeet I, a tournament running Nov. 5 and 6 at the Johnson Gym fields of UNM. Play runs all day both days. And, besides competition, virtuosos will demonstrate their art and skill with the Frisbee. The Duke City Flyers and KRKE are sponsoring the meet.

## Authors

R. R. Lagasse (5813), "Domain Structure and Time-Dependent Properties of a Crosslinked Urethane Elastomer," Vol. 21, No. 9, JOURNAL OF APPLIED POLYMER SCIENCE.

R. W. Harrigan (5711), "Nonbiological Photochemical Energy Conversion—Can It Compete?," Vol. 22, No. 1, JOURNAL OF SOLID STATE CHEMISTRY.

D. M. Mattox (5834), "Some Chemical Aspects of Solar Energy Utilization," Vol. 22, No. 1, JOURNAL OF SOLID STATE CHEMISTRY.

H. C. Hardee and D. W. Larson (both 1262), "Viscous Dissipation Effects in Magma Conduits," Vol. 2, No. 3, JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH.

H. T. Weaver (2354), J. E. Schirber (5150) and B. Morosin (5154), "Temperature and Volume Dependence of Some Magnetic Properties of Pr-pnictides," Vol. 20, No. 11, SOLID STATE COMMUNICATIONS.

J. P. Anthes (5214) and M. Bass (USC), "Direct Observations of the Dynamics of Picosecond-Pulse Optical Breakdown," Vol. 31, No. 7, APPLIED PHYSICS LETTERS.

J. W. Nunziato, J. E. Kennedy (both 5131), and D. E. Amos (5122), "The Thermal Ignition Time for Homogeneous Explosives Involving 2 Parallel Reactions," Vol. 29, No. 3, COMBUSTION AND FLAME.

P. M. Richards (5132), "Theory of One-Dimensional Hopping Conductivity and Diffusion," Vol. 16, No. 4, PHYSICAL REVIEW B.

J. S. Pearlman (5214) and G. H. Dahlbacka (LLL), "Charge Separation and Target Voltages in Laser-Produced Plasmas," Vol. 31, No. 7, APPLIED PHYSICS LETTERS.

E. J. T. Burns (5244), J. H. Degnan, R. H. Reinovsky and W. L. Baker (all AFWL), "Soft X-Ray Spectroscopy of an Imploding Aluminum Liner Z-Pinch," Vol. 31, No. 7, APPLIED PHYSICS LETTERS.

