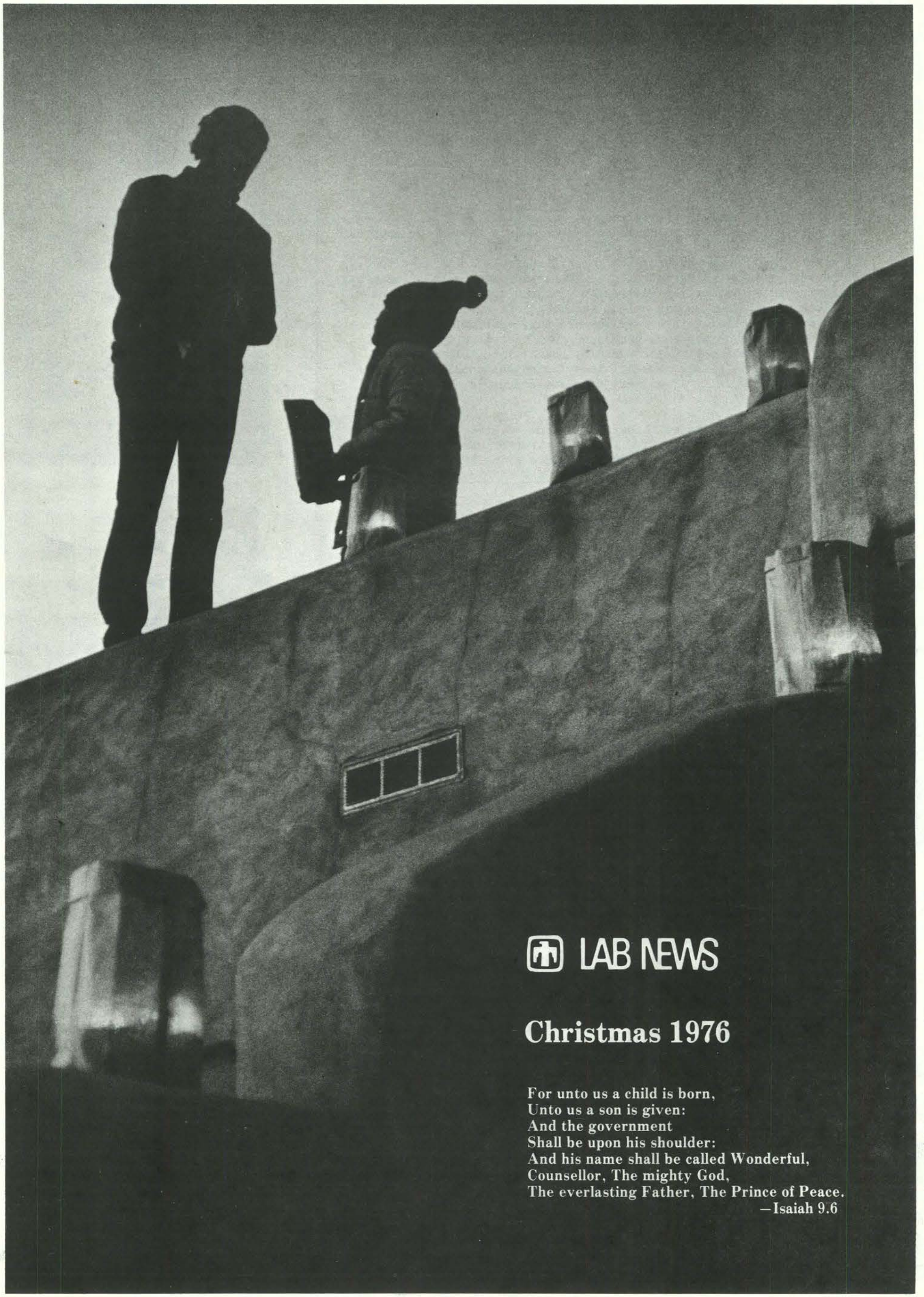

LAB NEWS

Christmas 1976

**For unto us a child is born,
Unto us a son is given:
And the government
Shall be upon his shoulder:
And his name shall be called Wonderful,
Counsellor, The mighty God,
The everlasting Father, The Prince of Peace.**

—Isaiah 9.6

Afterthoughts

Last minute Christmas shoppers--Surprise that special someone: ERDA's Division of Procurement has announced the availability of the vessel "Sturgis," a floating nuclear power plant with a reactor rated at 45,000 kilowatts. The converted Liberty ship, 441 feet long, served in the Panama Canal Zone for almost eight years, but still has enough fuel to last another five years. For the physicist who has everything, this could be just the ticket.

* * *

Hair--I recall a local tennis tournament in the late 60's in which a finalist in the men's singles scandalized onlookers because he sported a kind of Prince Valiant hair-do. Do you remember the furor about long hair? "Long" was touching the collar, and school PTA's anxiously adopted resolutions urging authorities to banish hirsute boys. Bearing in mind the intensity of the passion the subject aroused then, take a close look now at your Sandia male. Assuming your subject has hair, chances are his collar is not only touched but engulfed, his ears are concealed by hair, he may have bangs and, not content with this manly show, he may even have a mustache and/or beard. And this appearance provokes scarcely a blink. Moral: today's indignation is tomorrow's indifference, especially in matters of taste and style.

* * *

Browsing--"Everybody watches television to some degree, including most of those who pretend they don't. Felix Frankfurter was right; he said there is no highbrow in any lowbrow, but there is a fair amount of low-brow in every highbrow." Eric Sevareid in Saturday Review *js

Take Note

Ralston Barnard (2355) did a little market survey in quest of a low price for an HP calculator and came up with a Los Angeles outfit which offers substantial discounts, not only on calculators but on stereos, TV's, electric typewriters and other electronic stuff as well. Ralston left the catalog in the LAB NEWS office. If you're interested, don't call, come over (Bldg. 814).

* * *

Donald Keller of Albuquerque's Blood Services has written to President Sparks to thank the many Labs donors. He states: "You will be pleased to know that during November, members of Sandia Laboratories donated 205 units of blood... This is the greatest number of donors from Sandia since June of 1974. It is a fine tribute to the individual members of your workforce and to Sandia Laboratories---" Later, Mr. Keller notes the expanding need for blood because of medical advances in areas such as that of open heart surgery and leukemia treatment. Want to give? Any Tuesday. Go to the lobby of the Personnel Bldg.

* * *

At the joint Standards Symposium in Washington this fall, Warren Taylor of Physical Standards Division 2551 was session developer and chairman for a session entitled "Metrology and Regulations for Safety and Health." Attendees voted this the best session of the Symposium, and Warren received a prize and certificate.

* * *

265-7611. Jot down the number and put it in your wallet or purse. You probably won't need it, but if you do, you'll be glad it's available. It's the number of the American Automobile Association's DIAL-A-RIDE program. If you've been drinking, even a little, and have to get home to any place in Bernalillo County (and it's between 4 p.m. and 4 a.m. Dec. 24 through Jan. 1), call the number for a free ride. Identity of all callers remains anonymous.

Congratulations

To Robert Martinez (9512) on the birth of a son, Eric Michael, on Dec. 7 in Valley Forge, Pa.

Sympathy

To Al (4338) and Julia (ERDA/ALO) Sensel on the death of his father in Indianapolis, Ind., Dec. 12.

LAB NEWS

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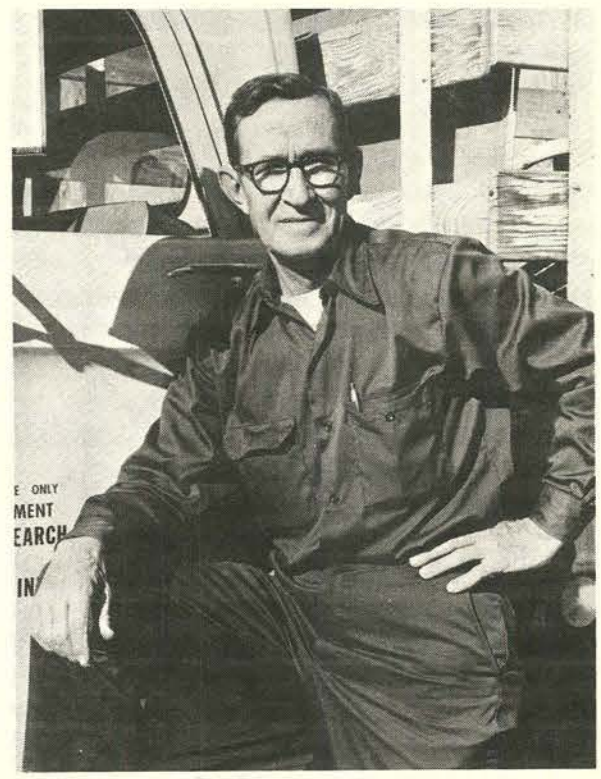
so does russ smith
&
lorena schneider reports on livermore

Retiring

Katie Tinsmith (2631)



Bill Thompson (9713)

Cliff Hiner (3430)

LIVERMORE NEWS

VOL. 28, NO. 26 LIVERMORE LABORATORIES DECEMBER 24, 1976

Cliff Selvage Discusses Energy

Department Manager Cliff Selvage (8180) has returned from Europe where, at ERDA's request, he was U.S. representative at the International Energy Agency (IEA) conference on the development of small solar systems. Held in Vienna, the meeting was attended by people from 10 countries as well as by representatives from the Community of European Countries (CEC).

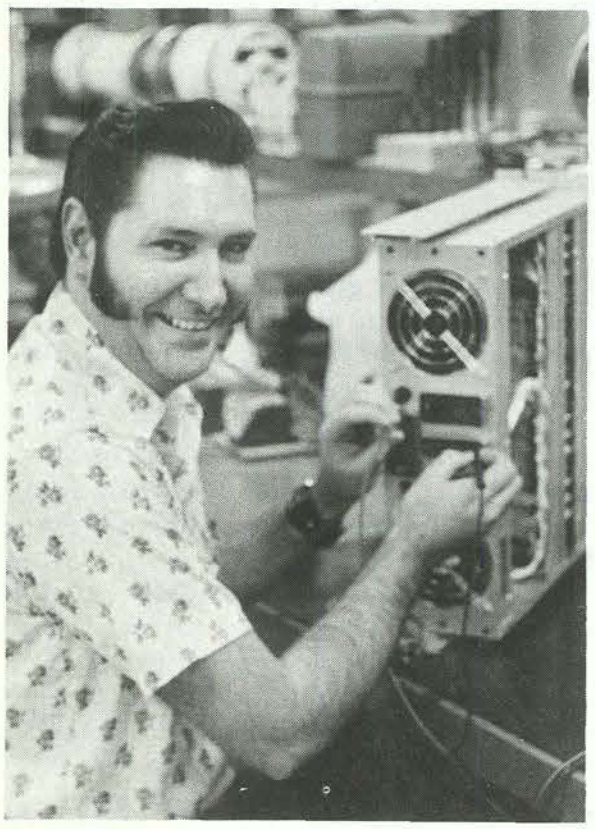
Cliff also spent some time in Munich to discuss an energy study performed by the German firm of Messerschmitt-Bolkow-Blohm.

After Munich Cliff visited the National Center for Scientific Research (Electro de France) and the Science Office of the American Embassy, both in Paris, to discuss expected performance, costs, and safety of the French central receiver systems, now in planning. He also presented draft papers prepared by Tom Brumleve (8184) on the aircraft "glint" problem (flash blindness in overflying aircraft). Cliff notes that this work and these discussions may lead to a cooperative test program to validate Tom's analytical treatment.

Later, at Odeillo, Cliff witnessed operation of the French solar thermal facility. Solar-thermal generated electricity is being delivered to the EDF electrical network by this facility.

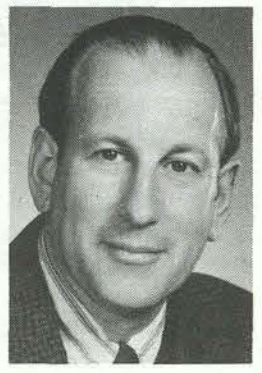
At the request of Spanish officials, Cliff then traveled to Madrid for an exchange of information on the U.S. solar program and Spain's energy program.

"This was the most constructive foreign trip I've made," says Cliff. "I learned a good deal, and I feel I made a substantial contribution, helping other countries with their energy problems."



LATEST GRADUATE of SLL's apprenticeship program is Chuck Sage, now an electronic fabrication technician in Model Labs Division 8424. Program requirements include four years of on-the-job training, plus related academic courses which he completed at Chabot and San Joaquin Delta Colleges.

Sandian Heads New Fusion Energy Task Group



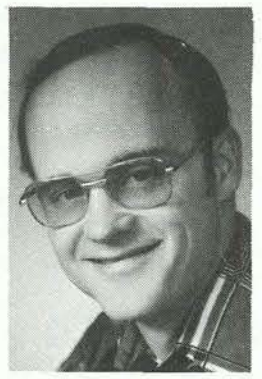
Walter Bauer (8334) has been named chairman of a newly formed national task group to study surface problems likely to be encountered in the practical application of magnetic fusion energy.

The new group, to be known as the Plasma-Materials Interaction Task Group, was appointed by the Materials and Radiation Effects Branch of ERDA's Division of Magnetic Fusion Energy. Membership includes representatives from ERDA Headquarters, Oak Ridge National Laboratory, Argonne National Laboratory, Princeton Plasma Physics Laboratory, and the University of Wisconsin. The six United States members will be assisted by consultants from Culham Laboratories, England, and the Garching Laboratory of the Max Planck Institute, West Germany.

Purpose of the Task Group is to integrate ERDA's surface program into a coordinated national effort. ERDA recognizes that the materials problems which must be solved for commercial fusion power can be dealt with most effectively under a coordinated national plan. Such a plan will provide for optimum use of manpower, facilities and funds. Sandia's portion of ERDA funds for plasma-materials interaction research is over one-half million dollars in FY'77.

Ken Wilson (8334) will serve as secretary to the Task Group. Other Sandians named to various sub-task groups include: Fred Vook (5110), Blistering, Synergism; Rob Rye (5114), Desorption, Chemical Effects and Hydrogen Interactions; and Mark Davis (5830) and George Thomas (8334), Non-Particle Effects, Materials Properties and Surface Metallurgy.

Supervisory Appointment



Bill Hoover to supervisor of Materials Development Division 8314, effective Jan. 1, 1977.

Joining Sandia Albuquerque in 1970 in the Composite Materials Development Division, Bill has helped to develop hardware such as the composite fin for the B-77 program. He has also coordinated materials development in the 5800 organization for the B-77 program.

Bill received his BS degree in metallurgical engineering from Lafayette College in 1966 and his MS and PhD in metallurgy and materials science from Lehigh University in 1968 and 1970 respectively. A member of the American Society for Metals, he also serves as vice chairman and chairman-elect of the Composite Materials Committee of the Metallurgical Society of AIME.

Off the job, Bill enjoys jogging, camping and woodworking. He and his wife Lois have two children, a girl and a boy.

Sympathy

To Art Camacho (8256) on the death of his sister in Livermore, Dec. 3.

Congratulations

Mr. and Mrs. Randy Gummus (8323), a daughter, Michelle Ann, Nov. 30.

