

Cancer Therapy

High-Energy Neutron Source Is Feasible

After two years of research, Frank Bacon (2352) and the staff of the Labs' Intense Neutron Source Target Test Facility have proved the feasibility of developing a high-energy neutron source for use in cancer therapy. They have now applied to the National Cancer Institute (NCI) for follow-on funding to build a hydrogen isotope ion accelerator that will produce high-energy neutrons from the nuclear reaction of deuterium with tritium.

Neutrons have been used in cancer therapy for years, but the source of these neutrons, in most cases, has been a cyclotron, a very large and expensive apparatus designed primarily to do physics experiments.

"Using the cyclotron for cancer therapy has been difficult for both the patient and the medical profession," Frank Bacon explains. "The apparatus is too large to be housed in the average hospital and far too expensive. Patients are often transported long distances — and cancer therapy must be scheduled in among research projects."

One of the advantages of the equipment proposed by Frank and the others involved in the operation and design of the Target Test Facility (Al Riedel, Don Cowgill, Jack Boers, Bob Bickes and Jim O'Hagan) is that it would occupy much less space and cost about half as much as a cyclotron.

The key to this new approach was developing a target that would produce the necessary neutrons and have an adequate lifetime as well. The research, funded by a \$500,000 NCI grant, is one outgrowth of neutron generator development in connection with weapon programs.

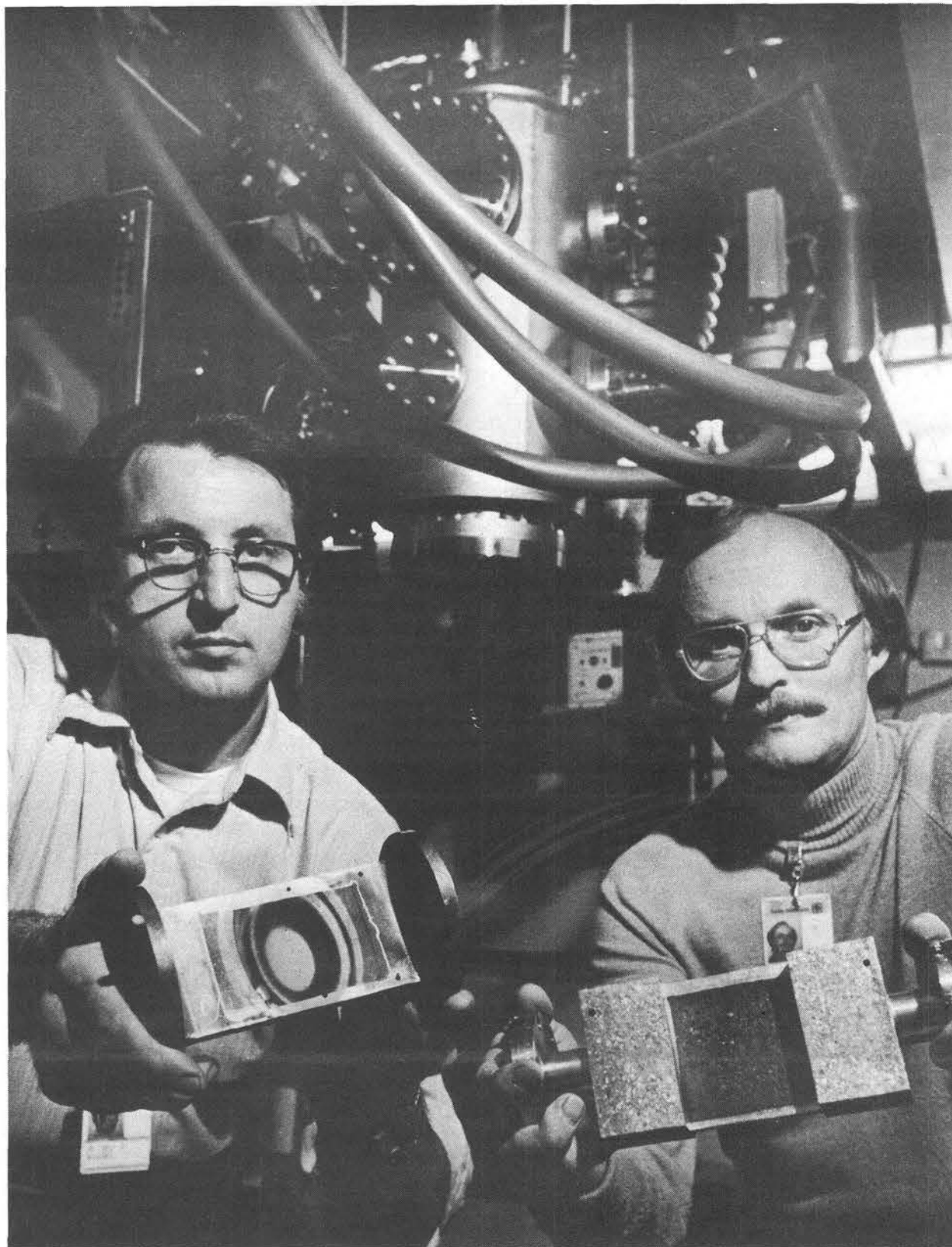
"We knew how to produce the required neutron intensity," Frank says, "The question was how to extend the life of the neutron source. Right now, we feel we can produce a target, that is, a source, that will last about 100 hours."

Cancer therapy treatments would average 5 to 10 minutes each, and a patient would receive about 20 of these over a three to six week period, according to Frank. "That means one target, at a cost of several thousand dollars, would treat about 40 patients," Frank explains, "and our current research indicates we can eventually develop a target that will last five or six hundred hours."

One design goal is to produce a neutron tube that can be removed and replaced very quickly — a tube that can then be returned to the factory (like a TV picture tube) for rebuild and reuse.

How did Sandia get involved in cancer therapy?

Sequentially, says Frank. Several years ago, Sandia supplied a small neutron generator to Texas A&M for use in a neutron activation project. Dick Wainerdi, the man who headed the activation project, later became a VP at Texas A&M. When his cancer therapy research team asked him if he knew anyone who could supply a high-intensity neutron source, he suggested Sandia. "After all," he once explained to Frank Bacon, "that first neutron generator was the only piece of equipment I ever bought that worked exactly the way it was supposed to the first time I turned it on."



AL RIEDEL AND FRANK BACON (both 2352) display experimental targets for high-energy neutron sources before and after they have been bombarded in the target test facility in the background. Two years of research have proved feasibility of developing neutron sources for possible use in cancer therapy.