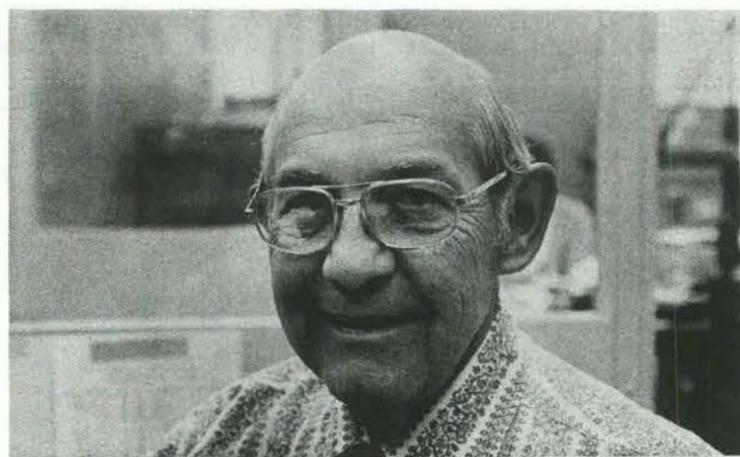
# MILEPOSTS

## LAB NEWS

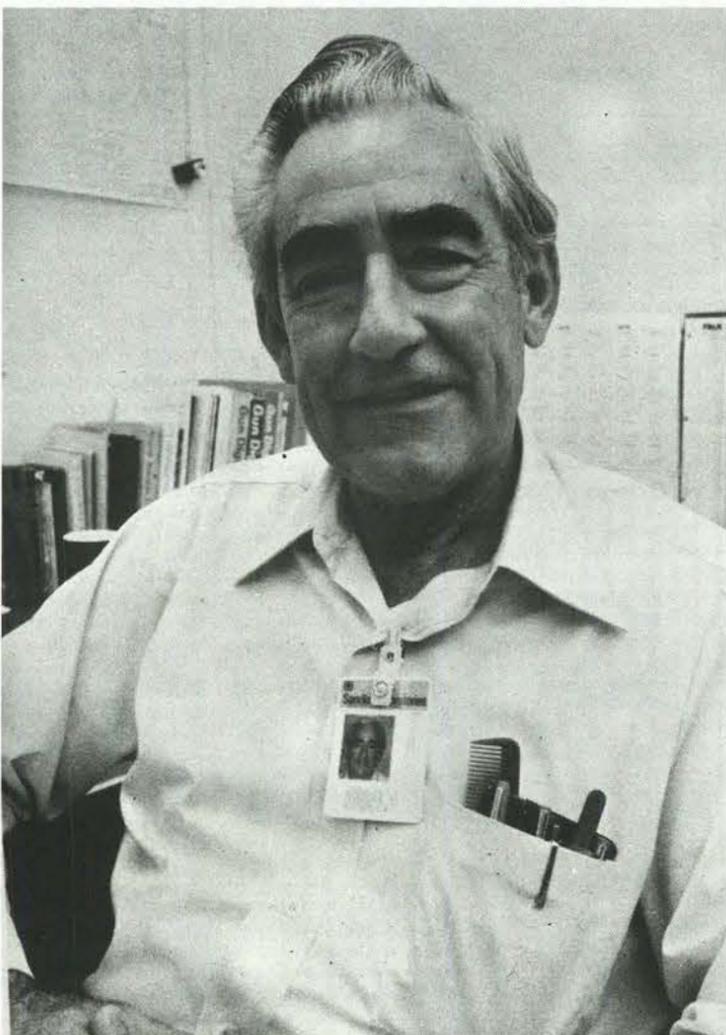
NOVEMBER 1977



Jim Holpp - 9625 25



Roy Allison - 9517 20



Robert Kindley - 4342 25



Tommy Glauner - 9636 25



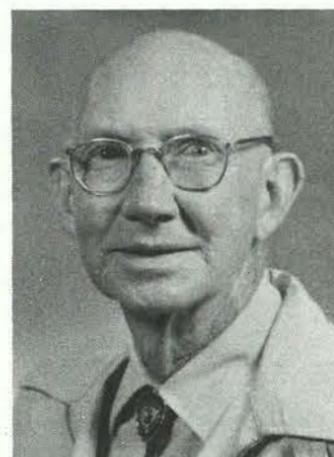
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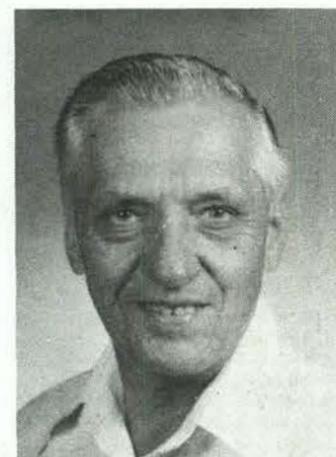
Henry Monteith - 5411 10