Speakers

Bob Cattolica (8115), "Velocity Slip of Gas Mixtures in Free Jet Expansions," and "Anomalous Broadening of the N_2 + First Negative Band System," Tenth International Symposium on Rarefied Gas Dynamics, July 18-23, Aspen, Colo.

Ted Dellin (8342), "Analytical Photo-Compton Current Deposition Profiles," IEEE Nuclear and Space Radiation Effects Conference, July 27-30, San Diego, Calif.

Bob Setchell (8115), "Raman Spectroscopy Measurements within an Internal Combustion Engine," and Dan Aeschliman (5262) and Bob Setchell, "Fluorescence Limitations to Raman Scattering Experiments in Combustion," 18th Annual Rocky Mountain Spectroscopy Conference, University of Denver, Aug. 2-3, Denver.

Bob Green (8111) and Dave Ottesen, Jim Bartel and Taz Bramlette (all 8313), "High Temperature Thermal Energy Storage," Sharing the Sun — Solar Technology in the 70's Joint Conference, American Section, International Solar Society and Solar Engineering Society of Canada, Aug. 15-20, Winnipeg, Canada.

Ken Wilson (8334), Invited Presentation: "Blistering Phenomena II, Gas Re-emission," Faculty Institute on Curriculum Development in Fusion, Aug. 9-13, Argonne National Laboratory, Chicago, Ill.

Walt Bauer (8334), "Materials for Controlled Thermonuclear Reaction First Walls," Symposium on Advances in Energy Storage and Conversion, American Chemical Society meeting, Aug. 29-Sept. 3, San Francisco.

Bob Cattolica, Bob Setchell and Dan Hartley (all 8115), "Laser-Based Molecular Scattering Methods for Combustion Diagnostics," 13th Joint Army-Navy-Air Force Combustion Meeting, Naval Postgraduate School, Sept. 15, Monterey, Calif.

Dan Hartley (8115), "Combustion Research and Radiation Chemistry," ERDA Workshop on Future of Radiation Chemistry, Sept. 11, Banff, Canada.

Ray Ng (8333), "Mavis—A Computer Program for the Modeling and Analysis of Explosive Valve Interactions," and "Measurement of Pressure Output Histories of Electroexplosive Devices," Ninth Symposium on Explosives and Pyrotechnics, Sept. 15-16, Philadelphia, Pa.

Labs To Study QA For NRC

A study to assess the effectiveness of the Nuclear Regulatory Commission (NRC) quality assurance program is being conducted by Sandia Laboratories.

The $258,000 NRC-funded study will focus on quality assurance activities of NRC and the nuclear industry, to include those relating to the design, construction and operation of nuclear power plants. The study is expected to continue through March of 1977.

A team of 10 Sandia quality assurance engineers, headed by Frank Muller (9525), is assigned to the study. Eight are American Society for Quality Control members.

The initial work has been an information gathering effort. Visits to NRC headquarters and four regional offices have provided data on NRC operations, while industry has been studied through visits to utilities companies, nuclear steam system suppliers, architect-engineers, nuclear power plants, components suppliers, standards organizations, service contractors and public interest groups.

With this information Sandia plans to identify relative strengths and weaknesses of quality assurance programs for nuclear reactors. Plans call for the report on the study to be submitted to NRC by April 1977; copies will also be available to the public through NRC.

Sandia quality assurance engineers have also worked with NRC in the development of a statistical sampling inspection program for the Inspection and Enforcement Office of NRC.

JIM GOVER and some of the Sandians he's recruited: front, Jeff Wilcoxen (2315), Mike Fletcher (1351), Sharon Fletcher (1241), and John Johnson (2315); back, Mike McClaun, Dave Fehl, Steve Montgomery, Andy Jones, Jim, and Steve Wilcoxen (all 2315).

Jim Gover: Sandia Recruiter

"Jim Gover does an outstanding recruiting job for us," said Herb Pitts, supervisor of the Recruiting Division 3531. "Go find out how he does it."

We went to Jim's office—he's supervisor of the Firing Subsystems Division III 2315—and asked him about his recruiting approach.

Jim is properly modest, but eventually he started talking:

"I think that successful recruiting demands that the recruiter be genuinely enthusiastic about Sandia as a place to do challenging and important work. I make it a point to know our department's tasks, and I have a pretty good feel for what's going on in the directorate. In addition, I try to keep informed about all the Labs' technical programs.

"You see, I really have three recruiting jobs. One is to look for PhD's at Purdue for all Sandia organizations. I'm also staff member recruiting coordinator for this directorate. Finally, I'm the staff member and engineering and science assistant (ESA) recruiter for my department.

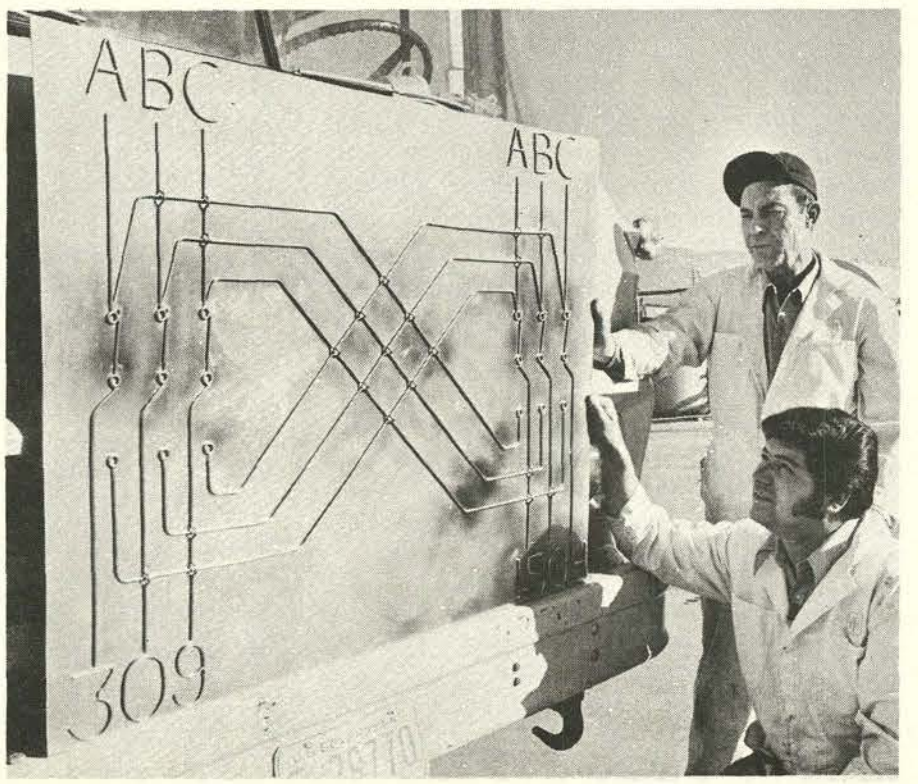
"I mentioned enthusiasm—and knowing as much as I can about Sandia's technical missions. I should add a couple of other things: One, I go after only the best candidates. And two, I treat them like the best.

"To attract the best candidates means to present, in a detailed fashion, the challenge of the technical problems we're working on. Sandia doesn't have to take a back seat to any company in this respect. The best graduates today don't fret over things like benefits or location, or whether the job is 'socially significant.' They want to be movers of the state-of-the-art. And that's the kind we want.

"When they get here, I treat them well—meet them at the airport, arrange their interview schedule, set up an appropriate audience for a seminar on their doctoral study, show them around the city, find answers to questions they have about Albuquerque. And my wife, Lois, and I invite many of them to our home for dinner.

"In short, I try to put myself in the candidate's place: what information would I need to make an intelligent choice about where I want to work? For example, what would I be doing? Who are the people I'd be working with? What are they like to talk with? What kind of office or laboratory would I work in?"

Jim's approach works. New hires he's been instrumental in bringing to Sandia during the last year include three PhD's and eight ESA's for Department 2310 and four PhD's for other organizations.



COMPLETED outdoor display sign to be mounted near switching gear that controls two 2400 volt circuits (including emergency circuits) for Area II is examined by the men who built it—welder Doyle Earnest, standing, and apprentice Henry Pacheco (both 9713). The schematic ensures safe switching of the circuits; stainless steel and copper materials will not fade or deteriorate through outside use.

For Rose Ann Things Are Looking Up

Last October, Rose Ann Schultz was one of a number of people going through the sign-in process required of all of Sandia's new employees. It's a confusing day at best, but when you are visually handicapped, as Rose Ann is, it's even worse. "I was scared to death," she says, "and wondered if it was all worth the effort."

ROSE ANN SCHULTZ (3144) types drafts of any recorded material. She is located in Rm. 1, Bldg. 804, tel. 4-7746. Contact her directly to schedule transcription services.

Today, Rose Ann will tell you, "Yes! It was definitely worth the effort." She is a typist for the Laboratories who is located in Technical Library Systems Reference and Periodicals Division 3144, supervised by Danny Seager. She types rough drafts from any type of recorded material. She operates the copier and answers the telephone for eight different numbers. Three ingenious Sandians—Ed Jenkins (9753), Elden VanVickle (9711) and Mel Smith (3616)—made the latter activity possible. They removed the lights from a telephone Pax system (phone rings and a light indicates which number is ringing) and installed buttons and a relay switch which causes a button to pop out when the phone rings. Rose Ann can then feel which button is out to identify which number is ringing. She uses a Braille machine to record the message.

Rose Ann says that she has always had poor vision. By the time she was attending UNM she was having trouble reading small print. "I was able to take notes, though, and my mother read for me. My professors all arranged for me to take tests orally or from tape." She received a degree in secondary education with a major in speech therapy. "I worked in this field for awhile," she recalls. "But as my vision became more impaired, I realized I would do better working in the adult world."

Four years ago, with the help of "Services for the Blind," she learned to read and write Braille. Last January the agency sponsored her at Triple A Business College (formerly Southwest College), where she strengthened her typing and business skills. Las Luminarias of the New Mexico Council of the Blind worked with Sandia's employment organization in placing her. Rose Ann received mobility instruction which helped her to become self-sufficient by riding the city bus—a Sandia Special—to and from work.

At home, Rose Ann manages as well as any mother and homemaker. She has help from her three children—Jeff, 16; Jim, 13; and Nancy, 9. "My children are what's important to me," she says. "I enjoy being their mother. My parents are also a great help; however they do not live with us.

"I've had so many pleasant things happen at Sandia," Rose Ann says. "The first day I was introduced to Pat Newman (3144), with whom I was to share an office. To my delight I discovered she was a former college friend. And later I found that Judy Hawbaker (3141) works in my building and rides the same bus I do. At one time Judy and I were neighbors. Now she walks with me between the bus stop and the office.

"I really enjoy my work, and what a vocabulary I'm learning! Each time I hear a technical term that is new to me, I write it out in Braille and file it. My customers from various Labs organizations are very helpful; one man sent me a tape which contained corrections for six words I had misspelled. I immediately put them into Braille and filed them in my binder. People have been extremely kind and helpful. This job has opened up a whole new world for me. Sometimes I feel like pinching myself just to make sure I'm here."

Fun & Games

Sandia Runners—As an activity, running resembles many of life's pursuits. That is, after a break-in period you arrive at a level of competence that is generally comparable to that displayed by the population engaged in that activity, whether it be violin playing, tennis, preparing omelets—or running. And in these pursuits most of us achieve mediocrity and let it go at that. The reason we stop improving derives from a sort of physical principle: small improvement takes large effort. Or, effort must increase exponentially while performance improves only arithmetically.

Now that we've cleared that up, we can all appreciate Irv Hall's (1223) recent performance in the Phoenix Fiesta Bowl Marathon. Irv had never broken the magic three hour mark in his many marathons, but this time he did with a 2:54, coming in 76th in a field of 650 and besting his previous best performance by 12 minutes. Curtis Dodd (5715) also ran in the 26-miler, his first, and turned in a respectable 3:46.

Pueblo Feast Day Dances

Listed below is a schedule of Pueblo feast day dances for December and January. The dances are usually performed in the main plaza of the Pueblo and start when the time is right.

Dec.		
24-25	San Juan, Taos, Picuris	Matachines
25	San Ildefonso, Santa Clara, Tesuque	Matachines
	Jemez, Santa Ana, San Felipe, Santo Domingo, Cochiti	Buffalo, Deer, Harvest, Basket, Rainbow & Matachines
26	San Juan Taos	Turtle Dance Matachines
Jan.		
6	Santo Domingo, San Felipe, Cochiti, Taos, Santa Ana	Corn, Turtle
6	Santo Domingo, San Felipe, Cochiti, Santa Ana	Eagle, Elk, Buffalo, Deer
23	San Ildefonso	Buffalo, Comanche

Authors

J.A. Panitz (5114) and R.J. Walko (2352), "Determination of Nanosecond High-Voltage Pulse Shapes at the Surface of Needle Emitters," Vol. 47, No. 10, THE REVIEW OF SCIENTIFIC INSTRUMENTS.

E.J. McGuire (5211), "The L-MM Auger Spectra of Na and Mg," and "Excitation of Atomic Oxygen in the Born Approximation," Vol. 14, No. 4, PHYSICAL REVIEW A.

C.H. Seager (5155), "Electronic Conduction in Zr-Doped TiO_2," Vol. 20, No. 6, SOLID STATE COMMUNICATIONS.

M.D. Bennett (1331), "Velocity of Bodies Powered by Diatomic Cold-Gas Thrusters," October 1976, JOURNAL OF SPACECRAFT AND ROCKETS.

G.C. Nelson (5825), letter to the editor, "Determination of the Surface Versus Bulk Composition of Silver-Gold Alloys by Low Energy Ion Scattering Spectroscopy," Vol. 29, No. 1, SURFACE SCIENCE.

K.H. Eckelmeyer (5832) and F.J. Zanner (5833), "Effect of Aging on Mechanical Behaviors of U-0.75 Wt Percent Ti and U-2.0 Wt Percent Mo," Vol. 62, No. 1, JOURNAL OF NUCLEAR MATERIALS.

M.W. Edenburn (5719), "Performance Analysis of a Cylindrical Parabolic Focusing Collector and Comparison with Experimental Results," Vol. 18, No. 5, SOLAR ENERGY.

J.E. Kennedy, J.W. Nunziato (both 5131), and D.R. Hardesty (8115), "Initiation and Detonation Studies of Condensed Explosives Using Interferometric Techniques," Vol. 3, No. 9-10, ACTA ASTRONAUTICA.

M.L. Knotek (5155), "Study of the Thermal Desorption of Ions from the Surface of B-Alumina," Vol. 14, No. 8, PHYSICAL REVIEW B.

W.H. Smyrl (5831), "Current and Potential Distributions In Plating Corrosion Systems," Vol. 123, No. 10, JOURNAL OF THE ELECTROCHEMICAL SOCIETY.

Charles Hartwig (8342), "Raman Scattering from Hydrogen and Deuterium Dissolved in Silica as a Function of Pressure," JOURNAL OF APPLIED PHYSICS, Vol. 47, No. 3.

Christmas Projects Around the Labs

SANDIANS who are members of St. Jude Express include Manny Archuleta (9652), Walt Henderson (1734), Adela Cooke (3171), Art Eiffert (9650), Fred Deiber (9652), and Bob Dawirs (1353). More than 100,000 miles have been logged on the truck since the group bought it three years ago.