LAB NEWS

VOL. 31, NO. 1

JANUARY 12, 1979

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

Labs Seeks Apprentices

Under the heading, "Apprentice Training — Sandia Laboratories," advertisements are currently appearing in the classified sections of newspapers throughout the state.

The Labs is seeking qualified applicants to fill apprentice slots in seven trades programs — machinist, material processing (training in plastics, glass, vacuum, plating and ceramics technologies), electronic technician, mechanical measurements, plant technician (structural), plant technician (electrical) and plant technician (mechanical).

Employees are urged to tell relatives and friends of the opportunities in Sandia's apprenticeship programs. Successful applicants will complete a five-year training program leading to a Craftsman II position at the Labs. They receive on-the-job and out-of-hours instruction in all practical and theoretical aspects of the trade.

Qualified women are particularly sought, according to Personnel Department 3530. The

(Continued on Page Three)

Afterthoughts

The business of aging--Like a registered horse, I turned one year older (54) on Jan. 1, which happens to be my birthday. Inevitably, at this advanced age, one is prompted to reflect and I am pleased to submit my findings to those striplings now in their 20's and 30's who view the 40-plus regime and their inexorable march into it with apprehension, if not terror.

First, as was said by the man who had been ridden out of several towns on a rail, it's not so bad once you get used to it. Indeed, age brings a number of satisfactions. One is less driven in the 50's than in the 20's so that there is a greater measure of that elusive quality of serenity. I'm not saying you're totally serene, only somewhat less exercised about your place in this world.

And, if your health remains good, you can do just about every physical thing you did while in your 20's. Only slower. I ski, play squash, chop wood, bicycle and run, and continue to scramble around and upon my house to keep it in one piece.

There's a bundle of intangible qualities that seem to improve with age: forbearance (or patience); understanding of others; compassion; temper (less volatile); and knowledge of self. Of wisdom, it suffices to note that many young fools grow into old fools, while others outgrow their affliction.

On the other hand, and seemingly contradictory, there is a lessening of one's ability to cope with nonsense in all its human and inhuman forms. Perhaps it's the sense that time is running out that causes this.

In things material, you're usually better off in later years. It's one of the paradoxes of our system that that system operates on the principle of inverse proportion: you make less when you're young, buying a house and raising a family; you make more when you're older, the house is bought and the kids are gone.

Sure, someone will say, but wouldn't you swap places with a 25-year old? Now there's a truly fatuous question, and I've already told you of my waning ability to tolerate nonsense, so how do you get off bringing that up? (P.S. The answer is no.) *js

Credit Union Reporter

Dividends, Deposits, Annual Meeting

Bonus Dividend on Regular Share Accounts

The Board of Directors of the Credit Union is pleased to announce a bonus dividend on regular share accounts for the last quarter of 1978. The bonus dividend, 1/4 of 1%, will be added to the 6% dividend for an effective annual rate of 6.25% for this quarter. Dividends for the last quarter of 1978 were posted to all share accounts on Jan. 1, 1979, and this amount will be shown on statements to be mailed in early January. The total amount of dividends as well as interest paid on loans during 1978 will also appear on these statements; these data are needed for completion of tax returns.

* * *

No Limit on Deposits

For those who wish to put more than \$40,000 in a Credit Union account, there is now no longer a limit on the amount that may be deposited in shares; however, each member's deposits are still insured only to \$40,000 by the National Credit Union Administration.

The Credit Union offers a variety of accounts:

Regular share accounts (similar to passbook accounts at banks);

Dependent accounts (savings accounts for dependents who live in the same household with a primary member);

Custodial accounts (savings accounts for children's education available for children under 18 years of age);

Young adults' accounts (for children between the ages of 16 and 23);

Share certificate accounts (similar to certificates of deposit at banks).

* * *

Annual Meeting

The 31st annual meeting of the Credit Union will be held on Jan. 25 at 5:15 p.m. in the Coronado Club. Following the regular business meeting there will be a drawing for cash prizes. First prize is \$500, second \$300 and third \$200. All regular members as of Dec. 31, 1978, who still have an open account on the date of the annual meeting are eligible for the prize drawing and do not have to be present to win.

Speakers and Authors

J.M. Hueter (3521), "Creativity in Leadership," NM State Conference of Leaders, Vocational Industrial Clubs of America, Nov. 10, Albuquerque.

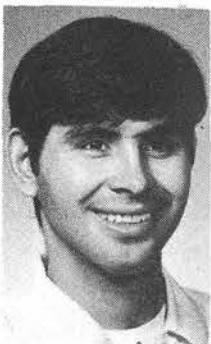
A.F. Veneruso and J.A. Coquat (both 4736), "Geothermal Logging Instrumentation"; D.W. Palmer (2151), "Design and Performance of Geothermal Hybrid Microcircuits," IEEE MIDCON/78 Conference, Dec. 13, Dallas.

M.J. Forrestal (4233), D.E. Grady (5532) and K.W. Schuler (5521), "An Experimental Method to Estimate the Dynamic Fracture Strength of Oil Shale in the 10³ to 10⁴ S⁻¹ Strain Rate Regime," Vol. 15, pp 263-265, INTERNATIONAL JOURNAL OF ROCK MECHANICS

R.L. Iman (1223) and W.J. Conover (Texas Tech.), "Approximations of the Critical Region for Spearman's Rho with and without Ties Present," Vol. 87, No. 3, COMMUNICATIONS IN STATISTICS.

R.L. Iman (1223) and W.J. Conover (Texas Tech.), "Some Exact Tables for the Squared Rank Test," Vol. B7, No. 5, COMMUNICATIONS IN STATISTICS.

Death



Raymond Najar, a material processing apprentice in Org. 1471-1, died Dec. 24 in a one-car accident on Highway 54 south of Corona. He was 30.

He joined Sandia's apprenticeship program in October 1974.

Survivors include his parents, a son and a daughter.

Retiree Deaths

(September - December 1978)

William Bailey (67)	Sept. 14
James Perry (66)	Oct. 1
Mary Lee Peckumn (64)	Oct. 6
Donald Hansen (69)	Oct. 9
Dewey Cochran (79)	Oct. 12
Robert Mueller (60)	Oct. 28
Gerald Hannen (72)	Oct. 30
Frances Savage (56)	Nov. 19
Mary Hazel Bailey (65)	Nov. 24
Jerald Johnson (61)	Dec. 5
William Stalcup (68)	Dec. 2
Lenore Petersen (64)	Dec. 26

Events Calendar

Jan. 16-21 — Holiday on Ice, State Fairgrounds, 265-1791

Jan. 20 — "Three Wishes" puppet show, Wee-Folk Puppeteers, Vortex Theatre, 10 a.m.