B. G. Prentice - 1714 25



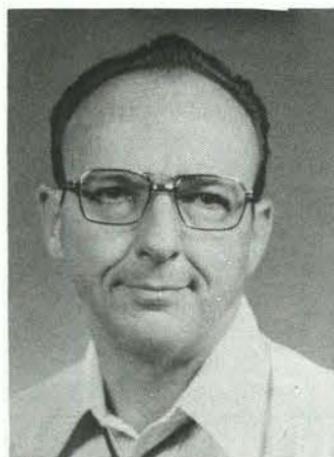
Guy Robinson - 4325 20



Emil Komarek - 2152 25



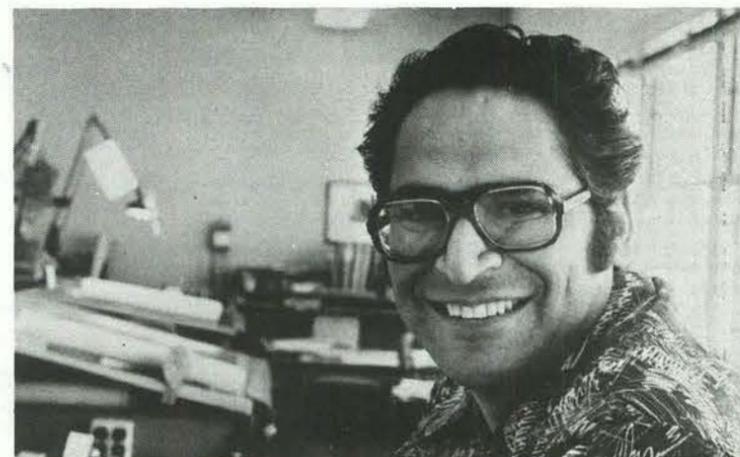
Arnold Schuknecht - 8323 25



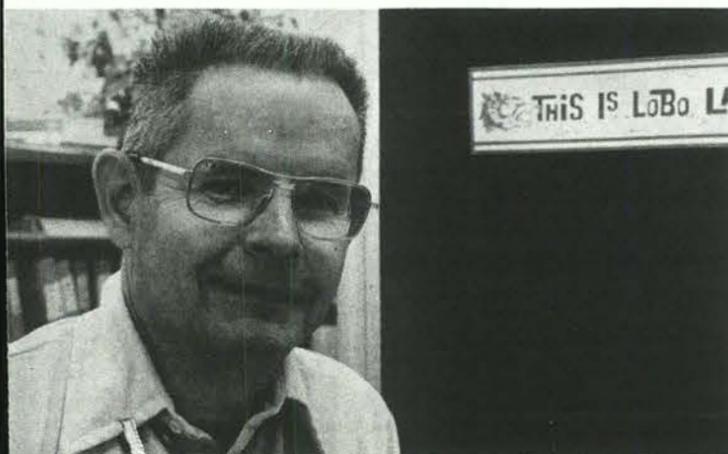
James Peek - 5231 15



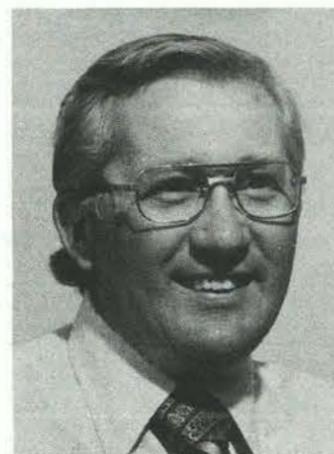
Clyde Taylor - 8413 10



Gabriel Garcia - 9743 10



Les Dye - 3243 20



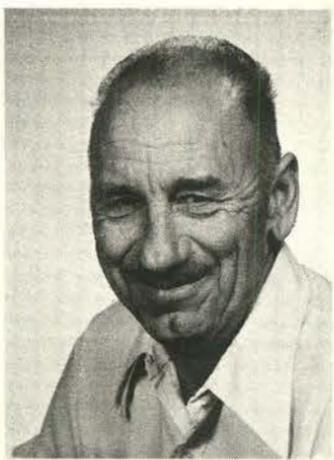
James Baremore - 2332 10



John Ledman - 5833 15



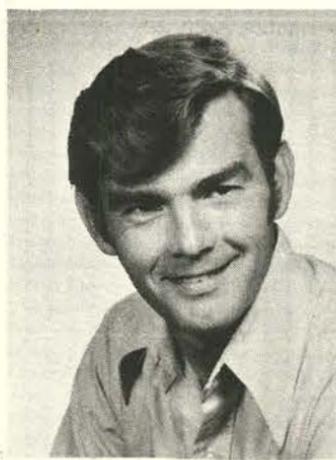
Don DuBose - 8424 15



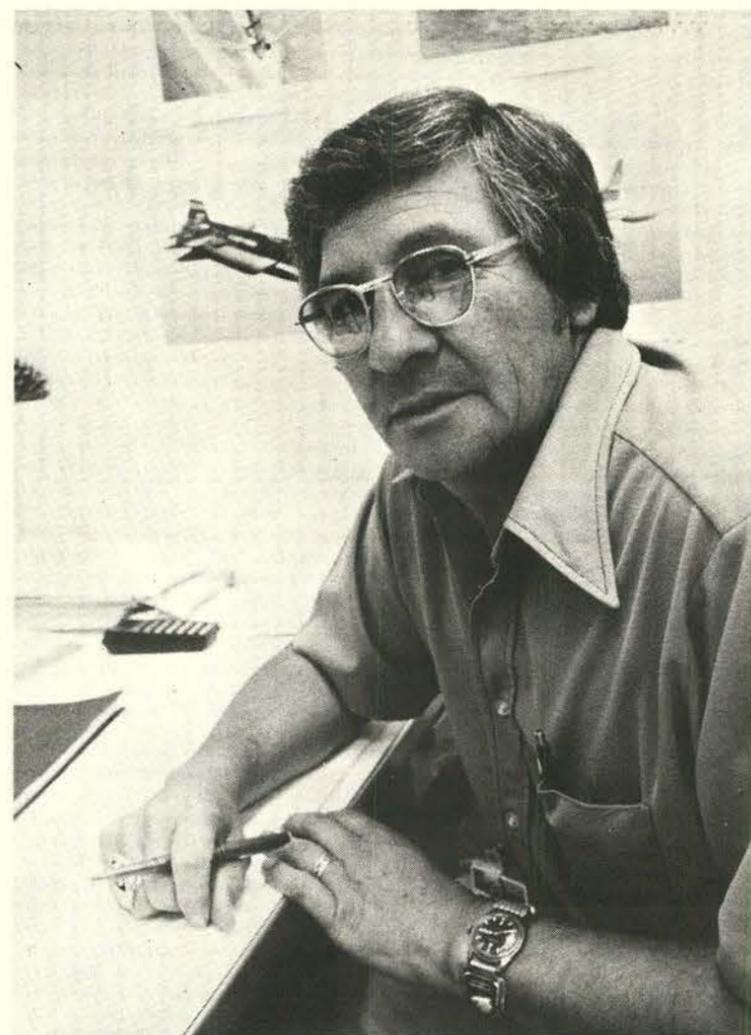
Fred Gregory - 9582 25



Tom Sullivan - 1353 15



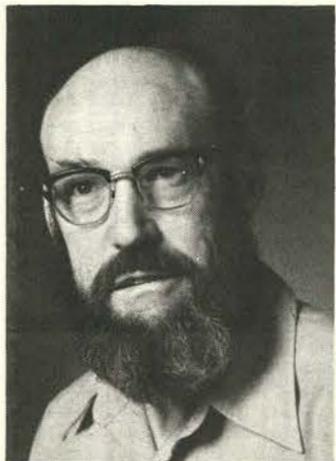
Arthur Lynch - 5824 15



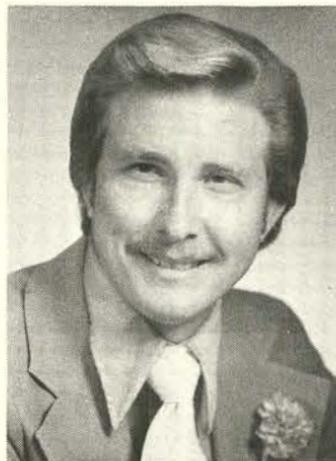
Alex Griego - 1135 25



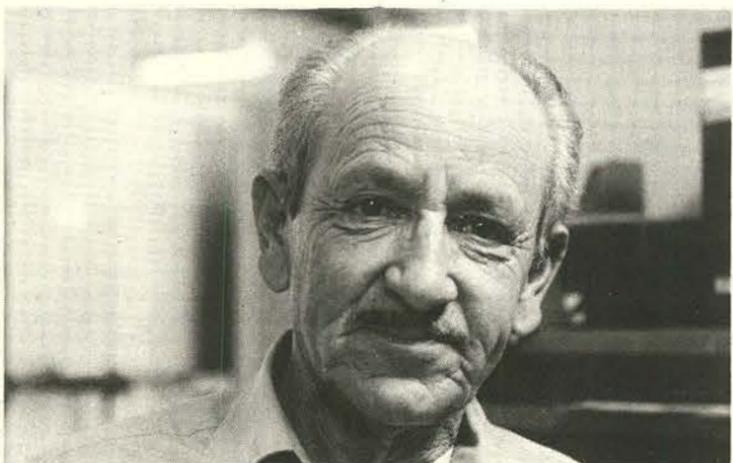
Russell Hall - 9343 25



Jim Gruver - 8431 20



Randall King - 8159 10



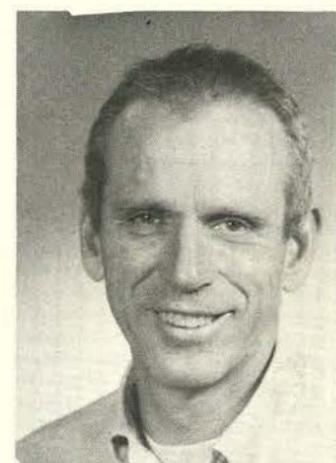
Lamberto Baca - 3424 15



Robert Williams - 9625 20



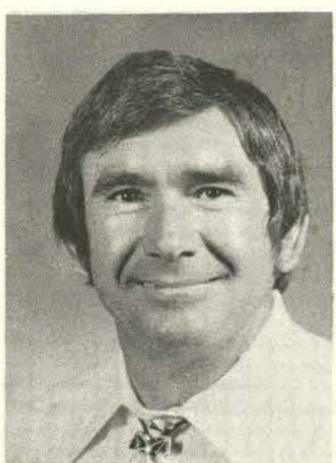
Frederick Bailey - 1715 10



Edwin Oakes - 9487 20



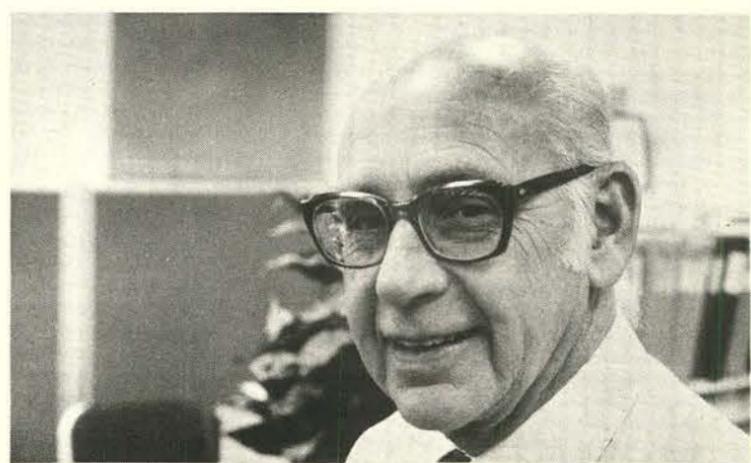
John Brengle - 8185 25



Wayne Cyrus - 9573 25



Larry Tichenor - 9572 20



Charles Roehrig - 2628 25



Jan Willis - 3152 15



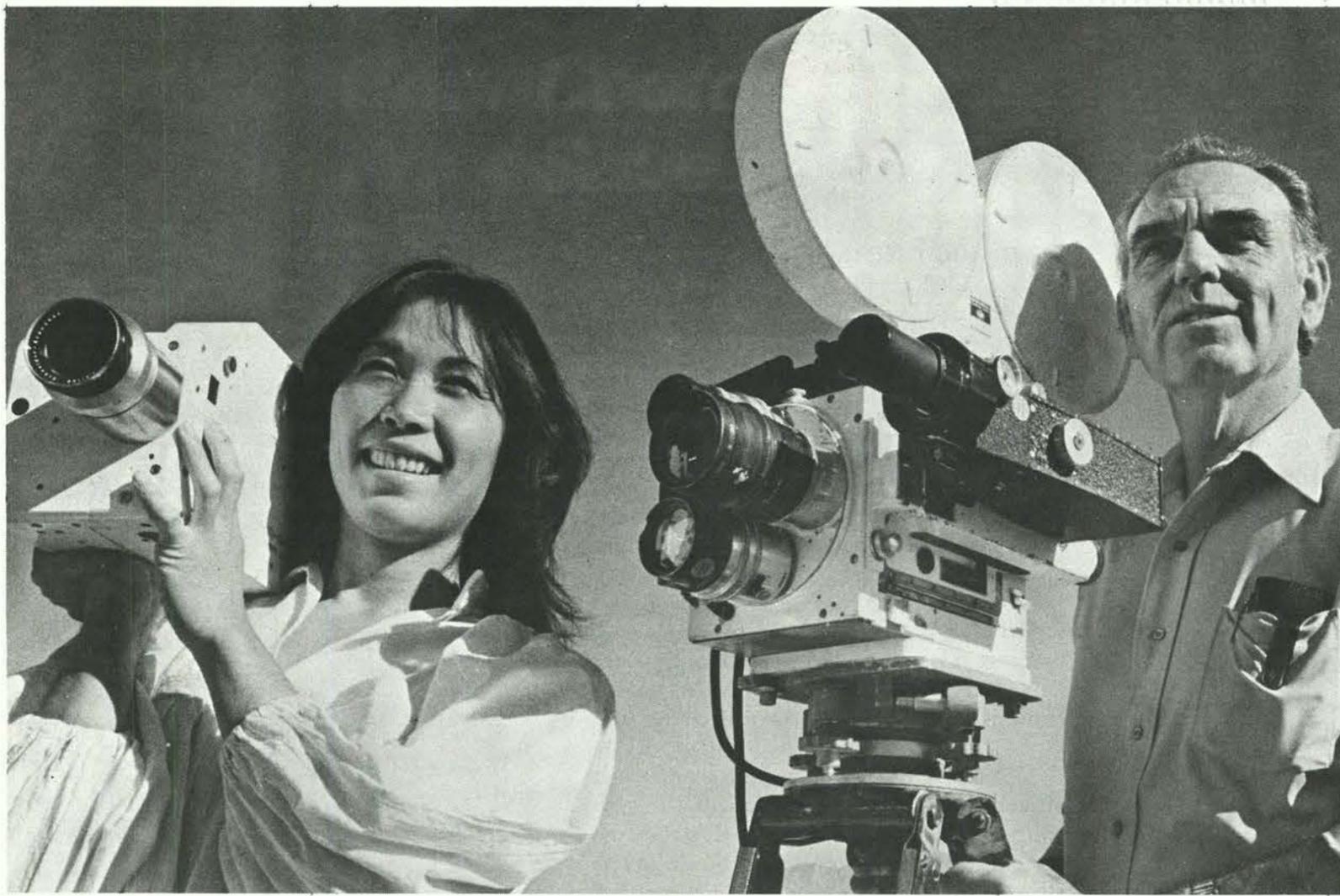
Les Hill - 1141 10



Reuben Minter - 9633 25



James Kenagy - 9580 25



**MODERNIZATION COMES TO PHOTOMETRICS.** Thirty years ago this December, Irv Lenz (9412) hired in at Sandia. That was the same year the Labs bought the bulky, heavy 35mm Mitchell camera next to Irv. This year, as part of a phased updating project, the Mitchells are being retired (but not the Lenz) and replaced by the smaller, lighter Photosonic 4M's like the one Fay Tamashiro (9412) obligingly hoisted to her shoulder to demonstrate its lightness. (In use, the Photosonic would always be mounted on a tripod.)