Org. 9600 Continues Food Basket Tradition

Sandians of Design Information Center 9600 are noting the 20th anniversary of their organization's tradition. Instead of exchanging cards, they donate money to provide a week's groceries, including Christmas dinner, to 24 needy families.

Names of the families are obtained from the Salvation Army. The food is delivered early Christmas Eve by members of the committee.

Wayne Shirley (9635) and Al Lujan (9651) head the committee this year. Other members include Bob Roginski (9621), Ron Garin (9623), Terry Bisbee (9624), Bill Wing (9625), Fran Armijo (9626), Bob Miera (9627), Alice Rodriquez (9631), Liz Bookwalter (9632), Mary Lafrenz (9633), Dan Jurgill (9655), Ernie Roberts (9656), Paul Hatch (9657), Mary Ward (9622) and Charles Duvall (9658).

South Highway 14 Villagers Are Helped

The villages behind the Manzano Mountains with the musical names are again the focus of the South Highway 14 Village Project. Thirty families, from Escabosa, Chilili, Tajique, Torreon, Manzano and Punta, are receiving Christmas boxes which include food, new and donated clothing, and other household items. Turkeys go to the large families, while canned hams are given to the many "singles"—usually older people living alone.

The Project budget this year, $1500, is the largest yet. Revenue comes from the used book stands located around the Labs, from luncheons and bake sales by people in organizations 3151 and 3152, and from donations. People in organizations 3162 and 3512 also work on the Project.

Some 90 families in the villages receive help from time to time. The Project operates year 'round. At Christmas, a fraction of the 90 is selected for assistance, the number being determined by the funds available.

Christmas Is Every Day for St. Jude Express

With members of St. Jude Express, it's Christmas every day. The essence of St. Jude is giving, and the organization gives year around.

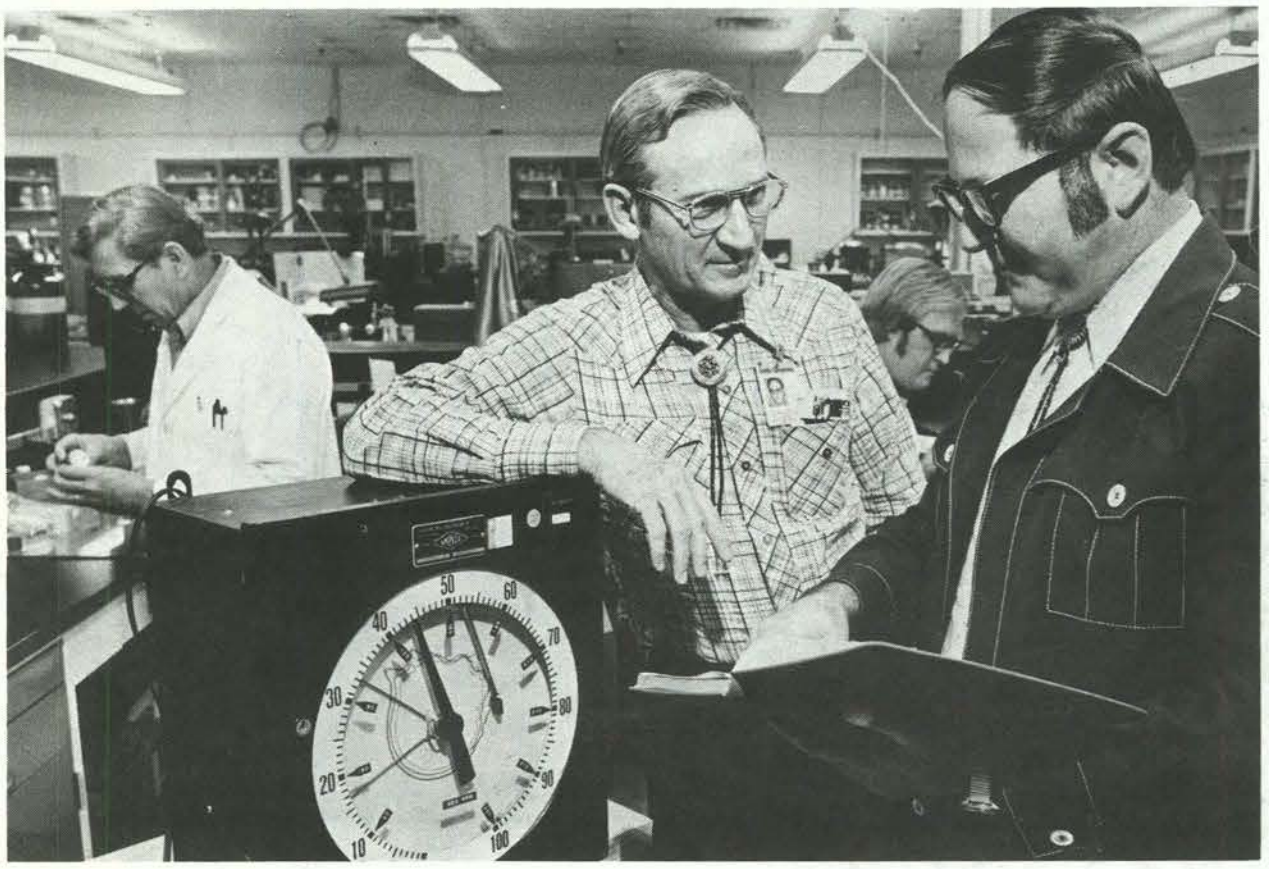
This past week the St. Jude truck carried 3000 lbs. of clothing and food to the Navajo reservation in northwestern New Mexico. In the past month the truck, similarly loaded, made deliveries to an orphanage in Juarez, to a church on the Navajo reservation in Arizona, and to churches in Tierra Amarilla and Parkview.

Special project of the group is the Tarahumara Indians, a nomadic tribe living in the Sierra Madre mountains about 120 miles southwest of Chihuahua, Mexico. St. Jude flies a local dentist and medical supplies into the remote area using a six-place Piper Cherokee aircraft. The plane is also used as an ambulance for emergencies in remote areas of New Mexico and Arizona.

The bulk of St. Jude's work is performed with the truck, however. "It's cheaper and carries a lot more than the airplane," says Art Eiffert (9650), past president of the group. "We make some 35 trips a year in the truck, delivering more than 100,000 lbs. of clothing, supplies and medicines. Most of the material goes to Mexican border towns where we work through local churches and neighborhood organizations."

Contributions are made to St. Jude's Express through churches, organizations and individuals. If anyone would like to help with the effort, contact Art, 4-6440, or Spence Stopa, president, 842-3277.

DO THEY FIT? Little Celina Ortiz thinks so as Agnes Sanchez readies the other shoe and husband Julian (3512) rummages through the box. Shoes are among items distributed during the Christmas season to families living in villages on South Highway 14.



THE HYGROMETER tells the story. It's less than 130 parts per million moisture in the dry room. Bob Wehrle and Bruce Van Domelen check the books—it's been a record dry spell.

A Very Dry Story

If you want to build a thermal battery, you'll need a dry place to do it.

That's the premise underlying construction of a unique room in Bldg. 894 where most of the development work of Battery Development Division 2522 under Bob Wehrle and Exploratory Batteries Division 2523 under Bruce Van Domelen is done. Thermal Batteries have wide application in nuclear weapons.

"When we say the room is dry, we don't mean simply that the roof doesn't leak," explains Bob. "We mean *really* dry—less than 300 molecules of water per 1,000,000 molecules of air. That's less than one percent relative humidity at 22°C (70°F). That temperature would normally feel a little warm for working, but with the humidity that low, it feels cool. Most of our lab technicians wear sweaters under their lab coats. We could raise the temperature, but that brings the risk of perspiration—which would raise the humidity."

"The reason for the dry room," says Bruce, "lies in the nature of the materials used in thermal batteries, more precisely, thermally activated batteries. Most of the materials either absorb or react with water. That's especially true of the electrolyte, which is very hygroscopic. And if any material used in the batteries absorbs water, the batteries won't perform to specifications."

The facility is unique. It's the onlv one at Sandia; in fact, it's the only one in the ERDA complex large enough (15 x 20 m) and well-equipped enough to mount a total R & D effort in-house: concept to prototype to design definition for a commercial supplier. The room was constructed under contracts administered by Plant Engineering, specifically by Don Knott's Building and Facilities Design Division 9742. "It was no easy task," says Bob, "but the room is certainly a success: performance continues to exceed our expectations."

The room, although it looks much like a typical laboratory, is essentially a box built of 3.2 mm (1/8") steel sheeting. Entry doors form an airlock. Ducts from the room lead to two tanks of molecular sieves. Each of these tanks is filled with about 4500 kg (10,000 lbs.) of ceramic pellets which adsorb (act as a trap for) moisture. Air is drawn out of the dry room, through a pellet tank for drying, then back to the room. When the pellets in one tank reach saturation, the water is driven off by air heated to 250°C while the room is served with the second pellet tank.

Says Bob, "Sandia has been a leader in developing improved thermally activated batteries. The type currently in use, the pellet battery, was originally developed here, and we have been instrumental in its improvement over the last decade or so. Active lifetimes are up, costs are down. Our success is due in part to our dry room facility."

Events Calendar

Dec. 24-Jan. 2—"TV or Not TV," Barn Dinner Theatre, 281-3338.

Dec. 25, 26, 29-31—"Camelot," Albuquerque Civic Light Opera, Popejoy.

Dec. 25—"Camelot," KHFM 96.3 FM, 6:40 p.m.

Dec. 26—"Hansel Und Gretel," KHFM 96.3 FM, 6:40 p.m.

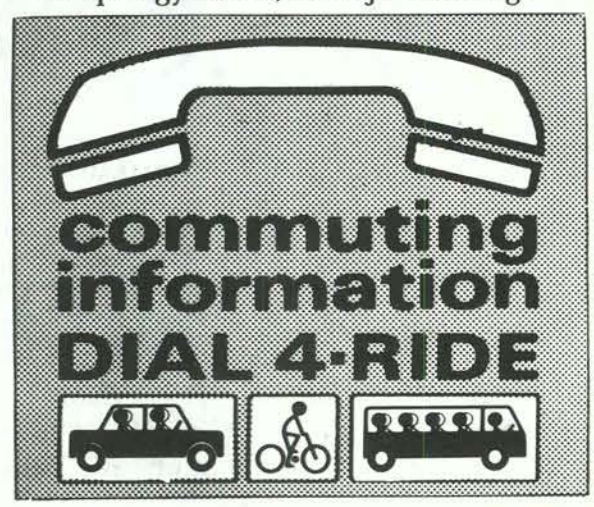
Dec. 28-Jan.23—"Mind With a Dirty Man," Ole Henry's Dinner Theatre.

Jan. 5—"Papau, New Guinea—Twilight of Eden," Audubon Wildlife Film Series, Popejoy Hall, 7:30.

Jan. 8—Registration for Sat. tennis lessons, Beverly Courts, 9-12.

Jan. 8,9—"An Evening of Mefistopheles," New Mexico Symphony Orchestra, chorus and the Albuquerque Boys Choir, with Justin Diaz guest artist, Sat.-8:15, Sun.-3 p.m., Popejoy

Continuing—Maxwell Museum of Anthropology-UNM, Navajo Weaving.



ENTHUSIASM for a fund-raising project of the New Mexico Ballet Company seems contagious as Lana Allen, artistic director; Ross Caccarale, Sunshine Theatre manager; and Bobbie Voelker (3151), ballet company secretary advertise the upcoming event. Special showings of the classic film "The Red Shoes" on Wednesday, Jan. 12, at 6 and 9 p.m. and on Saturday, Jan. 15, at noon and 3 p.m. will benefit the non-profit organization. Tickets are $3 for adults, $1.50 for kids. The Sunshine Theatre, downtown at Central and Second, is donating proceeds of the film showing to the ballet company.

GLENN KUSWA (5244), T. J. WILLIAMS (2312), BILL BOVERIE (1353), and DON SCHROEDER (2648).

Supervisory Appointments

BILL BOVERIE to supervisor of Systems Research Division III, 1353, effective Jan. 1. Since joining the Labs seven years ago, Bill has performed system studies on anti-ballistic missiles and, more recently, on foreign weapon systems. Responsibilities in his new position will be a continuation of the latter. Before coming to Sandia, Bill worked with Westinghouse, Raytheon and Texas Instruments.

He earned his BS from Texas Tech, MS from the University of Maryland, and PhD—all in EE—from the University of Texas. Bill is a deacon in his church, and the leisure-time activity he enjoys most is backpacking. Bill, his wife Johnnie, and their three children live at 1605 George NE.

* * *

GLENN KUSWA to supervisor of Electron Beam Research Division 5244, effective Dec. 1. He joined Sandia in March 1970 as a staff member in a physics group doing research on plasmas and ion acceleration. In addition, Glenn also developed several holography systems. He later transferred to the E-Beam Research Division.

Glenn has just returned from a two-and-a-half-year leave of absence in Washington, D.C., at ERDA Headquarters. He worked in DMA's Division of Laser Fusion. Glenn earned BS, MS and PhD degrees in plasma physics from the University of Wisconsin. He is a member of the American Physical Society and the American Association for the Advancement of Science. Glenn's hobbies include photography and woodworking and he enjoys any outdoor activity, particularly hiking and skiing. He and his wife Patty have two children and live at 7538 Bear Canyon NE.

DON SCHROEDER to supervisor of Electronic Design Division 2648, effective Dec. 1. Don joined the Labs in June 1965 under the Technical Development Program. Until 1968 he worked with a manufacturing and development group whose major program was the development of the Vela satellite. For the next three years Don was assigned to a group working on the development of thin film hybrid microcircuits. During 1971-72 he attended UNM under Sandia's Doctoral Study Program. Upon his return to the Labs, Don worked in the magnetic bubble memory program and, most recently, has been concerned with Data-Link, a fiber-optic communications system.

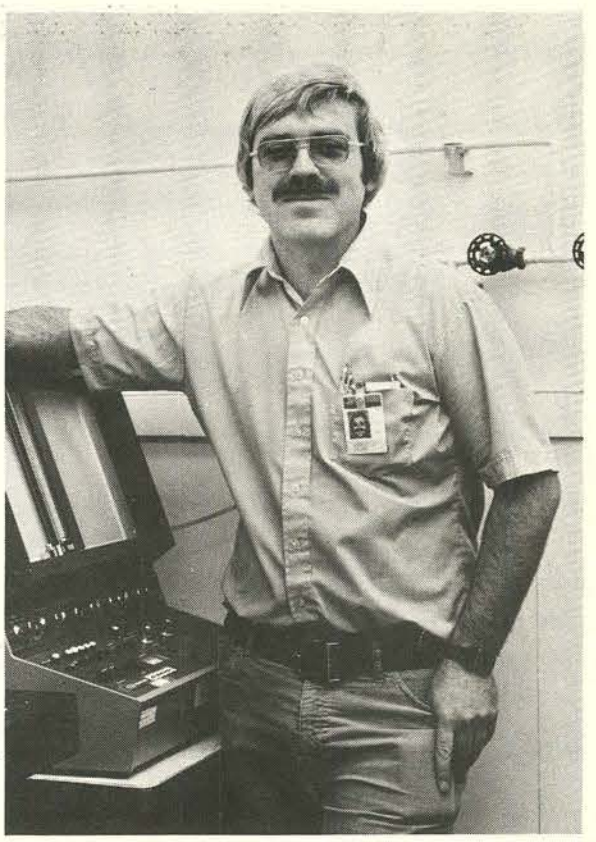
He received his BS degree from the University of Nebraska and his MS and PhD—all in EE—from UNM. He is a member of IEEE. Don enjoys river running, camping and hiking, and is president of the C-Club Ski Club. He is also active in the budding C-Club tennis group.