Jan. 20, 21 — Magic Circus, magic, illusions, juggling, clowns, Popejoy, 1:30 p.m. and 3:30 p.m., 277-3121.

Jan. 21 — William Albright Organ Concert, Music Vesper Series, 1st Methodist Church, 4 p.m., 243-5646

Jan. 21-Mar. 25 — Martin Chambi Photographs from Peru, UNM Fine Arts Center

Jan. 22, 23 — Feast Days, San Ildefonso Pueblo.

Jan. 23, 24 — "Grease," live Broadway show, Popejoy, 277-3121.

Jan. 23-26 — Classic Hockey Tournament, Tingley Coliseum, 255-2715.

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An Equal Opportunity Employer

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Joyce Carrol of Apprentice Training: "A Good Deal"

Joyce Carrol (1473), a material processing apprentice, is currently assigned to a microelectronics lab. She is learning to fabricate hybrid microcircuits, a complex process requiring many steps, many different operations.

Her assignment in this lab will continue for four months, then she will move on to other labs and receive training in physical electronics, electron and neutron tube assembly, printed circuitry, glass and plastic technologies and process analysis.

"Now is an exciting time in my life," 20-year-old Joyce says. "Believe it or not, I was eager to return to work after the Christmas holidays. I was bored doing housework."

Joyce lives with her parents, two brothers and a sister in Peralta. She graduated from Los Lunas High School in 1976, attended UNM for one semester and worked briefly at Lenkurt GTE. Now that she is part of Sandia's apprenticeship program, Joyce feels that her life "has direction."

"I want to be independent," Joyce says, "and I want to achieve — you know — do well. The work is extremely interesting, a challenge. I feel that I must do as well as the guys in the group. This is not because of any pressure from them, but because I want to for myself. There's opportunity to grow here and I like that."

"More women should try technical fields. We have a natural manual dexterity. Making things with our hands has always been a source of satisfaction. For me, welding is more fun than cutting cookies."



JOYCE CARROL (1473) is one of 15 women enrolled in Sandia apprenticeship programs. The Labs is seeking to increase this number. Applications are being taken now through the New Mexico Employment Service.

Joyce joined the apprenticeship program six months ago. In the next four and a half years, besides on-the-job training, she will take academic courses — mathematics, mechanical drawing, chemistry, material science, physics, applied plastics technology, potting and casting, chemistry of polymers, manufacturing statistics, electrical fundamentals and the like — a total of 1138 hours of classwork both on-the-job and out-of-hours.

"It's better than college," Joyce says. "Apprentices are paid well during their learning period. You graduate into a responsible job with Sandia Laboratories. Hey, I can be proud of that."

Since Sandia is now taking applications (through the State Employment Service) for openings in the apprenticeship programs, Joyce is urging several of her friends to apply.

"It's the best deal going," she says.

Fun & Games

Biking — DOE's Porter Grace has sent us a weighty (13 pages) extract from the *Federal Register* entitled "Requirements for Bicycles, Revised Safety Standard." If you've somehow had the notion that your bike is, essentially, a simple instrument, then perhaps you'd better take a look at this document. Consider, for example, what it says about side reflectors: "(f) Side reflectors. Reflectors affixed to the wheel spokes shall be mounted either flat on the spokes or within the spoke cage such that the angle between the optical axis and the normal to the plane of the wheel shall not exceed the angle of the spokes with the plane of the wheel." It's available in the LAB NEWS office.

Want to tour a bit? The New Mexico Wheelmen meet for a ride every Sunday morning at 9 at Popejoy Hall on the UNM campus. All bikers are welcomed, members or not.

* * *

Bird Watchers — The Albuquerque Museum Foundation is holding its annual guided tour of the Bosque Del Apache wildlife

refuge this Sunday, Jan. 14. Bert Lindsay (2113) of the Audubon Society is tour guide. Busses leave from the museum at noon, and a box lunch is provided. Cost is \$15; call the museum at 766-7878 for reservations. (Which calls to mind the ancient story about the rancher who, having agreed to let some Audubon people spend a day on his spread, then informed his head wrangler that they were coming. "What are these people gonna do?" the wrangler asked. "Watch birds," said the rancher. "Watch 'em what?")

* * *

Skiing — The Ski Touring Club offers two interesting trips this weekend. Tonight you have a chance to ski in the moonlight when the group heads for Sandia Crest; rendezvous first at the Western Skies parking lot at 7 p.m. On Sunday the 14th, ski tourers will meet at 8 a.m. in the Goodwill parking lot on San Mateo and take off for the Redondo campground in the Jemez. The club sponsors its annual Albuquerque Avalanche race on Sandia Crest on Jan. 21.

Labs Seeking Apprentices

trades areas have been traditionally male dominated but times are changing — 15 women are currently enrolled in Sandia apprenticeship programs. Sandia would like to increase this number.

Applicants should be high school graduates between 18 and 30 with good learning ability and electrical or mechanical aptitude. They must meet the physical requirements of the job and be able to secure a DOE security clearance.

All applications must be made through a New Mexico Employment Service Office.

1979 Holidays

Sandians will observe the following 1979 holidays:

Memorial Day ... Monday, May 28

Independence Day Wednesday, July 4

Labor Day Monday, Sept. 3

Thanksgiving .. Thursday, Nov. 22

Christmas and New Year

Shutdown Dec. 25 through Jan. 1

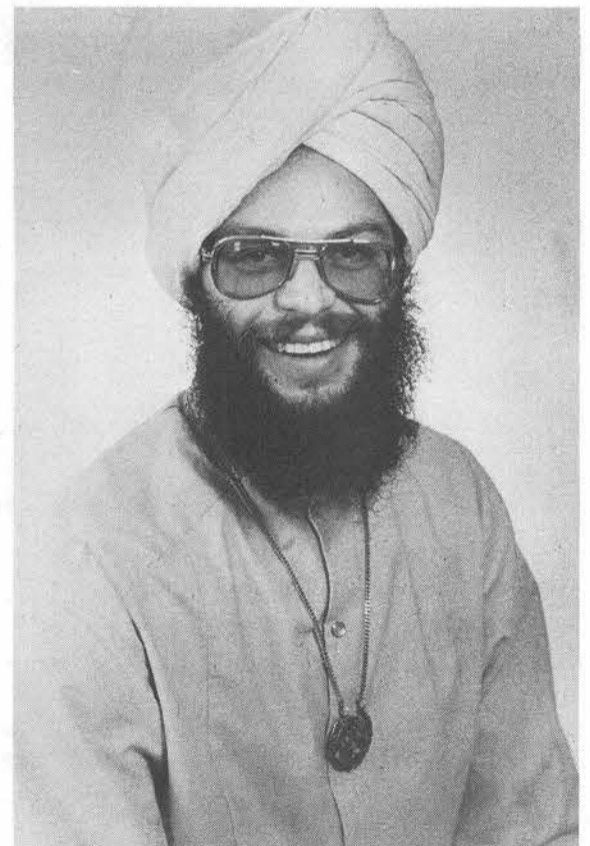
Energy Conservation Day will be announced prior to Oct. 1.