**JUNK • GOODIES • TRASH • ANTIQUES • KLUNKERS • CREAM PUFFS • HOUSES • HOVELS • LOST • FOUND • WANTED • & THINGS**

**CLASSIFIED ADVERTISING**

Deadline: Friday noon prior to week of publication unless changed by holiday. Mail to: Div. 3162 (814/6).

**RULES**

1. Limit 20 words.
2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and ERDA employees.
6. No commercial ads, please.
7. Include name and organization.
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

**MISCELLANEOUS**

GE APT. SIZE refrigerator, 2 yrs. old, \$60; dbl. bed headboard, \$5; trundle bed w/foam mattress, \$40. Byrne, 293-6117.

OUTBOARD MOTOR, 7.5hp, \$50. Merritt, 299-1482.

CIRCULAR DINING TABLE, 42", w/2 extension leaves, birch, lt. finish, \$100. Smith, 299-6873.

WATER SOFTNER, has elec. problems, but still usable, free, you pick up. Leisher, 281-5258.

BRAKE SHOES for '70 Datsun pickup (rear axle), \$5. Chavez, 831-5220.

BABY CRIB w/mattress, wood finish, very firm mattress, used 2 years. Cova, 266-3345.

RCA HIFI Console AM/FM stereo receiver record player. Houghton, 299-3386.

11' ASPEN camper, self-contained, jacks, refrig., \$1400; 6000 lb. axle w/tires & brakes, \$125. Berg, 299-5640.

GUITAR, 6-string acoustic, played very little, lined-case, accessories, \$150. Brooks, 298-0370 after 5.

GOLF CLUBS: Citation irons (3-PW), Wilson Woods (1,3,5), heavy white bag, slightly used, \$260; 2 sets skis/bindings, w/poles. Scales, 296-9295 after 5.

SHERWOOD 7200 AM/FM receiver, 50-60W/ch., 3 yrs. old, \$185. Smith, 255-5662.