Don and his wife Miriam have a four-year-old daughter and a son (born Nov. 15). They live at 4101 Dietz Ct. NW.

* * *

BOB EAGAN to supervisor of Ceramics Development Division I, 5845, effective Jan. 1. Since coming to Sandia in June 1971, Bob's work has been in ceramics, primarily in the development and characterization of glass ceramic materials. The principal use of these materials has been in making hermetic seals for vacuum tubes.

Bob earned BS and PhD degrees in ceramic engineering from Alfred University and the University of Illinois, respectively. He is a member of the American Ceramic Society and the Institute of Ceramic Engineers. Bob and



BOB EAGAN (5845)

his wife Judy have had only one hobby for the past two years—building their own home in Cedar Crest. They have lived in the house for about a year. Bob still has some finishing work to do on the house, and then he plans to try his woodworking skills at furniture making.

* * *

T.J. WILLIAMS to supervisor of Firing Subsystems Division I, 2312, effective Jan. 1. T.J., a native of Albuquerque, joined Sandia in February 1955. For the next nine years, he worked with a components group as a tube engineer and section supervisor. He then transferred to a radar tubes division and, for the past seven years, has been a firing set engineer.

He earned his BS in EE from UNM and, under Sandia's Educational Aids Program, he received his MS in EE from UNM in 1962. T. J. served two years in the Army as a radar instructor at Aberdeen Proving Grounds. He is a registered professional engineer in New Mexico.

T. J.'s off-the-job activities include fly fishing, backpacking and hiking. He and his wife Carolyn have three children and all three are attending college—two daughters at New Mexico State and a son at UNM. The Williams' live at 1519 Eastridge Ct. NE.

Credit Union Meeting

Annual Meeting, the 29th, of the Credit Union is slated for Thursday, Jan. 20, at the Coronado Club. At the meeting, which starts at 5 pm, four board members and two credit committee members will be elected. Refreshments will be served and door prizes distributed. First prize in the drawing is a $500 share deposit; two $250 share deposits will also be awarded.

Cheap Energy: Composites May Offer Economy

Economy and new energy sources are sometimes at odds with each other, and energy research frequently consists of looking for ways to take advantage of the energy source more economically. Here at the Labs, low cost composites made of wood, paper, aluminum and fiberglass are producing encouraging results in tests that show these materials can compete in certain applications with more expensive high-performance composites.

The tests involve materials to be used in constructing parabolic solar reflectors that can last at least 20 years. A search is also underway to identify low-cost composites for use in vertical axis wind turbines.

Sandia already has built and fielded 600 square metres of parabolic solar reflectors that use plywood on curved beams to collect the sun's energy. The trough-shaped reflectors focus the sun's rays onto an axially aligned receiver tube that carries a heat exchange fluid. The plan is to add reflector arrays to the system made from lower-cost composite materials.

To this end, researchers are working to develop and understand low-cost composite structures that will survive in environments of wind, moisture, salt concentrations, hail and cold. Cost is a vital factor because solar collectors cover a large area and constitute a large part of the cost of any solar system.

Barry Butler of Composite Materials Development Division 5844 reports that low-cost composites have survived severe environments, and it appears the materials may meet the long-term requirements for solar reflectors.

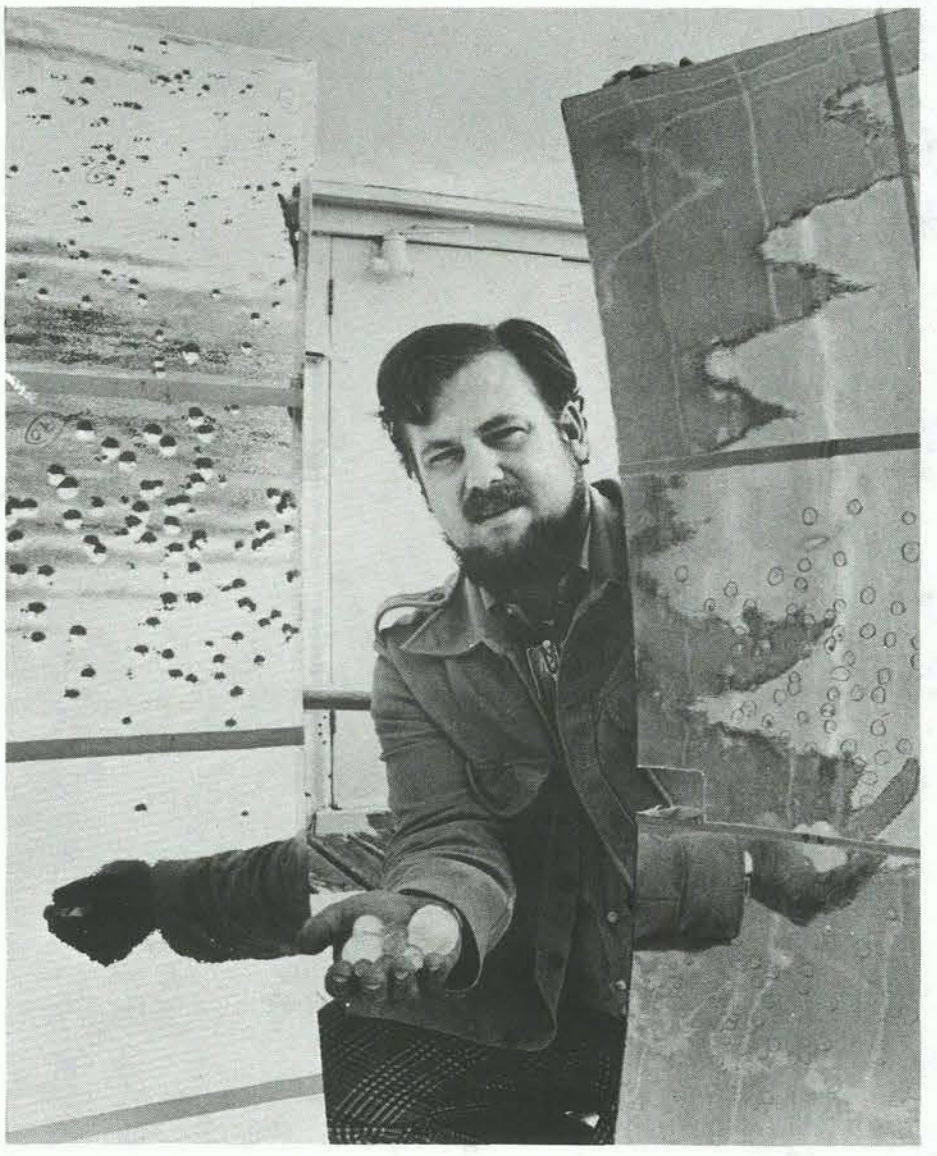
He also believes the use of low-cost composites in such reflectors could make the concentrating systems cost-competitive with flat-plate systems. Parabolic solar collectors are similar in efficiency to flat plates but generate higher temperatures in the working fluids.

Barry says that Sandia studies to date have centered upon materials easily available to homeowners and upon building units similar to those in the Sandia test facility. Materials being considered include resin-impregnated paper or laminated plywood, as well as fiberglass and aluminum.

High-strength paper honeycomb structures or plywood structures offer an ecological advantage over fiberglass, which requires petroleum-base resins.

A necessary characteristic for the trough reflectors is stiffness. The reflectors must not change their shape because the efficiency of the system is reduced if the sun's rays are not properly focused. It now appears that low-cost composites can be made with considerable shape stability.

In moisture tests fiberglass, as expected, performs well, but Sandia researchers have learned that the performance of less-expensive paper and plywood composites can be greatly improved by adding moisture-barrier coatings. Hail damage on reflector structures and mirror materials is being evaluated. In tests using free-falling ice balls, fiberglass and paper honeycomb materials display considerable resistance to damage.



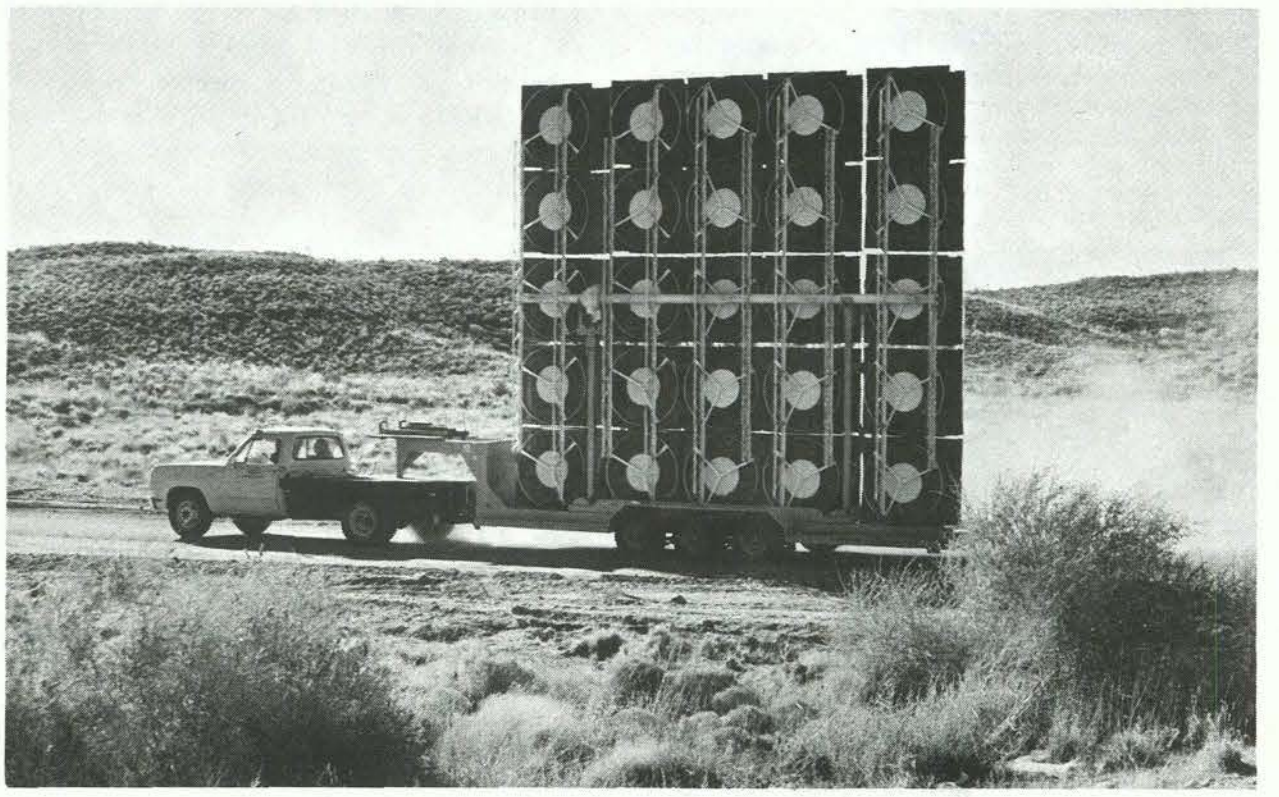
TEST RESULTS: Barry Butler (5844) holds ice balls — up to 4 cm in diameter — used in environmental tests of parabolic solar reflectors. Aluminum-skin, aluminum-honeycomb core sandwich reflector at left shows extensive damage from the hail-simulation test, while the fiberglass-skin and core reflector at right suffered much less damage (impact points circled in order to be readily noticeable).

Another goal of the Sandia work is to identify the lightest materials for use in reflector arrays. Such materials reduce the cost of the reflector support and tracking structures which keep the troughs aimed at the sun.

"Putting all these characteristics of composites together in the best possible way is the aim," Barry says. "If work continues to progress, we estimate fabricated cost of $1.50 per pound of material used throughout the array." Current costs are about four times higher.

Higher cost composites, such as Kevlar or graphite fibers in a resin matrix, can be used when the application justifies the expense. "Model studies on a two-metre vertical axis wind turbine have given us data on plywood blade performance. Plywood appears to be quite satisfactory for forming airfoil-shaped blades up to 4½ metres in diameter," Barry says. "But once beyond that size wood becomes less attractive, and the higher-cost, high-performance materials are needed.

"However, we're working to test the feasibility of using low-cost composites in the larger vertical axis wind turbines. At the moment, though, we're not sure whether we can make their use cost-effective. The answer will take more testing."



THE HELIOSTATS ARE MOVING from the Martin-Marietta assembly area in KAFB-West to the Solar Site in Area Y. Here we see two of the 6.4 by 6.7m (21 by 22 feet) units, each weighing 1530 kg (3400 lbs.), on a detour necessary to miss electrical lines near the KAFB golf course.

SENATOR Pete Domenici addressed Sandians in this colloquium gathering last week. His topics included discussion of committee assignments in the upcoming congressional session and the federal budget over the next years. He reported that New Mexicans rank crime as the state's principal problem, according to a survey conducted by the Senator.

BILL FIENNING (1751) and DUANE DeWERFF (2136) portray Merlin and Sir Dinadan in ACLOA's production of Camelot, opening at Popejoy Hall tomorrow night. Performances will be Dec. 25-26, 29-31, and Jan. 1-2, with matinees only on the 26th and 2nd. For reservations call 883-1080 or 277-3121.

THE MINUTE MAN award is presented to Morgan Sparks by Francine Neff, Treasurer of the United States, in recognition of his work as chairman of the Albuquerque Savings Bond campaign during 1976. Mrs. Neff hails from New Mexico. Her signature appears on all currency.

feedback

To get a response to your comments and questions about Sandia Labs, complete a Feedback form [available near bulletin boards] and return it to the Feedback administrator. The substance of questions and responses of wide interest is published in LAB NEWS.

Q. If we're trying to reduce paper work, isn't it illogical that we now have twice as many time cards to fill out?

A. We share your concern regarding an increase in the number of time cards used at the Laboratories. However, the change to weekly time reporting has several benefits which offset the increased number of cards. The change will (1) eliminate the frequent need for requesting time cards prior to the end of the reporting period, (2) reduce the need for corrected time cards, (3) enable using computer facilities for weekend processing to meet increasingly early ERDA reporting requirements, and (4) decrease clerical and keypunch effort expended in processing the simplified cards.

C.R. Barncord - 3200

Q. In my opinion the self nomination procedure for staff members seeking a new job assignment lacks an important ingredient. Talking to a recording is disconcerting enough, but not knowing if your message was ever recorded and subsequently processed by the appropriate human being is unacceptable. Perhaps the present procedure is cost effective, but is it really too much to ask that an oral or written acknowledgement be made?