Sympathy

To Dorene Yepa (1472) on the death of her brother in Oklahoma, Jan. 1.

To Mary Ann Melo (1120) on the death of her mother in Albuquerque, Dec. 21.

To Joe Amarante Silva (2145) on the death of his brother on Jan. 6 in Albuquerque.



THIS is Guru Deep Khalsa who will teach two exercise classes (one for women, one for men) at the Coronado Club later this month. Guru Deep takes the yoga approach to exercise, emphasizing relaxation and diet, and hopes to work with students on a one-on-one basis. Course runs for eight weeks twice a week, is available to employees and spouses, and costs \$10. Women's sessions are Tuesdays and Thursdays from 5 to 6 after work, men's will be set up according to consensus. Registration by Jan. 25; call 4-8486 (C-Club).

Supervisory Appointments

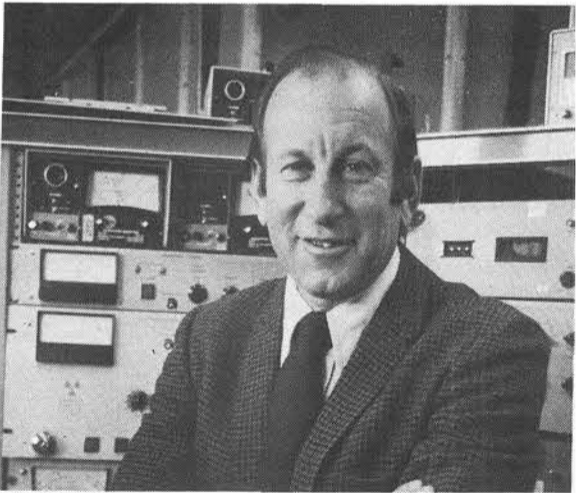


PAT CHILDERS to supervisor of Mail and Document Control Section 8266-1, effective Jan. 1.

Joining Sandia/Albuquerque in 1962, Pat came to Livermore in 1968 to work in Personnel/Benefits and Public Relations before transferring to Visitor Control in 1973. Prior to Sandia, she worked for a hospital supply company.

Pat has attended Chabot College and taken art instruction under various well known artists in Northern California. She was named the Livermore Art Gallery's first "Artist of the Month" in 1976. A Livermore Art Association board member the past eight years, she has chaired numerous local art-related events.

Although her favorite hobby is painting, Pat also enjoys skiing and reading. She and her husband Bill, an electrical engineer in Division 8116, live on Asti Court in Livermore with their two daughters. They have two sons in military service and two grandchildren.



WALT BAUER to Manager of Physical Science Department 8340, effective Jan. 1.

Joining Sandia/Livermore in 1969, Walt initiated a helium implantation research program. Since 1972, he has been supervisor of Physical Research Division 8347. Before coming to Sandia, he studied radiation damage in metals as a staff scientist at Atomics International.

Walt received a BS degree from UC/Berkeley and a PhD from the University of Illinois, both in physics. A member of the American Physical Society, he also serves as chairman of the U.S. Plasma Materials Interaction Task Group in DOE's Magnetic Fusion Energy Program.

Off the job, Walt enjoys outdoor sports, especially bicycling, sailing and skiing. He, his wife Suzanne, and their two children, a boy and a girl, live on Via Del Paz in Livermore.

LIVERMORE NEWS

VOL. 31, NO. 1

LIVERMORE LABORATORIES

JANUARY 12, 1979



QUEEN ANNE STYLE HOME of Gary Drummond (8333) and his wife Elizabeth, the first stuccoed house in Livermore, was built in 1898. Exterior of the home remains substantially unmodified.

Gary Drummond

Livermore's Architectural Historian

"My interest in preserving old homes is simply part of the conservation movement — conservation and reuse of the built environment," says Gary Drummond (8333) who recently published a book on the subject, "A Guide to the Architectural Styles in the Livermore-Amador Valley."

Gary's interest in these homes goes back to 1970 when he was appointed to the Nity of Livermore's Beautification Committee. Currently, he's a member of a number of preservation organizations.

"Old houses represent a tangible asset of the past, but not many are left," notes Gary. "So it's important that those remaining be identified." Two years ago, Gary ran an architectural survey of Livermore. His approach was later used by the city of Mountain View for a similar survey, and Gary helped the city of Sunnyvale in its survey.

The Livermore survey turned up some 660 structures built before 1930. Of these, 31 were Italianate (a style popular from 1860 to 1880), and only a few of these were original, i.e. unmodified. One, the 100-year-old Daniel Murphy house at 291 McLeod St., had been put up for sale, all or in pieces. To forestall demolition, Gary succeeded in placing the house on the National Register of Historic Places, the first and only registration to date in the Livermore-Amador Valley. Another survey result has been the development of a walking tour of Victorian-era homes in the area.

Gary and his wife Elizabeth own a Queen Anne-style home at 567 South "L" St., built in 1898 by Tom Knox, a local contractor and political figure. With typically gabled dormers extending from the hipped roof to the front and side, it was the first stuccoed house in Livermore. The Drummonds have repainted and wallpapered the interior, replaced the substandard electrical service and inside water

lines, and remodeled the basement.

On new versus old, Gary believes an older home offers more spaciousness and other amenities. "It's light, it's airy — especially in Livermore where houses were built with lots of windows and high ceilings. It has a quality of craftsmanship and materials not found in most modern houses. Of course, there's nostalgia too, particularly if you were raised in a house like this. My house brings back memories of my grandmother's home in the midwest."

Last June Gary completed his BA degree in architectural history, for "academic credibility," he says. "Besides, I guess I'm a social historian at heart. You don't save an old house just because it's old — you save it because it has historic meaning for the people in the community."