LADIES diamond & ruby cocktail ring, Mindlin Jewelers appraisal \$375, asking \$225. Bogdan, 293-9304.

TYPEWRITER, Smith-Corona, reconditioned; window, horizontal dbl. sliding, aluminum, 30x72, new; drum set, Camco, 7-piece; Groves bow, 17-lb. Grear, 281-3166.

MOBILE HOME, 14x70 Marlette, 2-bdr., 1 1/2 baths, in city park, landscaped. Pearl, 299-5121.

OAK CABINET used for stereo system, 32" wide, 34" high, 2-door, stained fruitwood, \$65. Shepherd, 299-9066.

SOLID OAK BUNK BEDS w/inner-spring mattresses, ladder & rail, can be used as twin beds, \$150. Gibbs, 281-3639.

SEARS air-lift adjustable shocks for GM cars; VW fuel gage sending unit. Hymer, 298-2232.

77 LAYTON travel trailer, 19' self-contained, AC, firm \$5000; Ping Pong table, \$35; stereo w/speakers, \$25. Anderson, 296-3558.

GOATS, Reg. Nubian bucks, 2 available, sired by star buck, \$80 and \$100. Shank, 877-4497.

FORMICA sink top w/sink & faucets; men's 3-spd. 36" bicycle. Boes, 292-1690.

3 TABLE SET, walnut, contemporary, 2 end tables, coffee table, set \$95; gold velvet traditional chair, \$75. Paul, 299-6387.

FIREPLACE SCREEN, polished brass, 25" H x 49" W, \$23. Chavez, 298-1649.

HARMONY copy of Gibson Trini Lopez standard, wine red thin hollowbody, Bigsby tremolo tailpiece, soft case, \$125. Floyd, 292-2160.

ARMCHAIRS, blue velvet, \$35 ea.; 10'x10' carpet, lt. beige w/pad, \$30. Smaardyk, 299-7077.

TRAILER HITCH, Class III & wiring, fits '66-'70 Chevy wagon, \$40; rack for lwb pickup, oak, bolted, painted, \$35. Sublett, 298-1004.

SANKYO Super CNE 440 HiFocus movie camera 8mm; antique beds; 4 black padded bar stools, 30". Dollahan, 293-8523.