A. Your Feedback suggesting a written or oral acknowledgement to employees who have nominated themselves for job vacancies was considered prior to starting the program and also reconsidered after your inquiry.

The Personnel Manual suggests that the supervisor with the vacancy phone or personally contact each candidate who has nominated himself/herself for a vacancy.

An average of five nominations was received for each vacancy posted during the period July 1 through September 30, 1976. The total number of nominations was 717. Due to the volume of self-nominations, management continues to support the procedure that the selecting supervisor contact each candidate as outlined in the Personnel Manual.

R.J. Edelman - 4200

Q. For future Family Days would it be possible to hold the event both Saturday and Sunday? Since this is an infrequent event, families are very interested in visiting the Labs. A great number of people toured Sandia on Saturday and there were several long lines waiting to view exhibits.

A. Thank you for your suggestion concerning the next Family Day. The Family Day Steering Committee is in the process of reviewing details of Family Day '76, and the coordinator will prepare a final report which will be a key element in planning the next event. Your suggestion will be passed along to the committee for consideration.

Some thought was given to the two-day idea this time, but the committee settled on the Saturday-only plan because of the factors you mentioned, mainly cost. Four or five years from now the situation may have changed sufficiently to warrant a different decision.

K.A. Smith - 3100

Speakers

R.A. Langley (5111), "Implantation Studies of Candidate First-Wall Materials for Fusion Reactors," Physics Dept., Georgia Tech, Nov. 4, Atlanta.

C.E. Land (5133), "Some Imprssions of the USSR as a Guest of the Soviet Academy of Science," invited talk, Los Alamos Section IEEE meeting, Nov. 10, Los Alamos.

J.J. Ramirez and K.R. Prestwich (both 5246), "REBLE, A Radially Converging Electron Beam Accelerator"; R.S. Clark and K.R. Prestwich (both 5246), "LILI, A 0.5-1.5 μs, 600 kV Electron Beam Accelerator"; J.P. VanDevender (5245), "Short Pulse Electrical Breakdown Strength of Water"; C.W. Mendel, S.A. Goldstein and P.A. Miller (all 5242), "The Plasma Erosion Switch"; T.H. Martin (5245), "Pulsed Power for Fusion"; D.L. Johnson (5245), "Initial PROTO II Pulsed Power Tests"; E.C. Cnare (5233), "Terawatt Pulse Power Systems Utilizing Inductive Storage"; J.P. Quintenz and J.W. Poukey (both 5241), "Space Charge Flow in a Non-cylindrically Symmetric Diode," IEEE International Pulsed Power Conference, Nov. 9-11, Lubbock, Texas.

G.B. Krefft (5112), "Radiation Effects in Ion-Bombarded Al_2O_3 and MgO"; J.D. Keck (2521) and I.J. Fritz (5132), "Optimizing Ferroelectric Compositions for Pulsed Power Supplies"; P.D. Wilcox and C.S. Snow (both 2521), "A Ceramic-Metal Seal Applied to Flat Packs for Resonators"; Snow and Wilcox, "A ZrO_2-Pt Seal with Oxygen Probe Applications"; R.H. Dungan (2521) and J. Matsko (9572), "Ferroelectric Ceramic Processing"; G.W. Arnold (5112) and J.A. Borders (5111), "Nucleation and Crystallization of Ion-Implanted Glass"; C.A. Hall (2521), "Engineering Ceramic Capacitors for Weapon Components," Ceramic Materials Symposium, Nov. 12, Los Alamos.

J.A. Borders (5111), et. al., "Formation of Metastable and Non-Crystalline Phases by Ion Implantation in Metals," Annual meeting of the Materials Research Society, Nov. 15-17, Cambridge, Mass.

D.M. Mattox (5834), "Thin Films in Solar Energy Utilization — A Perspective," Symposium on Thin Film Research for Solar Energy, Nov. 1-3, Pacific Grove, Calif.

T.I. Chappell (2142), "A Silicon Sensor for High Intensity Solar Flux Mapping"; M.W. Edenburn (5719) and G.R. Case (2142), "Computer Simulation of Photovoltaic Systems"; D.G. Schueler and B.W. Marshall (both 5719), "Status of the ERDA Photovoltaic Systems Definition Project"; J.G. Fossum (2141) and E.L. Burgess (5133), "Silicon Solar Cell Development for Concentrated Sunlight, High Temperature Applications"; E.L. Burgess (5133) and M.W. Edenburn (5719), "One Kilowatt Photovoltaic Subsystem Using Fresnel Lens Concentrator," 12th Photovoltaic Specialists Conference, Nov. 15-18, Baton Rouge, La.

J.H. Renkin (5231), "Minimization of Neutron-Absorber Effects in Pulsed-Neutron Uranium Logging"; D.H. Jensen (2355), "Prompt Fission Neutron Assay of Uranium Boreholes"; H.C. Hardee and R.H. Nilson (both 1283), "Heat Transfer Regimes in Generating Porous Media"; Hardee and Nilson, "Prediction of Dryout in a Porous Bed of Fuel Debris"; C.H. Karnes and R.H. Marion (both 5847), "Characterization of Graphite Matrix Pulsed Reactor Fuels"; P.E. McGrath (5413), "Assessment of Consequences from Airborne Releases of Radioactive Material"; S.A. Dupree (5231) and H.J. Rack (5832), "Radiation Shields foran LMFBR Spent Fuel Shipment Cask"; R.E. Nickell (5431), "Spent Fuel Shipping Cask Containment and Accident Impact Limiters"; C. Arnold (5811) and R.B. Pope (5431), "Preliminary Evaluation of Organics as Coolants for LMFBR Spent Fuel Shipping," International Conference of the American Nuclear Society, Nov. 15-19, Washington, D.C.

M.A. Sweeney (5241), "Double-Shell Targets at Low Electron-Beam Power"; Sweeney and M.M. Widner (both 5241), "A Shock Focusing Particle-Beam-Fusion Target"; E.J.T. Burns (5244), "X-Ray Line Spectra From an Imploding Liner"; C.L. Olson (5241), J.P. VanDevender (5245), J.S. Pearlman, A. Owyoung (both 5214), and P.R. Johnson (5244), "Experiments on the Ionization Front Accelerator"; C.L. Olson (5241), "Collective Ion Acceleration With Net Space Charge and Applications to Heavy Ion Fusion"; J.E. Boers and R.J. Walko (both 2352), "Computer Simulation of Ion Beam Optics Utilizing Self-Consistent Computations to Match Space-Charge Limited Emission to Experimentally Determined Plasma Ion Current Densities";

G. Yonas (5240), "Development of a Fusion Ignition Source Using Intense Particle Beams"; L. Baker, J.R. Freeman (both 5241), and S.L. Thompson (5166), "Magnetic Effects in Particle-Beam-Imploded Fusion Targets"; D.P. Bacon (5242), J.P. VanDevender (5245) and J.W. Poukey (5241), "Beam Pinching Studies in Low Pressure Regimes"; K.R. Prestwich and J.J. Ramirez (both 5246), "A Radial Converging E-Beam for Laser Excitation"; Ramirez and Prestwich, "An Intense Source of 14 MeV Neutrons"; G.R. Hadley (5241), "Fluid Modeling of High Aspect Ratio Diodes"; S.L. Shope (5246) and A.J. Toepfer (5242), "Magnetic Insulation Experiments on the Hydra Accelerator"; M.T. Buttram, R.S. Clark and K.R. Prestwich (all 5246), "Generation of a 600 kV, 5 to 14 kJ, 0.5 to 1.5 μs Electron Beam";

M.M. Widner, J.W. Poukey (both 5241), and J.A. Halbleib (5231), "Enhanced REB Deposition Resulting from Magnetic and Electric Fields"; D.H. McDaniel; E.L. Neau (both 5245) and K.D. Bergeron (5241) "Effects of Magnetic Field on Vacuum Insulator Surface Flashover"; J.P. VanDevender, D.H. McDaniel (both 5245) and J.W. Poukey (5241), "Studies of Magnetic Insulation in the Range of 2 to 10 MV"; R.A. Gerber and E.L. Patterson (both 5212), "Electron Energy Deposition in Transverse Geometry for HF Laser Excitation"; A.J. Toepfer, L.W. Kruse, R.J. Leeper, L.P. Mix (all 5242) and M.J. Clauser (5241), "Neutron Production from Electron Beam Irradiated Solid Targets"; J.S. Pearlman (5214), "Resonance Absorption and Its Effects on Thermal Conductivity," "Evaluation of Picosecond Ionization Rate Processes in Laser Produced Plasmas," "Radiofrequency Emission of Laser-Produced Plasmas," and "Mechanisms of Polarization Dependent Thermal Conductivity"; R.J. Leeper, L.W. Kruse (both 5242) and J.J. Ramirez (5246), "Neutron Diagnostic System for Particle Beam Fusion Experiments"; S.A. Goldstein, P.A. Miller and C.W. Mendel (all 5242), "Electron Beam Pinch Experiments on the Proto I Accelerator"; Mendel, Goldstein and Miller, "Moving Plasma Sheaths and Fast Opening Switches";

J.R. Freeman, M.J. Clauser (both 5241) and S.L. Thompson (5166), "Fuel-Pusher Interface Instabilities in Electron Beam Fusion Targets"; P.A. Miller (5242), "Ion Beam Focusing Experiments"; L.P. Mix (5242), "Measurements of the Energy Deposited in Electron Beam Fusion Targets"; K.D. Bergeron (5241), "Theory of Secondary Electron Avalanche in Vacuum Flashover of Insulators"; J. Chang (5242) and K.W. Dolan (8344), "X-Ray Imaging Devices for REB Driven Pellet Implosion Studies"; F.C. Perry (5242), "Energy Deposition by an Intense Relativistic Electron Beam From Dynamic Response Measurements"; J.W. Poukey and C.L. Olson (both 5241), "Numerical Simulation of the Ionization Front Accelerator"; T.P. Wright (5241), P.A. Miller (5242) and M.M. Widner (5241), "Effects of Cathode and Anode Surface Perturbations on Diode Pinch Structure"; J.P. Quintenz and J.W. Poukey (both 5241), "Computer Studies of Large Aspect Ratio Diodes," 1976 Annual meeting of the Division of Plasma Physics of the American Physical Society, Nov. 15-19, San Francisco.

J.R. Wayland (5413), "Theoretical Approach to the Effect of Extremely Low Frequency Electromagnetic Field on Physarum Polycephalum," Texas A&M University, Industrial Research Dept., Biomathematic Div., Nov. 16, College Station.

G.A. Carlson and W.H. Sullivan (both 5423), "Ultrasonic Thermometry in Fast Reactor Safety Research," ASTM E-20.6 Committee on Acoustic Thermometry, Nov. 17, Denver.

G.L. Simmons (5120) and J.A. Davis (5121), "Optimal Experimental Designs for the Method of Paired Comparisons," AMS meeting, Nov. 19-20, Albuquerque.

R.L. Fox (5261), "Mean Value Closure of the Turbulent Multipoint Distribution Function Hierarchy"; R.R. Eaton and R.L. Fox (both 5261), "Flow of Condensing Fluids Through Regions of Extreme Curvature"; J.C. Cummings (5262), "Second-Sound Shock Waves in Superfluid Helium," 29th annual meeting of the Division of Fluid Dynamics, American Physical Society, Nov. 21-24, Eugene, Ore.

F.N. Coppage (4312), "Radiation Effects Technology," Seminar on Electronic Nuclear Radiation Environment, Nov. 17, Bedford, Mass.

A.G. McGuckin (3250), "Microfilm-Microfiche Tools for Management," 12th Annual N.M. Accounting and Management Seminar, Nov. 19, Albuquerque.

J.G. Curro (5813), "Hydrogenation of Phenyl Propargyle Ether," JOWOG 28 AVIS 091 meeting, Nov. 22-23, BKC.

P.H. Holloway and G.C. Nelson (both 5825), "Spectroscopic Analysis of Deactivation Mechanisms of Cobalt Molybdate Catalysts," AICHE 60th annual meeting, Nov. 28-Dec. 2, Chicago.

R.K. Quinn (2516) and H.T. Weaver (2354), "Magnetic Susceptibility and Nuclear Resonance Studies in Rare Earth Intermetallic Compounds," invited paper at Symposium on Magnetic Resonance in Chemistry, Dec. 1-3, Ft. Worth, Texas.

L.D. Bertholf (5162), "Two-Dimensional Stress Wave Calculations on Kinetic Energy Projectile Impact on Multi-Layered Targets," Workshop on Mechanics of Impact and Penetration, Dec. 2-3, Aberdeen, Md.

J.M. Hoffman (5212), G.J. Lockwood (5232) and G.H. Miller (5216), "Charge Transfer and Emission Cross Sections in CO"; ' Lockwood, Miller and Hoffman, "Electron Capture by He+ and H+ in Atomic and Molecular Hydrogen"; Miller, Hoffman and Lockwood, "Charge-Transfer Excitation of N_2+" Division of Electron & Atomic Physics Meeting of the American Physical Society, Dec. 6-8, Lincoln, Neb.

J.G. Fossum (2144) and D.G. Schueler (5719), invited paper, "Design Optimization of Silicon Solar Cells for Concentrated-Sunlight, High-Temperature Applications"; E.P. EerNisse (5133), "Viscous Flow of Thermally Grown SiO_2 at Device Processing Temperatures"; R.A. Kiehl (5133), "Improvement of TRAPATT Performance with Optically Generated Carriers," Electron Device Meeting, Dec. 6-8, Washington, D.C.

E.P. EerNisse (5133), "Viscous Flow of Thermally Grown SiO_2 at Device Processing Temperatures," 1976 Silicon Interface Specialists Conference, Dec. 9-11, Baton Rouge, La.

R.C. Hughes (5814), "When is an Insulator Not an Insulator? Electronic Properties of Quartz and Glass," Special Colloquium in connection with the Formal Dedication of the Sherman Fairchild Laboratory for Solid State Studies at Lehigh University, Dec. 9, Bethlehem, Pa.

G.W. Hughes (1243), "Astronomy," Nov. 5, Sandia Civitan Club, Albuquerque.

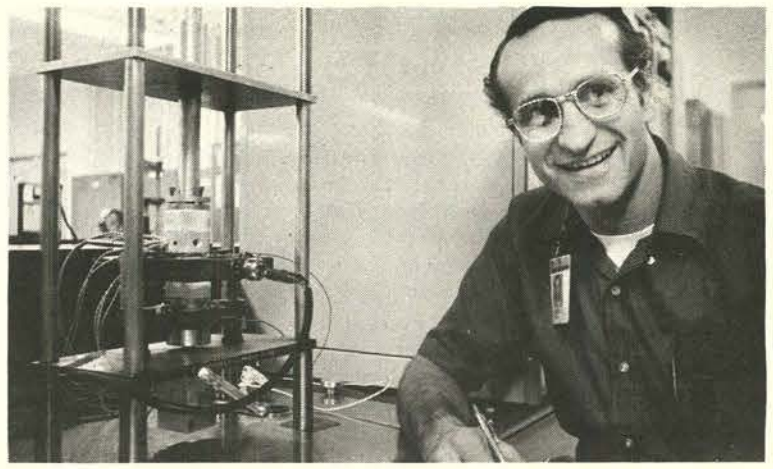
QUESTION: What's the quickest way to get snow out of a rifle barrel? Answer: Pull the trigger. Unfortunately, the quick method has some undesirable side effects, as Jay Holton (9742) can testify. While elk hunting in northern New Mexico on Nov. 28, he apparently brushed the end of his 30-06 Enfield's barrel in the snow while reloading. On his next shot, the pressure reached an estimated 120,000 psi (rather than the usual 55,000 psi) with the result shown. Jay was left holding the stock; the barrel traveled some five feet into the snow. He was lucky twice: he was only scratched during the explosion; and two days later he got his elk (needless to say, with another rifle).