Recently, Gary helped with an architectural survey at San Juan Bautista where the architecture is much older than at Livermore. He likes the survey work: "It sharpens my talents."

Take Note

Congratulations to Bill Ormond (8261) and Wayne Townes (8257) who were recently recognized for their contributions to the U.S. Army Reserve. Bill, a lieutenant colonel with 22 years of service, received the Armed Forces Reserve Medal and the Army Reserve Components Achievement Medal for outstanding performance as Assistant Commandant of the Oakland U.S. Army Reserve School. Wayne, a master sergeant with over 20 years of service, was presented the Army Reserve Components Achievement Medal for his service as Commandant of the School's Noncommissioned Officers Leadership Program.



A NORTHERN CALIFORNIA byway is the focus of this scene by Don Spencer (8265).

Livermore Speakers

Dan Tichenor and Von Madsen (both 8444), "Computer Analysis of Holographic Interferograms for Nondestructive Testing," Ray Smith (8352), "Rayleigh Temperature Profiles in a Hydrogen Diffusion Flame," and Larry Rahn and Pete Mattern (both 8342), "Coherent Raman Spectroscopy for Combustion Application," Society of Photo-Optical Instrumentation Engineers 22nd Annual Technical Symposium, Aug. 28-31, San Diego, CA.

Dave Stephenson (8353), "Non-Intrusive Profiles in Atmospheric Hydrocarbon Air Flames," 17th International Combustion Symposium, Aug. 20-25, University of Leeds, England.

Bill Wilson (8341), "Hydrogen Trapping to Vacancies, Dislocations, and Stress Fields Near a Crack Tip in FCC Materials: A Quantum Chemical-Lattice Defect-Finite Element Hybrid Approach," Seminars: Technical University of Denmark, University of Aarhus, H.C. Orsted Institute and Riso, Sept. 6-14, Denmark.

Ben Benedetti (8121), "Measurement of Balloting and the Free Run Efforts for a Projectile During Gun Launch," Second U.S. Army Symposium on Gun Dynamics, Institute on Man and Science, Sept. 19-22, Rensselaerville, NY.

Lutz Dahlke (8444), "Dynamic Neutron Radiography, Its Techniques and Applications," and Chuck Oien (8444) and Lutz Dahlke, "Photographic Effect of Secondary Electron Emission from Metal Foils During Radiography," American Society for Nondestructive Testing Fall Conference, Oct. 2-5, Denver, CO.

John Pohl and Don Hardesty (both 8353), "Pulverized Coal Firing: Current and Future Research Needs," Fall Meeting, American Flame Research Committee, Oct. 9-10, Pittsburgh, PA.

Tom Devlin (8252), "Tritium Monitoring," International Atomic Energy Agency Symposium on the Behavior of Tritium in the Environment, Oct. 16-20, San Francisco.

Pete Witze (8352), "Application of Laser Velocimetry to Internal Combustion Engines," Invited Seminar, Mechanical Engineering Department, UC/Berkeley, Oct. 17.

Jack Swearingen (8316), "A Physically Based Internal-Variable Model for Rate-Dependent Plasticity," Invited Seminar, Metallurgy and Materials Science Department, Carnegie-Mellon University, Oct. 20, Pittsburgh, PA.

Congratulations

Mr. and Mrs. Robert Bradley (1245), a son, Jonathan David, Jan. 3.

Mr. and Mrs. Charles Tapp (8460), a daughter, Barbara Frances, Dec. 11.

Sympathy

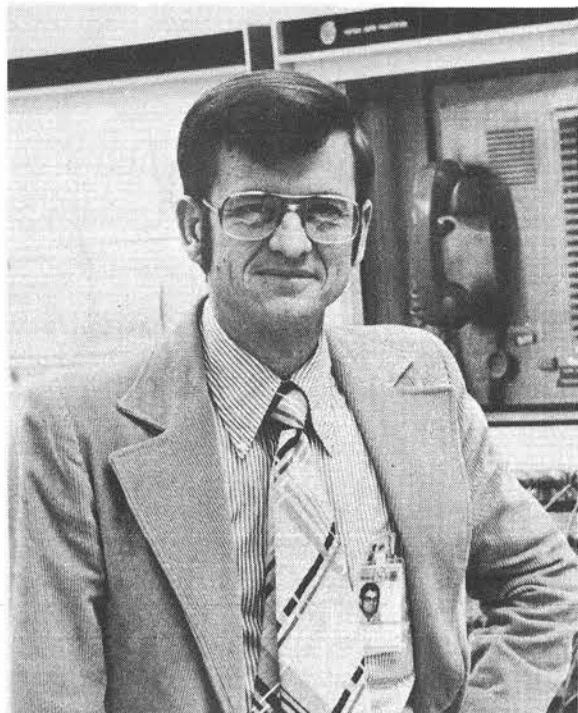
To Bob Green (8353) on the death of his father-in-law in Phoenix, Dec. 17.

To Perry Lovell (8252) on the death of his father-in-law in Glendale, AZ, Dec. 14.

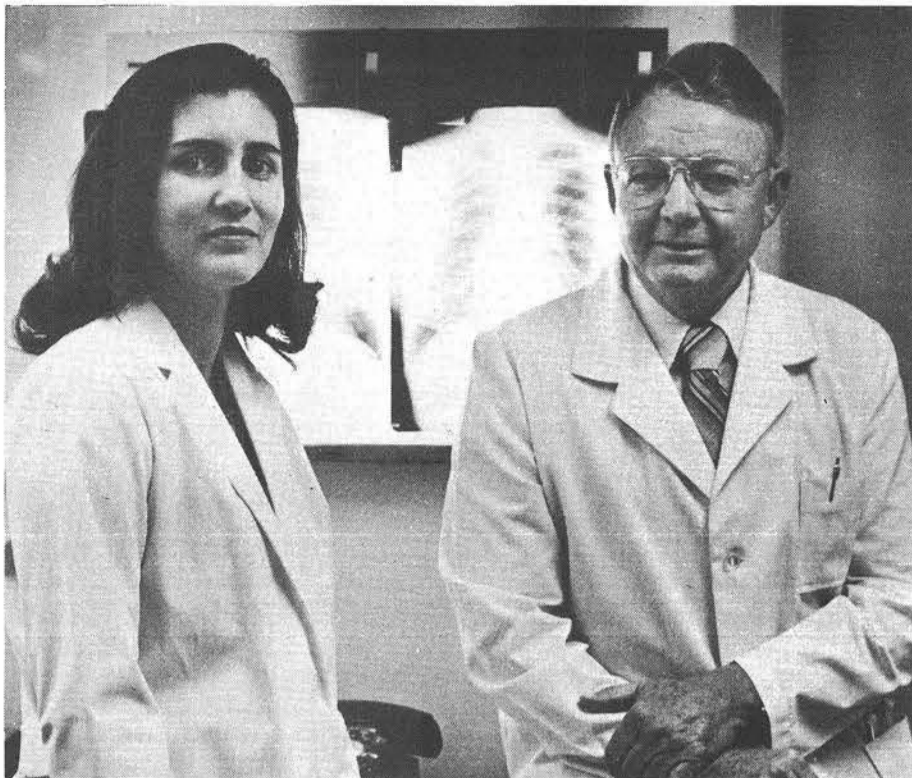
To Rex Richardson (8256) on the death of his mother-in-law in Napa, Dec. 19.