DINING TABLE & 6 chairs including 1 arm chair, hardwood, dark color, \$150. Bartel, 296-5270.

OLD WOOD cook stove. Hill, 299-7813.

STEREO combination console, maple cabinet, AM/FM, stereo, record player & tape jack, \$300. Perryman, 294-6113.

LAMBS: about 6 mos. old, 2 females. Navalesi, 344-0598.

MOTORCYCLE HELMET, Sterling Cougar, size medium, meets 2 90-lb. 1973 testing stds., \$15. Warren, 256-1334.

VAN captain's seat, new, brown naugahide, herculon upholstery, highback, never used, reclines & rotates, \$150. Reyelts, 299-0932.

HOBBY HORSE, \$15; 2 bar stools, \$10; childrens card table & 2 chairs, \$5. Esch, 292-0754.

73 EVINRUDE motor, 50hp w/gas tank & controls, \$945. Bohannon, 344-9235.

RANCH OAK: twin beds, dbl. bed, coordinated family room group of 2 chairs, love seat & coffee table. Spoon, 765-1712.

14" STEEL WHEEL, 5-hole, fits Ford Mustang & others, \$6; tire, F70-14, 4-ply nylon tubeless, whitewall, \$4. Daut, 255-2529.

TYPEWRITER, Royal silent, manual, office-size, \$25. Shunny, 265-1620.

TIRES: 2 Sears steel radials, R78L, \$20 ea.; 4-piece upholstered sectional chairs, \$40. Barth, 345-0172.

SAILBOAT, 13' Cyclone racing class, includes trailer, cover & all go-fast items, \$750. Denton, 821-4488.

WATER PUMPS, 1 elec., other gas, \$95 & \$140; paint sprayer, \$35; car cooler, \$20; weed burner, \$15. Gall, 834-7307.

SOFA, Colonial, herculon tweed, 2 yrs. old; 2 gold chairs. Pedro, 344-2104.

GAS FURNACE for mobile home, \$80; oil space heater, \$18. Bentz, 299-3448.

FRIGIDAIRE custom deluxe 30" copertone elec. range, self-cleaning, 6 mos. bachelor use. Granfield, 296-8651.

TENNIS BALLS, brand names, 4/\$1; practice balls, 10/\$1. Hochrein, 268-9204.

CUSTOM RIFLES, call for caliber & description. Blackmon, 298-2095.

GARAGE SALE: Nov. 5, sofa, chair, lawn mower, dishes & more. 4101 Camino de la Sierra NE, Beckmann, 296-1829.

FOOD DISPOSER, Wards sound proofed model, \$20; Pampas, free for digging; Sears best microwave, service contract maintained, \$350. Atkins, 298-5762.

VAN SEATS, 2, single, std., blue, \$20 ea., firm, will sell 1 or both. Owens, 881-0815.

WATER SOFTENER; shop manuals for '75 Vega; 5" CRT tubes; RG-8 cable. Norris, 877-6415.

DOUBLE BED, box springs; 4-dwr. dresser; kitchen table. Orear, 256-1941.

COLOR TV, 25" table model, \$125; 2 carpets, gold/turquoise; night stands; 8mm movie camera; Bagby golfcart; skis. Chandler, 296-3323.

GAS RANGE, \$50; 3 gas yard lights, \$10 ea.; Black & Decker edger-trimmer, \$30. Liguori, 256-3613.

DOG, 1-yr-old Terrier-Poodle cross, female, spayed, has rabies shots & tags, free to good home. Barton, 266-8607.

PUPPIES: pure bred Irish setters, \$40 to good homes. Korak, 293-7737.

SHURE Unisphere mic w/stand & boom, \$60 or best offer. Markiey, 293-4016.

**TRANSPORTATION**

'68 MERCURY 4-dr, original owner. Power, Air, shop manuals, \$600. Minnear, 344-5419.

RACING go-kart, Margay Panther, ready to run, 100cc Mc92 engine. Hansen, 898-3173.

'64 AMC Ambassador, 4-dr., 3-spd. OD, AM, FM, PB, PS, Mustang buckets. Palkovic, 255-4084.

'70 CHEVY str. wgn., \$800 or best offer. Hymer, 298-2232.

'74 FORD Maverick, 4-dr., V8, available about Dec. 1, \$1500. Oakes, 898-0236.

'73 PONTIAC Catalina, 4-dr., AT, AC, PS, PB, tilt steering wheel, steel

belted radials. Giles, 821-8638.

'63 BUICK Special, 4-dr., R&H, AC, less than 54,000 miles, \$275. Miller, 255-7716.

'67 CHEVY Impala SS, radio, PB, PS, AT, \$350. Mistretta, 821-0611.

'72 MONTE CARLO, rebuilt engine, new paint, AT, AC, AM-FM, etc., \$1850. Prevender, 299-5253.

EITHER '67 MERCURY SW or '63 Olds, 53,000 miles, 1-family cars, both loaded, \$400. Hueter, 242-1620.

'71 VW BUS, rebuilt engine still under dealer warranty. Matthews, 293-6510.

'76 CHEVY Nova, 6-cyl., R&H, AC, 30,000 miles. Narvaez, 344-4461.

MOTOR HOME, Dodge Travco, 1971, self-contained, 2-RAC, CC, BC, 110 generator, PS, 40 GWT, PB, make offer. Gall, 834-7307.

TWO JEEPS for price of one, both Military models, one in great shape, one in parts, \$1400. Bentz, 299-3448.

'77 CHRYSLER Newport 4-dr., HT, options include 8-track & FM stereo, low mileage, \$2200 below sticker. Granfield, 296-8651.