MILEPOSTS

LAB NEWS

DECEMBER 1976

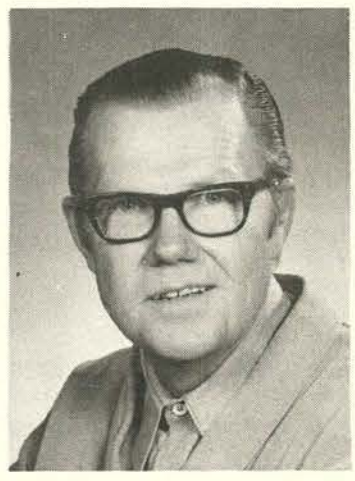
Lessie Lee - 5241 20



Sam Levy - 2523 15

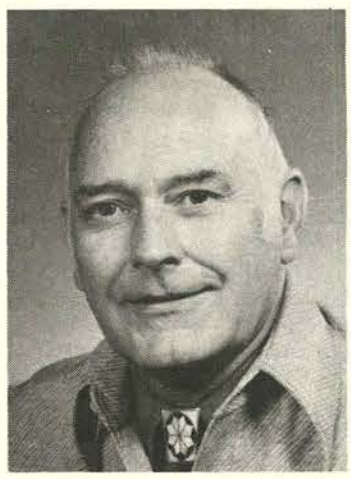
Angie Rivera - 9631 25

Marv Glaze - 8260 25



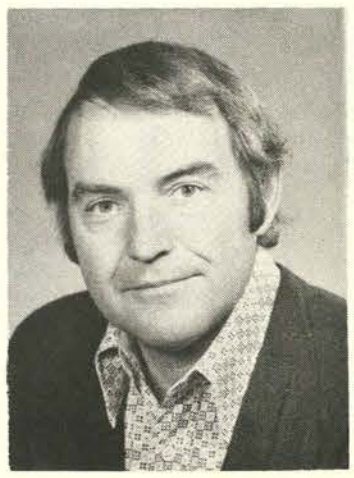
Arthur Bacon - 3614 25

Alyce Loveless - 8424 20

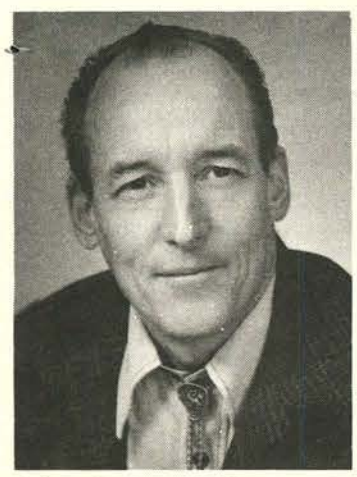


Bob Mottern - 9351 25

Bernard Kenna - 5824 15

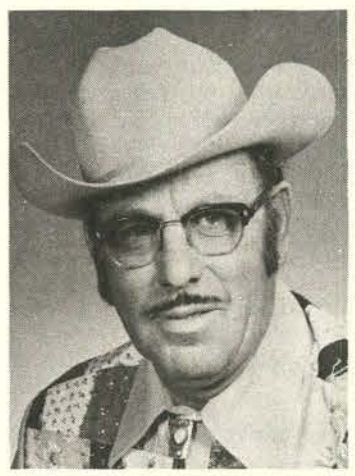


Dick Baughman - 5154 15

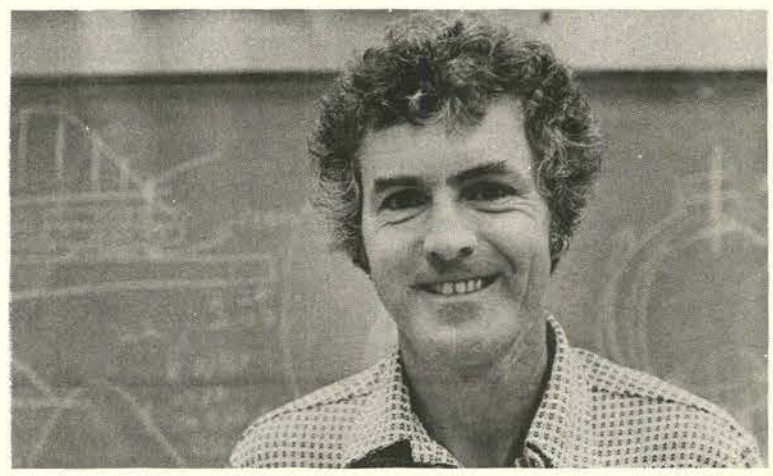


Robert Burton - 1132 25

Juanita Mansfield - 8325 10

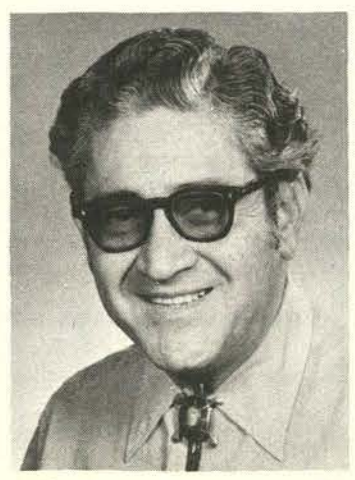


Orlando Sanchez - 9712 25

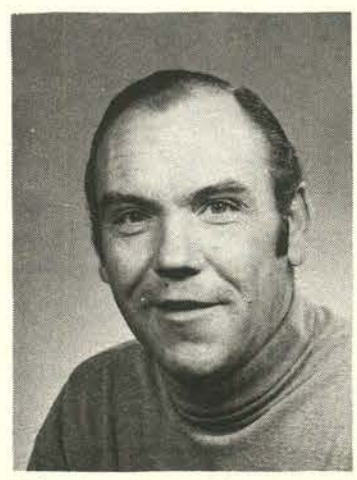


Dick Spalding - 1244 15

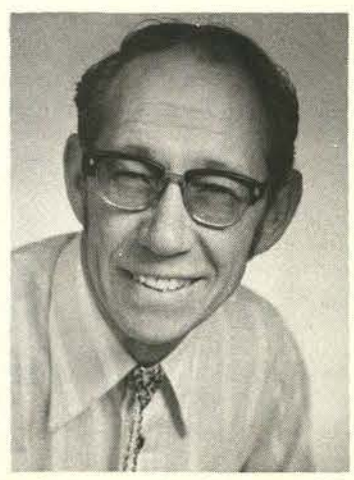
Derrell Dollahon - 3714 20



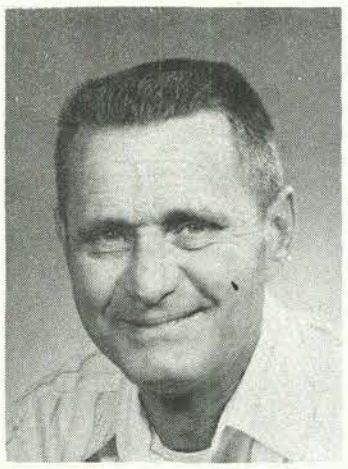
Arthur Troum - 3145 25



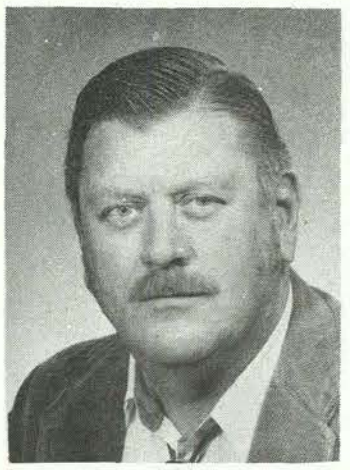
John Smatana - 5834 20



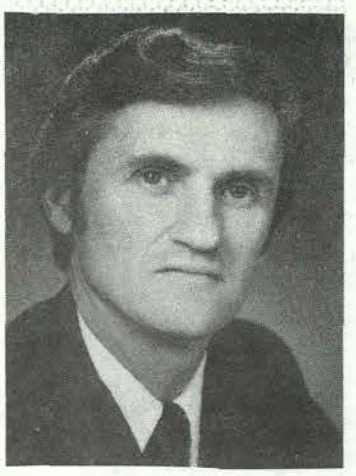
Dale Irving - 8413 25



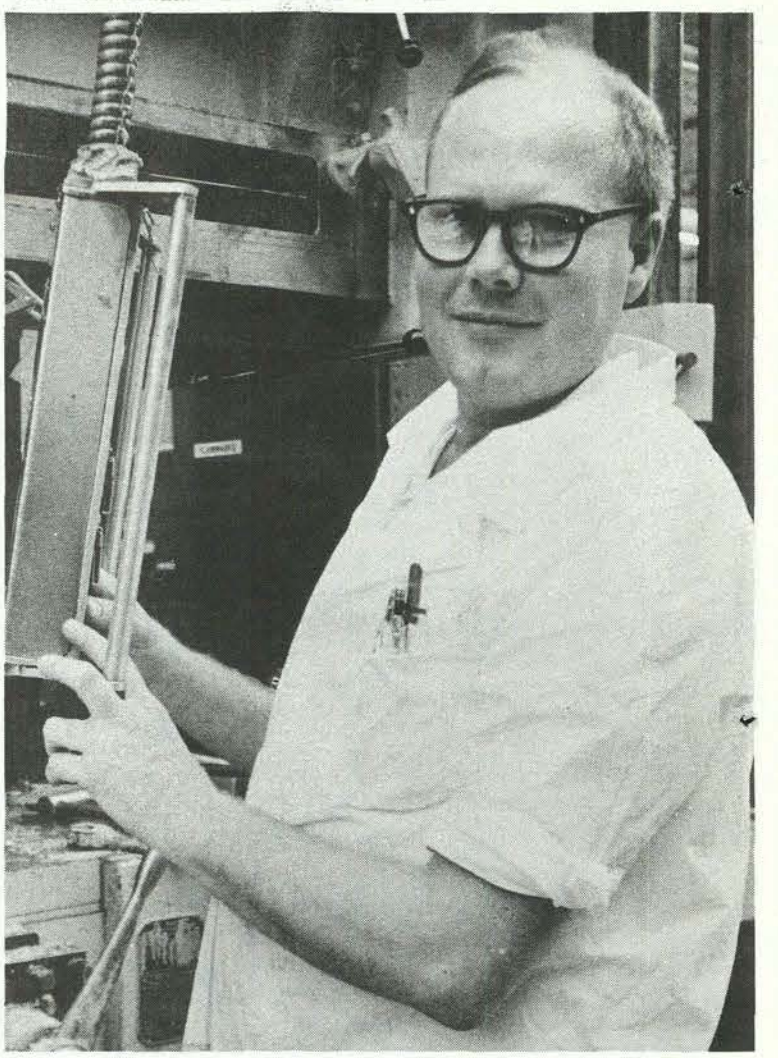
Jack Labrier - 9753 25



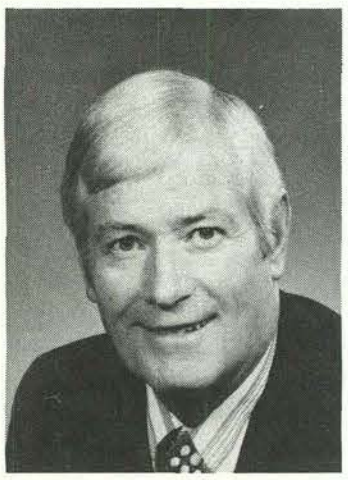
George Stohner - 3241 20



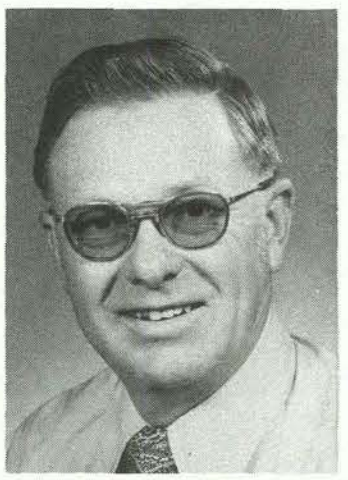
George Perkins - 8213 20



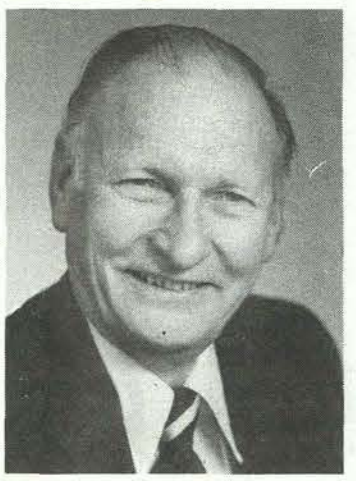
Glen Heston -3646 10



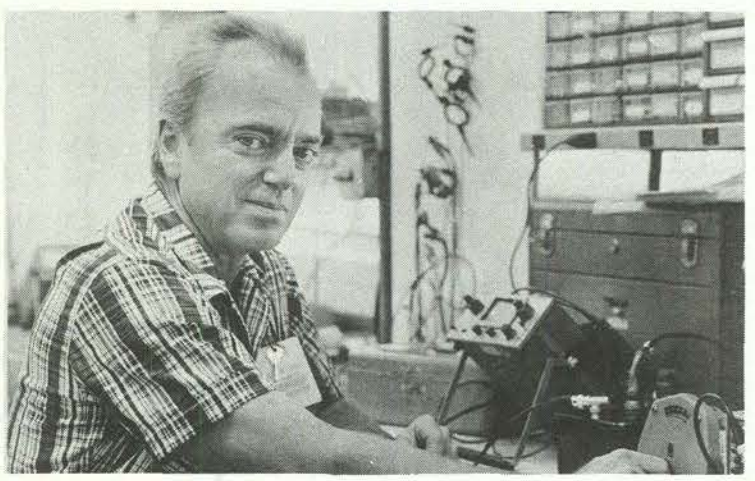
Joel Landrum - 1100 20



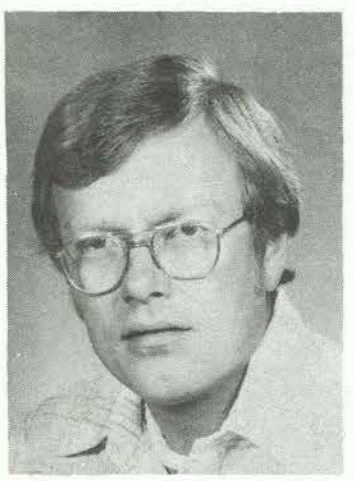
Melvin Johnson - 9335 20



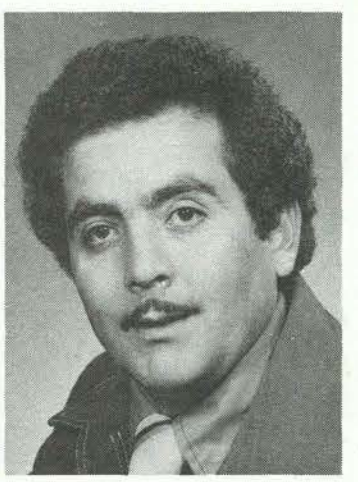
Chandler Smith - 8264 20



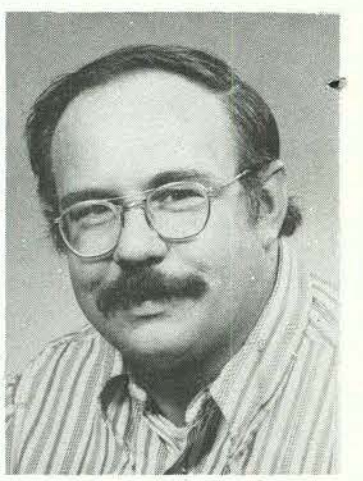
Henry Cole - 1734 20



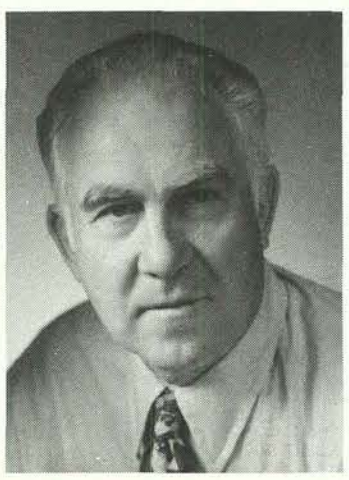
Wayne Vine - 5833 10



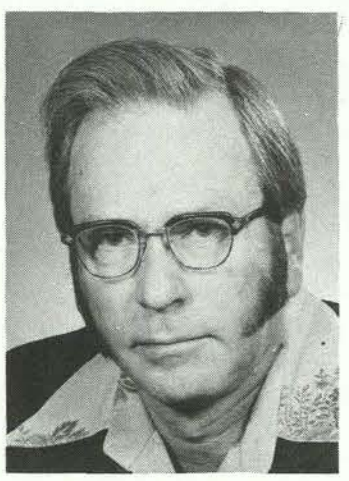
Profeso Padilla - 3735 10



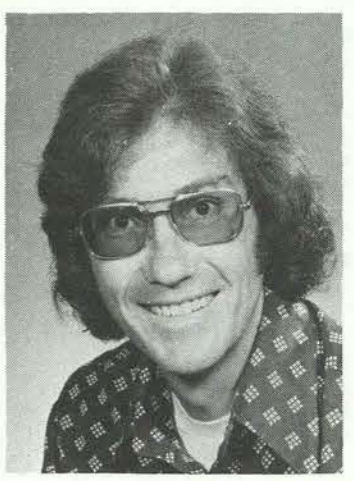