SCIENCE STUDENTS from Stone Valley School in Alamo, recently toured Sandia Livermore. Here Dick Houser (8451) explains the Heliostat Development Facility as the students watch the image beamed from the heliostat onto the target on the hill. Others conducting briefings and demonstrations were Wes Estill (8316), Wil Jorgenson (8123) and Mike Dyer and Ray Smith (both 8352).



CHUCK GWYN (2110)



JUDY EWING (3330)
JACK FITZPATRICK (3320)

Supervisory Appointments

CHUCK GWYN to manager of Integrated Circuit Design Department 2110, effective Jan. 1.

Following graduation from the University of Kansas with a BS in EE, Chuck joined the Labs as a member of the Technical Development Program in 1961. Two years later he received his MS in EE from UNM. He continued his studies at UNM under Sandia's Educational Aids Program and, in 1968, was awarded his PhD, also in EE. Chuck's early work at the Labs was with radiation effects on semiconductors. Five years ago he was promoted to supervisor of Computer-Aided Design Division 2114 where he has been working on the development of software relating to the automatic design of integrated circuits.

Chuck is a member of IEEE and has held both local and national offices. He works with his church, enjoys jogging and refinishing antiques. Chuck and his wife Jean have two children at home and one in college. They live in the NE heights.

* * *

JUDY EWING, M.D., to manager of Industrial Medicine and Clinical Psychology Department 3330, effective Jan. 1.

Dr. Ewing has been a staff physician at Sandia since December 1975. In August 1977 she became the supervisor of the Industrial Medical Division. Before coming to the Labs she was the Emergency Room Physician at Lovelace-Bataan Hospital for eight years. Judy earned her BA at Phillips University in Oklahoma and her M.D. at the University of Oklahoma. She completed her internship at the Bernalillo County Indian Hospital and her residency at BCMC.

Off the job, Judy enjoys camping and fishing in the summer and cross-country skiing in the winter. She and her husband Ron (1112) have a nine-year-old daughter and seven-year-old son. They live in Siesta Hills in SE Albuquerque.

* * *

JACK FITZPATRICK, M.D., to Assistant Medical Director 3320, effective Jan. 1.

As an Army physician, Dr. Fitzpatrick was stationed at Sandia Base in 1950-52 and 1967-70. Retiring from the Army Medical Service in 1970, he entered private practice in San Benito, Texas. Later, he joined Sandia for a

year (1974). From 1975-79, he again practiced medicine at the same clinic in his home town of San Benito. He returned to the Labs as a staff physician in May 1978.

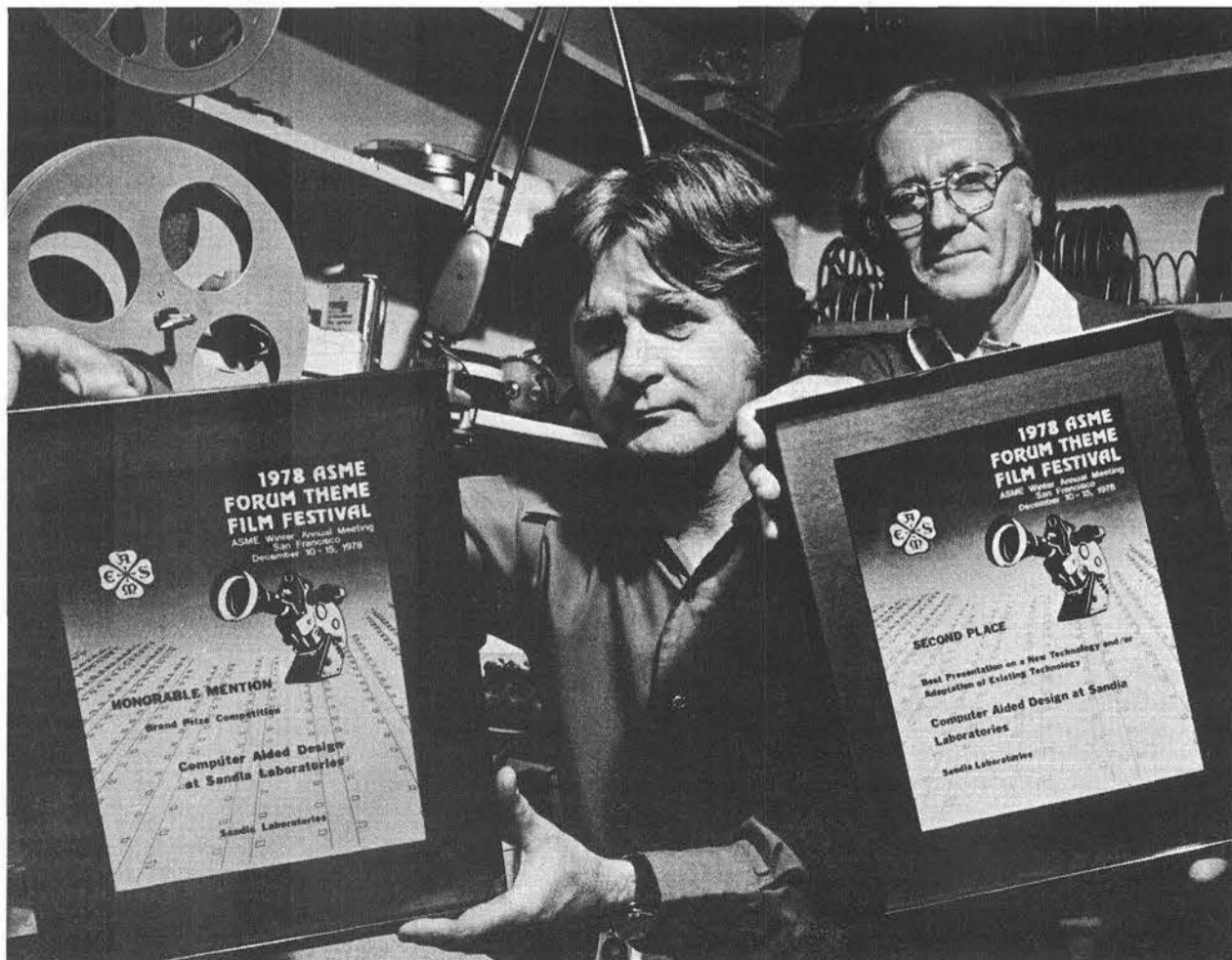
Dr. Fitzpatrick earned his M.D. from Southwestern Medical College in Dallas; his internship and residency requirements were completed at Fitzsimmons Army Hospital in Colorado and Los Angeles County General Hospital. He is a graduate of the Army War College. His specialties are nuclear medicine and internal medicine.