'73 JEEP Wagoneer, 4-wd, 360V8, AT, PS, PB, 40,000 miles, radials, other extras including cassette tape deck. Bozone, 299-2986.

'74 PINTO Squire wagon, std., AC, 58,800 miles, \$2150; '68 Plymouth Fury II, 4-dr., AT, PS, AC, \$425. Bishop, 299-5749.

'75 CAMARO, all accessories; Bricklin SV-1 gull-wing sports car, best reasonable offers. Norris, 877-6415.

'70 VW BUG, \$600 firm. Owens, 881-0815 after 5:30.

BIKE, 10-speed, men's, French-made, \$50. Orear, 256-1941.

'73 CHEV Cheyenne pickup, 350 V8, LWB, new tires, 68,000 miles, \$2300. Cox, 293-5518.

'74 GMC truck, 3/4 ton, LWB, 8200 GVW, fully equipped & LWB shell, dbl. door, custom built. Simon, 898-3275 or 256-9734.

'72 CHEVY VAN, 3/4 ton, deluxe conversion, sleeps 4, AT, PS, front disc brakes, Mini Open Road camper, \$5000. Perez, 898-3002.

'69 COUGAR, factory tapedeck, 351 engine, stick shift, AC, 20 mpg, \$1095. Kerschen, 299-6468.

**REAL ESTATE**

EDGEWOOD, 27 acres, fronts 66 south side, joins Bonners Realty to the east, all utilities available, terms. Lewing, 10629 Sequoia Dr., Sun City, AZ, 974-8571.

4-BDR., den, LR, DR, auto. sprinkler, corner lot on cul-de-sac, 1960 sq. ft., \$61,700. Navratil, 293-5527.

3-BDR. HOME, den w/fp, screened porch-greenhouse, lg. barn w/corals, on 1.1 acres near Los Lunas. Aubuchon, 865-7790.

**FOR RENT**

2-BDR. condominium w/garage, fp, washer/dryer hook-up, \$265/mo. Caruthers, 296-5953.

UTILITY TRAILER, 4x6, has spare tire, \$3/day, 2-day minimum. Gallo, 296-0112.

NE HOME, 3-bdr., 1 1/2 baths, den w/fp, dishwasher, etc., 2-car garage, on cul-de-sac, \$375; \$350 deposit. Grant, 881-6243.

SINGLE GARAGE or open storage within fenced & locked yard, SE Heights. Liguori, 256-3613.

**WANTED**

OSCILLOSCOPE. Spray, 299-0412.

ADULT TRICYCLE; trade or sell pigeons, ducks, chickens & geese. Lackey, 898-6638.

CHILDCRAFT BOOK SET, any age or condition will be considered. Thhammer, 298-8521.

SOMEONE to pull a small U-Haul trailer from Los Angeles (near Disneyland) to Albuquerque between now & 1st of year, will pay \$75. Shinkle, 299-8486.

OLD Lionel trains, any condition. Shepherd, 294-7297 after 5.

SINGLE FEMALE in 20's wanted to share 2-bdr. furnished apt. (not yet found) with same by 12-1-77. Quintana, 265-6369.

8MM MOVIE PROJECTOR; dolly for moving heavy items. Picraux, 345-2032.

BOOT TOE piece for Cubco ski binding, adult size. Cummings, 292-0524.

'55/'56 CHEVROLET 1/2-ton pickup, stepside, need not run, but sound body. Pallcovic, 255-4084.

HOUSE or Townhouse, buy small 2-3 bdr., pitched roof w/single garage in NE; prefer low maintenance. Fianning, 298-0743.

SHREDDER/COMPOSTER to borrow, rent or buy. Orear, 256-1941.

METAL FILM RESISTORS, 1/4-watt, valves 560, 39K, 240K, 270K; vacuum tubes 1LB4, 1LA4 or 1A5GT. Beatson, 881-2589.

RESPONSIBLE PERSON wanted to live, rent-free in small house on secluded adobe compound in Corrales. After 8 pm, Stern, 898-6405.

**LOST AND FOUND**

LOST—Sandia 5-yr. tie-tac, silver w/black thunderbird; 8 keys on a cable ring; 2 men's brown hats—1 plastic leather, 1 semi-felt; Municipal Parking Lot Pass (yellow); Rx glasses in brown case; brown pouch containing driver's license & other papers.

FOUND—Grey raincoat in green plastic case, marble-colored square cuff link, GM key ring. LOST AND FOUND, Bldg. 832-264-6245.

## King Crab Feast Set Nov. 19

HAPPY HOUR TONIGHT features a roast beef buffet, La Ultima for dancing. At Happy Hour next Friday, Nov. 11, shrimp creole and baked ham are on the menu, the Stardusters on the bandstand.

SINGLES will mingle tonight in the El Dorado room starting at 4:30. Chips, dips and entertainment by singer/guitarist Linda Beattie. Club members and one guest, 50 cents, non members \$1. Coming up Saturday, Nov. 19, is a singles hayride—bus, bonfire, hot dogs, etc. for \$3. Tickets from the Club office by Nov. 18.

TOMORROW is Variety Night starting at 7 p.m. with movie, "When I Grow Up," cartoons, and entertainment by mime artist Michael Frith. Supper is served at 6.

LOBO BUSES will depart from the Club parking lot at 6:45 p.m. tomorrow and again Nov. 19. It beats the traffic hassle at the stadium. Cost is 75 cents for members, \$1 guests.

SOUL SESSION Saturday, Nov. 12, features Brown Sugar for dancing from 9 to 1. Members free, guests \$1.