Lawrence Kiefer - 9341 15



Val Black - 8333 30

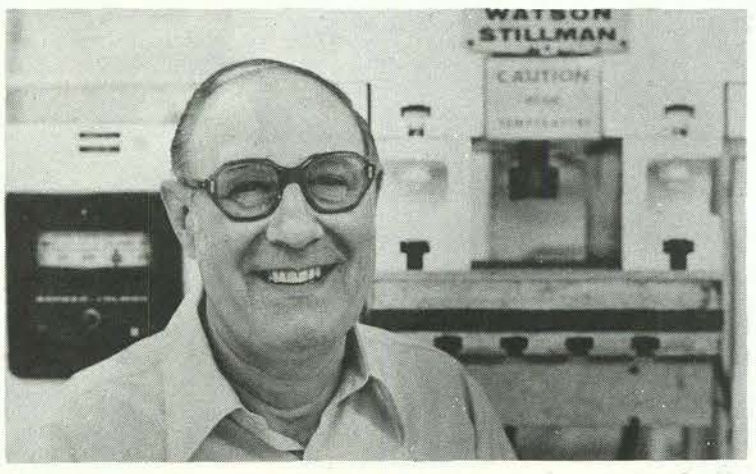


William Nielsen - 2136 25

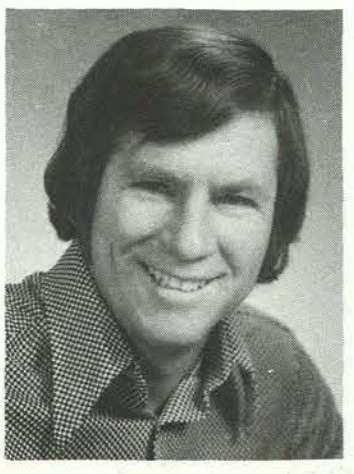


Joe Harris - 1112 10

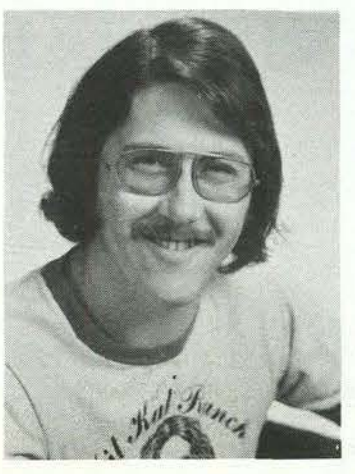
Connie Souza - 3145 10



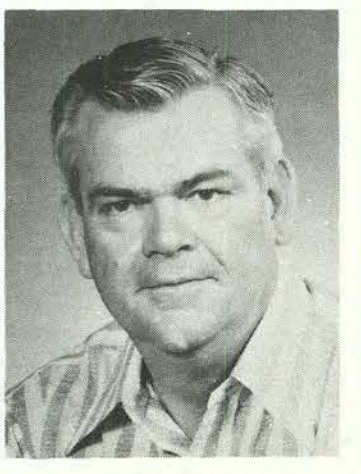
George Mancuso - 3623 25



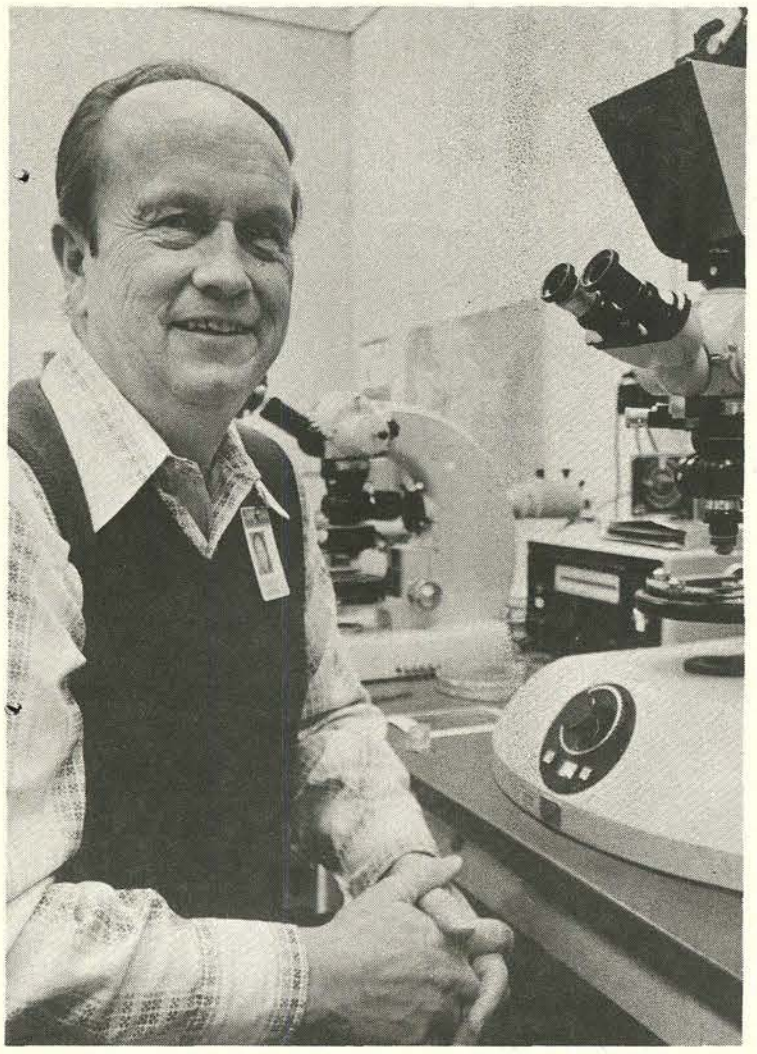
Ron Allen - 8256 15



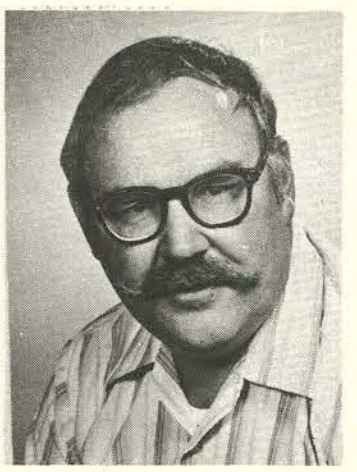
Roger Bouscal - 8257 10



Donald Jones - 9515 20



Floyd Ganyard - 2151 10



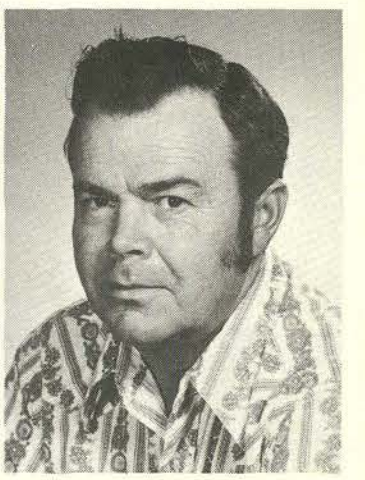
Earl Rush - 9742 10

Doyle Earnest - 9713 15

Ruth Scates - 9626 20

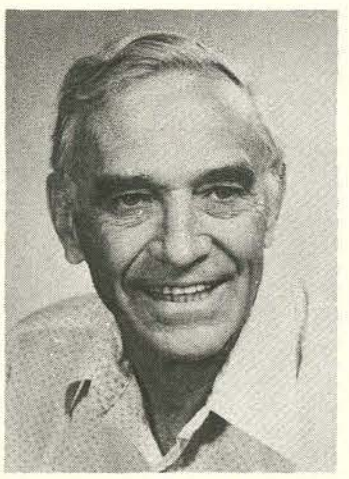
Oran May - 9583 20

Robert Vokes - 2633 20

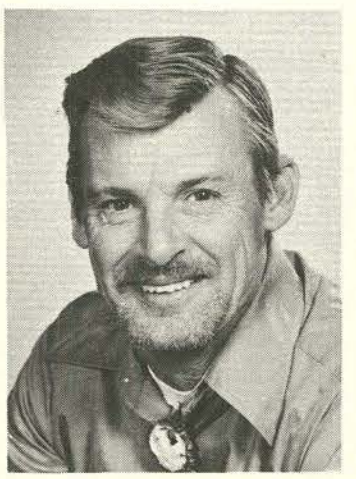


Jim Reid - 1712 20

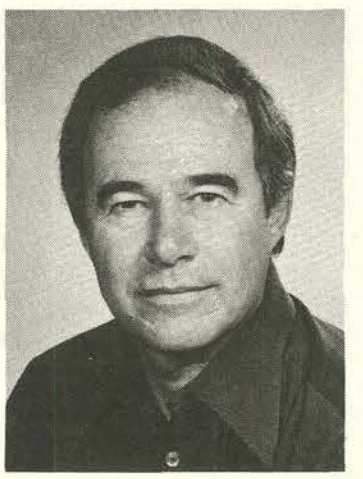
Richard Eifert - 5735 20



Ray McVeety - 5735 20

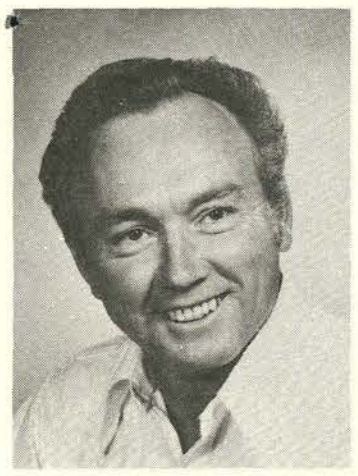


Leonard Hitchcock - 9514 20



Dwayne Bennett - 1331 20

Jim Taggart - 1714 20



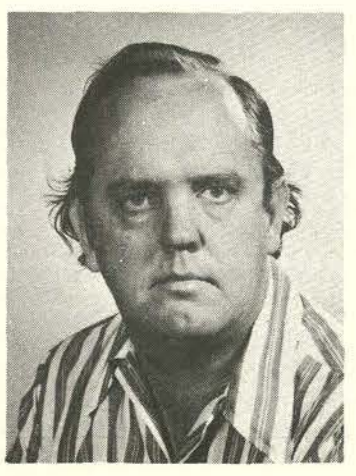
Lloyd Faucett - 5735 20

Lew Faw - 3646 20

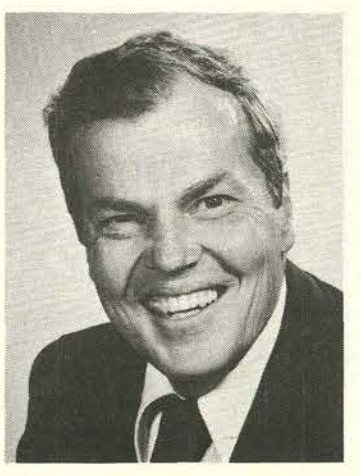
Quirino Carrillo - 9581 20

Gene Bates - 3532 15

George Chapman - 9753 25

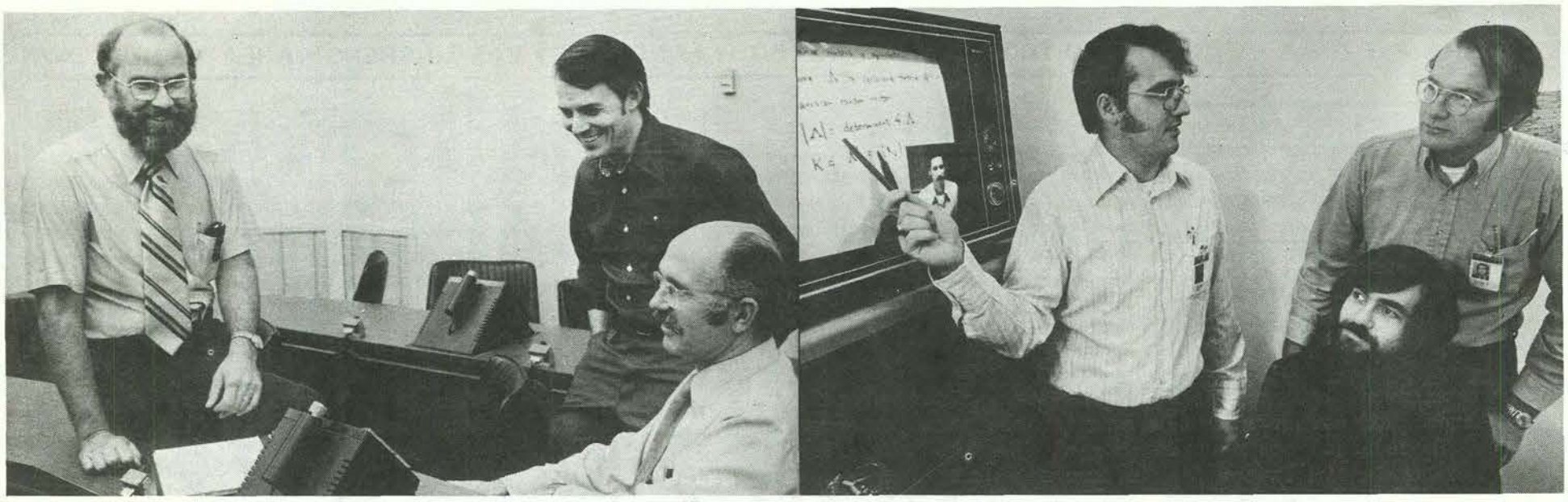


David Williams - 5422 10



Chris Dalton - 1321 20

Andy Fuller - 3531 20



STANFORD's Ken Down, Jim Gibbons and Bob Kincheloe, at left, developed tutored videotape instruction, now in use by Sandia and Hewlett Packard. At right, tutor Tom Paez (1284) discusses equation in EE graduate course with Bryan Preas (2142, standing) and Jim Caruthers (2132). Bryan and Jim have each taken four credit courses from Stanford under this mode of instruction.