Jack and his wife Mary have a son who is a student at UNM. Off the job, Jack enjoys music, reading and hiking.

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Diet & Health Lectures Set

Nutritionist Susan Brammer of Medical is repeating her series of three lectures on diet and health starting next week. First is set for Monday, Jan. 15, the second for Jan. 17, and the last for Jan. 19. All run from 12 noon to 12:45 in Bldg. 815 (outside entrance). Titles of the lectures are: 1. The rating game — a short course in nutrition and weight control; 2. Fatty foods and heart disease; and 3. Nutrition sense and nonsense. Employees and their spouses are invited to the lectures — and bring your lunch if you wish.



TWO FOR ONE — Sandia's film, "Computer Aided Design at Sandia Laboratories," produced by Motion Picture Production Division 3153, recently won two awards in the ASME Forum Theme Film Festival (held in conjunction with the ASME winter annual meeting in San Francisco, Dec. 10-15). Wayne Graving, left, cinematographer/editor of the film, holds plaque awarded for grand prize honorable mention while Chuck Cockerleas, writer/director (now with *Lab News*, 3162), holds second place award in category for best presentation of a new technology.

The Directorates

1200: Weapons Analysis

The concerns of Weapons Analysis Directorate 1200 are wide ranging — extending from underground seismic detectors through worldwide nuclear weapons reliability, safety and handling to satellite packages in near and far space.

“To meet weapon safety and reliability requirements,” explains Director Leon Smith, “1200 gets into the process very early. Our first assessment is of requirements and component and system design.

“In reliability studies, we write failure equations for each system, describing how well the system elements (hardware and human) will meet the military characteristics in a system configuration. These reliability studies continue through design, development, production and stockpile.”

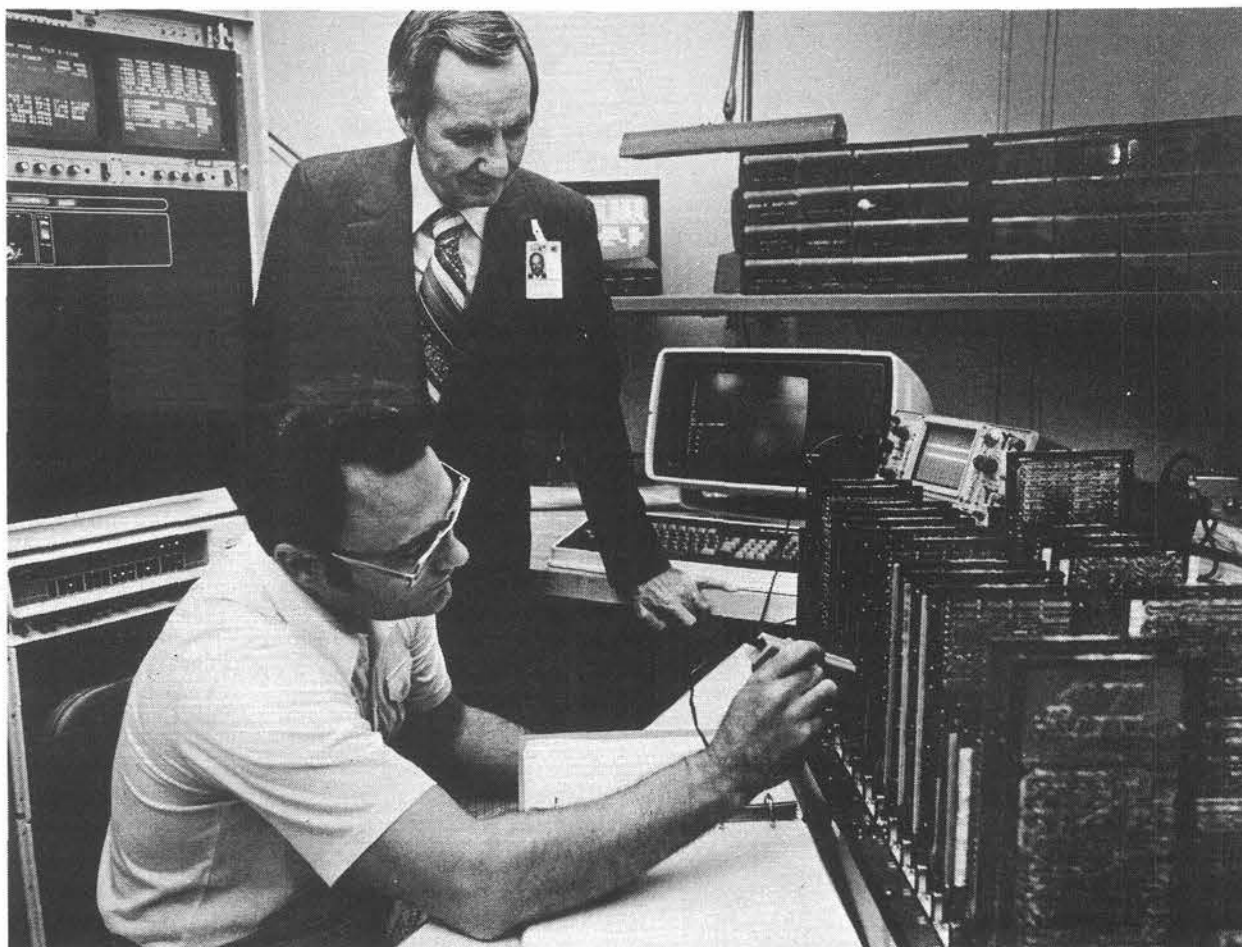
In terms of the nuclear safety of weapons, one group in 1200 runs safety assurance studies on weapon systems under development, suggesting new design approaches to the weapon designers. Another group devises analytical means (like fault trees) to assess weapon safety and security and a third participates as a technical advisor to a joint DoD/DOE group which assesses the nuclear safety of each weapon system.