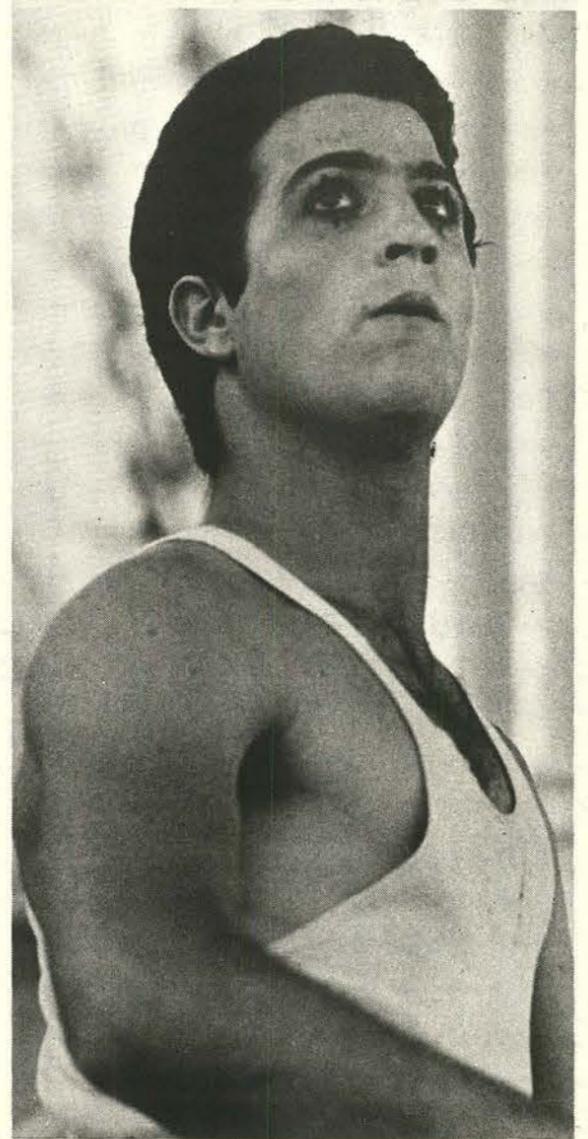
THE BIG ONE this month is King Crab Feast Saturday, Nov. 19—the works for dinner plus a show and dance music by the Red Hot Chili Jazz Band. Members \$6.25, guests \$7.25—pick up tickets by Nov. 12.

SANADO CLUB meets Tuesday, Nov. 8, at 1 p.m. for lunch and a slide show, "Where Edges Meet," by best-selling New Mexico author and educator Tony Hillerman. For reservations call 298-2133 right now.

SKI CLUB meets Nov. 15 to hear a talk by Steve Knowlton, former Olympic skier now executive director of RMSA. A ski clinic is set for 6 p.m., the talk at 7.

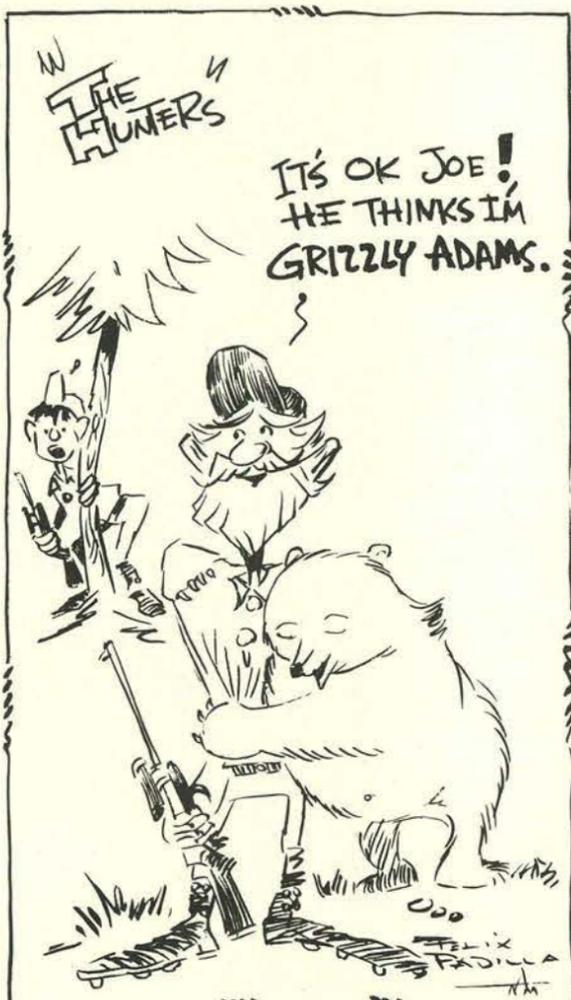
TENNIS CLUB will organize and elect officers plus discuss operation of the new courts at 7:30 p.m., Nov. 16. It's the first meeting of what promises to be an active new Coronado Club group.

TRAVEL DIRECTOR Ed Neidel still has openings on the Jan. 7 Caribbean Cruise but time to sign up is short. See Ed tonight in the Club lobby from 6 to 7 to discuss this trip or the one to the Holy Land Dec. 26. Holy Land slides and movies will be shown at a travelogue session Nov. 22 at 7:30 p.m.



MIME MICHAEL FRITH will perform at 7 p.m. tomorrow at Variety Night. He presents an entertaining act that includes participation by children in the audience.

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NEW YORK TIMES Science Editor William Sullivan (left) was a recent visitor to the Solar Power Tower. Here Larry Seamons of Solar Thermal Test Facility Division 5713 explains heliostat operation. Power Tower is gaining more national attention as construction nears completion.