You See Some Good Things on TV Nowadays

Many of us have a private vision of hell, and for me it is to sit in a college class in thermodynamics (as I once did), wondering what that guy up front is talking about. My fellow students were as cowed as I was, and it never occurred to us to stop the teacher and insist that he better explain his subject. With each class, our collective ignorance of thermodynamics became deeper and our mood more desperate. The experience was traumatic.

But education doesn't have to be that way for difficult subjects and, on a recent trip to Sandia Livermore, I visited Stanford University to learn about a teaching technique that might work even for dumbheads in thermodynamics. Called tutored videotape instruction, the technique was enthusiastically described by its chief practitioners Jim Gibbons, Bob Kincheloe and Ken Down, all professors in Stanford's EE department.

Tutored videotape instruction is now in use at Sandia. Picture a classroom in Bldg. 632. Three or four Labs students watch a 17" TV screen on which the teacher explains some abstruse point. A student gets up, stops the video recorder, turns to another person in the room — not one of the students — and the entire group discusses the subject. They replay the videotape. More discussion until, finally, there is a sense of comprehension in the group. The recorder is turned on and the teacher's TV presentation continues.

The other person in the small group is a tutor, usually a Labs person who has already taken the course. From his own experience with the subject, he separates the easy and the difficult and serves as a discussion leader when something difficult comes up. Stanford's Gibbons explains: "The TV replay and discussion with the tutor — and each other — are the key elements. Every teacher knows that in a large class, say 20 or more students, you don't get many questions or much discussion. The fact is that most students are intimidated by a large group — they won't ask questions. But here we have a small group, usually less than 10, and a tutor whom the student probably knows. The climate is conducive to question and discussion. Even the timid souls jump in."

Learning by TV with a tutor at your elbow has compiled an impressive track record since its inception in 1973. Close watch has been kept on the performance of students from Sandia and Hewlett Packard, the other major industrial user of tutored videotape instruction. Grade point averages for these students have, on the whole, been higher than those of on-campus students in the same courses. Further, the Stanford group notes that a significant number of the industrial students come to these courses with marginal academic qualifications, so that results aren't being skewed by a preponderance of scholastic hot shots.

In his detailed report on tutored videotape instruction, Professor Gibbons concludes "TVI can be successfully extended to larger-scale applications, at least for courses in science and engineering. We believe the method can also be successfully extended to other subject areas." •js

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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

AQUARIUM: 30 ga. w/stand, pump, heater, light & many misc. supplies, $90. Naranjo, 294-7714.

AMBER Becker lighting fixture (Early American five-staff lanterns), $45; Keystone 8 mm movie camera; CO_2 handgun; drapes; area rug; bedspreads. Chandler, 296-3323.

TYPEWRITERS: Remington port. "Quiet Writer" w/case, $35; Olivetti "Editor II," elec w/service policy. Weidman, 898-0331.

6-CHANNEL mike mixer, $100; foot switch, $5. Esterly, 881-1973.

COLOR TV, RCA 24", wood cabinet, needs work; Admiral combination radio phonograph, wood cabinet, needs work. Silva, 256-3739.

ACOUSTIC 106D bass cabinet, $300; Peavey 200w bass head, $100; Epiphone guitar, $90; P.A. cabinets-with JBL's, $300. Gleicher, 294-8777.

TRUMPET w/case, music stand & accessories, $45. Rozelle, 298-0396.

100 YDS. used gold nylon carpeting, $2 a yard. Baca, 296-0369.

HORSE TRAILER, all metal, spare wheel, single axle, cattle rack, LW pu modified for hauling single horse. Houghton, 299-3386.

TYPEWRITERS: Olympia, $50; Royal, $35; 2 white/chrome kitchen chairs, $15; vinyl recliner, $25; Kodak 1A-"Pocket" bellows camera w/case, 40-50 yrs. old, $25. Mead, 299-2396.

WHIRLPOOL port. dishwasher, $70; braided rug, 5½'x7', burnt orange, $15; hanging lamps, 2 ea., $14. Watterberg, 294-6759.

PRESTO vertical broiler, 12" by 10½", $15; RCA solid state record player, needs work, $5. Tripp, 265-8640 or 266-4626.

PORTABLE stereo phonograph, Wards Airline, $35; RCA port. 8-track, AC or battery, $25; overstuffed chair, gold cotton felt, $35. Dalphin, 265-4029.

YAMAHA guitar, FG110 w/case, $100; Brinktun pool table w/balls, rack 3 cues, wall mount & assorted accessories, $100. Vigil. 298-6188.

SOLID-OX WELDER, complete, $15. Laval, 898-0518.

BUNDY FLUTE. Smith, 296-8519.

COIN COLLECTIONS: 1909-40 Lincoln head cent set (less 6 key coins); includes 1931S; misc. U.S coins, best offer. Lassiter, 298-2461.

SKI BINDINGS, Tyrolia step-in type for alpine skiing, $15. Stevens. 299-6086.

AUTO REPAIR MANUALS: Chilton's 1967-1974, $4.50; Clymers V.W. squareback & fastback, '62-'73, $3.50; Clymers. V.W. 411 & 412, '68-'74, $3.50. Roady, 264-8600.

FREE: White German Shepherd, 1 yr. old, spayed female, loves people & dogs. Forsythe, 293-6579.

GREAT DANE puppies, fawn-colored, AKC reg., show quality, sired by Kolliers Top Brass. Nelson, 869-9161.

TOY POOL TABLE complete w/balls & cues, $13. Shipley, 298-2433.

BARBELL SET, Sears, in orig. box, $15. Smith, 242-9576.

CRUTCHES, 2 sizes, & walker, $12.50 ea. Phillips, 881-2450.

MOVIE CAMERA, Keystone 8mm, 1.8 zoom lens; developing tank; film slitter; all for $40. Miller, 255-7716.

CALCULATOR, Hewlett-Packard HP 25. Fisher, 881-8072.

MOPAR 4-spd. transmission, everything from flywheel to end of trans. including Hurst super shifter, $350. Jones, 881-1918.

TRANSPORTATION

'76 HONDA CB-360T, under 2000 miles, blue, w/ accessories, $975. Maydew, 821-0102.

HONDA 90 trail bike, 2700 miles, spare gas tank, knobby tires, luggage rack, $450. Perryman, 294-7040.

BICYCLE, girls 20" $20. Shipley, 298-2433.

'70 OPEL Cadet deluxe, bronze w/off-white interior, AM-FM, below book, Make offer. Ortiz, 842-4170 or 265-1834.

'74 CAPRICE classic, lots of extras, 350 V8, AC, leather interior, vinyl top. Walter, 293-5020.

62 LINCOLN Continental classic, trade for Volkswagen bug or convertible, give or take difference. Smitha, 881-1001.

'72 FORD Courier pickup, HD bumper, tires, beefed-up suspension, additional set of good tires, $1725. Martin, 299-6768.

'71 BULTACO 250cc Trials, low mileage, street legal, $595. Dodrill, 293-3487.

'72 FORD Courier, HD bumper, CDI, steel belted radials, 43,000 miles, 25-30 mpg, $1795. Lackey, 898-6638.

'75 HUSQVARNA 360 GP dirt bike, 1 yr. old, $100 under book. Lewis, 296-7896.

'74 VEGA GT Hatchback, 4-spd., AM/FM, custom interior, 22 mpg town, 30,500 miles, $1750. Hart, 265-2221.

'74 DATSUN pickup, 29,000 miles, 8-track FM, Tackman spoked mags, carpet, 4-spd., $2850. Witten. 299-5491.

BICYCLE, 10-spd., French made, Astra Tour de France, thorn proofs, $65. Smith, 296-8519.

'75 MAVERICK, 2 dr. Sedan, blue, $200 below book. Klemm, 821-0769.

FOR RENT

PURGATORY condominium, 2 bdrs., 2 baths, kitchen, fp, fully furnished, sleeps 8, ski to and from lifts. Carson, 898-8847.

2 BDR. condominium in Ruidoso (Sierra Blanca), sleeps 6, everything furnished including daily maid service. Banks, 268-7723.

SINGLE occupancy studio apt. near Louisiana & Zuni, $95 includes utilities, new & clean. Rush, 265-5374.

WANTED

STUDENT FLUTE in good condition, Tucker, 877-1140.

BABYSITTER, irregular evenings, near U of A. Carson, 898-8847.

6" JOINTER PLANER w/motor. Silva, 898-6249 after 6.

SHOP MANUAL for '59 Ford. Roberts, 293-8726.

TYMPANIST and tympani to accompany Classics Theatre Co. production of *Julius Caesar* at Popejoy in January. Gardner, 898-3963.

LOST & FOUND

FOUND: Gibson near Yale; green duffle bag, containing clothes. Michigan plates. Hansen, 869-2716.

LOST — 3 silver keys; man's black leather glove (left hand); man's brown Rx glasses in brown leather case; ladies' Zuni turquoise inlay ring (size 5½) in plastic bag; dark grey plastic rimmed Rx sunglasses; electric watch with turquoise band "L'egant"; 10 car keys in black case; black leather gloves w/white orlon gloves inside.

FOUND — Rx black frame glasses; auto registration receipt "Serdo-Lo." LOST AND FOUND, Bldg. 832, 4-1657.

FRIDAY	SATURDAY
24—HAPPY HOUR 3:30—6:30 NO BUFFET	25—MERRY CHRISTMAS!
31—HAPPY HOUR Noon—6 NEW YEAR'S EVE PARTY 8—?	1—HAPPY NEW YEAR!
7—HAPPY HOUR ROAST BEEF BUFFET Adults $3.25 Under 12 $1.92 UP COUNTRY Singles Night—4:30	8—VARIETY NIGHT Shirley Clair Barr Storyteller ONE LITTLE INDIAN Roadrunner Cartoons Food—6 Show—7 Free to Members 30

NOW'S—the time to invite a few favorite friends to meet you at 3:45 at the Club and join you in a Happy Hour toast to the holidays. Else they might forget and work till 4:30. On the menu tonight is the famous Nothing Buffet. "What's totally non-fattening?" "Nothing." "What food does everyone love?" "Nothing." Obviously, it's a good choice. Price is right too.

THE—Club's next Happy Hour runs from noon to 6 on the 31st. And the one after that is just like old (1976) times—roast beef with baked potatoes and sour cream, buttery peas, four savory salads, a tray that you'll eat with relish, and jello.

TIME—to decide whether to yield to the temptation of a luxurious trip to exotic Rio de Janeiro. To help and/or tantalize you, come out for the Pre-Trip Meeting at 7:30 on the 11th. No room here to list all the extras, but plenty of room there—on the fabled Copacabana Beach, in a luxurious hotel at beach edge, on excursions of the city and its environs. It's April 23-May 1, and it's just $669 ($758 single) for the whole package.

WE—singles celebrate the arrival of '77 on Jan. 7 after work. It's sure to be a singular year. We'll listen to/dance to/enjoy Denny, the only man around who necks and frets simultaneously. We'll have a private Happy Hour bar, a very private bartender, free popcorn, and lots of good company. It's in the El Dorado Room, and it's fifty cents at the door.

LEARN—how to make soup out of a nail. Thrill to the story of "The Old Troll of Big Mountain." Come out of your TV womb for Storyteller Shirley Clair Barr at Variety Night on the 8th. It's free to members at 7 (with food at reasonable prices at 6). A Disney movie too—*One Little Indian* in which James Garner walks a Mile (Vera Miles, to be exact) for a Camel (an Army one, at that). Roadrunner cartoons too.

THE—Lobo buses roll on the 3rd (WNMU), the 5th (Portland State), and the 13th (Univ. of Arizona). Get your tickets early. And don't forget Fifth Quarter after the game. Special drinks at special prices—and you get to keep the glass: Mustang Maulers on the 3rd, Viking Vanquishers on the 5th, and Wildcat Widowers on the 13th.

TRUE—Lobo fanatics will stowaway on a tramp (Stanley) steamer if necessary to get to Arizona for the big games Feb. 10-13. But even the marginal fan will enjoy the travel package Nancy Sanchez has put together for that weekend—hotels, bus fare, game tickets, time to sun or shop, cocktail hours, and more. All for $128 (less $10 for Wolfpackers). Make deposits by Jan. 7; balance by Jan. 21.

MEANING—of what you Sanadoes say is affected by the motions you make while saying it. Or maybe you're saying a lot without speaking at all. Find out all about it with Arnold Abrams, body language specialist, on the 11th. Reserve with Vicky Clark by the 6th.

OF—course the Bridge Club reverts to its every Tuesday evening schedule come Jan. 4, 11, etc. Novices and newcomers: drop by at 7 for a full evening or for just a few minutes (an abridged evening). Meet Virg Bailey and get acquainted with duplicate bridge and bridgers.

BATTERIES—all run down after the holidays? Get them recharged at the big Country Hoedown on Saturday, the 29th of January. Barbequed everything, a square dance demonstration, and the *Watermelon Mountain Jug Band*! Come on out and just try to keep your toes from tapping—wear shoes. Tickets ($5.50 members, $6.50 guests) by the 22nd.

NOT—that Cribarri wines are bad, but we offered some to a poor wretch dying of thirst in the remote reaches of Area Y, and he just kept on crawling. Announcing (trumpet fanfare) *Paul Masson*—and other premium wines—as of 1977 at the Club!

INCLUDED—somewhere on this page ought to be a properly Christmasian message from the C-Club board, management, and staff. Oh, here it is: Merry Christmas and a Happy New Year to all our Club members, families, and friends!

MORE INFO—265-6791.

SHOULD AULD ACQUAINTANCE tra la, tra la. These not-so-auld acquaintances (front to back, Nancy and Fred Sanchez, Virginia and Lewis Sisneros) are already ready for the big New Year's Eve Gala a week from tonight. If you're going, pick up your tickets TODAY.