In recent years, a new concept (strong link/weak link) has dominated Sandia's approach to nuclear safety and has been incorporated into many new weapon designs. As Leon explains it, strong links are safety devices (like electrical switches) which can survive accident environments like fire and shock. Weak links, co-located with strong links, are components vital to the normal operation of the weapon which are designed to become inoperable at environmental levels significantly less than those necessary to destroy the strong links.

“The beauty of this simplifying concept,” Leon says, “is that it gives us an appropriate balance between operational readiness and safety. We can count on a predictably safe response without requiring the safety devices to survive all the extreme environments of possible accidents.”

Closely allied are other human factors studies, and 1200 is conducting a series of Safeguard studies for the Department of Energy and the Nuclear Regulatory Commission on subjects like safe/secure transport, facility protection systems, installation security, terrorist characteristics and reactor control. They are also doing statistical studies and computer analyses in the areas of weapon development, reliability assessment, solar energy applications and risk assessment.

Another phase of 1200's work involves training and liaison with the users of nuclear weapons. In support of each weapon program, technical publications of all kinds are prepared to provide the military with procedures to assemble, test, store, maintain, dismantle, and dispose of nuclear weapons. Instructors from the Naval Technical Training Command, the Army Training and Doctrine Command, the Air Force Training Command and the Explosive Ordnance Disposal School (among others) are trained at Sandia when a new weapon system is about to be fielded, or



LEON SMITH, DIRECTOR OF WEAPONS ANALYSIS 1200, looks on as Harold Eyer (1242) works on a breadboard version of an instrument package being developed for a NASA satellite. Computerized test systems check adequacy of the instrumentation package before it is actually built.

when retrofits and changes in concept require it. In 30 years, military students have spent over a half million hours attending classes taught by Sandia instructors in 1200.

Sensor systems are also big business in 1200. Last November, for example, they set up a research seismic station in Tennessee. Seismometers in 300-foot holes measure earth motion caused by natural and man-made events, collect data and transmit them in near real time via space satellites to a receiving station in Albuquerque.

Sandia's involvement in space programs began in the early 1960's, in collaboration with Los Alamos, with design and development of instrumentation payloads for Vela satellites. These instruments were capable of detecting nuclear detonations in the atmosphere and in deep space. Today, 1200 is working on a variety of instrument packages

for DoD and NASA satellites. One current program involves a nuclear detonation detection system for potential use in Global Positioning System (GPS) satellites.

This system calls for 24 satellites to orbit the earth in 12-hour circular orbits, broadcasting navigational signals which will enable military aircraft, ships and land vehicles equipped with proper receivers to determine their precise location. If Sandia's systems are included, they will constantly monitor the entire earth's surface and surrounding space for nuclear detonations. Sandia's hardware for GPS consists of optical and x-ray sensors as well as a data processing logic system.

“Some of our sensors,” Leon sums up, “would probably be used as a part of the verification system if, and when, a Comprehensive Test Ban treaty is signed.

Frank Francis Is A 'Mended Heart'

The doctor advises heart surgery. It's a prospect you find intimidating, even frightening. You can gain some reassurance, however, from a group of people who are graduates of the course. Called Mended Hearts, members are former heart patients who provide moral support to future heart surgery patients. Frank Francis (5815) is one of those members.

As a trainer for Mended Hearts, Frank coordinates training of members who make pre- and post-operative hospital visits to heart surgery patients and their families to help relieve some of their anxieties.

“We're not doctors,” Frank says, “we're just people who have had surgery. We can talk to these people on a personal basis — we've been there. Their doctors answer the medical questions but we can talk about other worries that seem to be common to heart surgery patients. The one thing that people seem most apprehensive about is that they will be invalids and that life will be worthless afterwards. But they are usually pleasantly surprised at how well they do feel when it's over.”

Associate members in the organization

are wives or husbands of heart surgery patients and, according to Frank, they too provide a valuable service to the patient's family. “Heart surgery is such a long and involved procedure and, for a family, the waiting can be agonizing. A visit by one of our members at this time can be helpful.”

A number of cardiologists are also associate members of Mended Hearts. “Their presence at our monthly meetings is helpful,” Frank says. “Heart surgery technology is making rapid advances. When I had mine in 1971, I went to Houston to have it done. Today, I could have it done in Albuquerque. In 1971, my surgery consisted of two by-passes because of the limitations on the heart/lung machine. Today, doctors have the time to do five or six by-passes.”

New Mexico Chapter 91 of Mended Hearts currently has about 60 members. Retired Sandian Fred Sweet is chapter president, Bill Thomas (1412) is treasurer. George Horne (2635) and Archie Fisher (retired) are also members. Contact one of these if you want more information.

Eating on the Run



(Ed. Note — Susan Brammer, Sandia Medical's nutritionist, agrees with us that Sandians are active people, many spending weekends in vigorous pursuits. We asked her what's best to eat under these conditions, and this article is her reply.)

Participation in a popular winter sport like downhill or cross country skiing, or snow shoeing, gets us out in the fresh air and gives us enjoyable exercise. But what's best to eat on outings? Overeating during a lunchtime break or eating the wrong types of food may make an afternoon siesta more appealing than further exercise.

The body's main needs during exercise are ready sources of energy as well as fluids to replenish water losses. Dehydration is especially severe at high altitudes. During exercise that lasts for several hours, an easily digested food long on starch or sugar is needed.

Of course, overloading the stomach with any combination of fats, proteins, or carbohydrates (starches and sugars) creates that drowsy feeling, but this is particularly true after eating a meal high in fat. The reason derives from the speed of digestion of these three nutrients. Carbohydrates are most quickly digested, then proteins, then fats. The longer it takes to digest a nutrient, the longer a portion of the body's blood supply is diverted to the stomach area, producing drowsiness and lethargy.

A good approach to an active day's eating is to plan the menu as a series of snacks, never eating a full meal. Eat small amounts at frequent intervals; this "little and often" system prevents overloading the stomach and makes continued exercise more enjoyable. Keep one convenient pocket in your outfit as a "nibble" pocket for storing snacks to eat throughout the day.

Here are some good snack foods: "trail mix" (any combination of nuts, seeds, dried fruits), fresh or dried fruit, breakfast bars, granola bars, hard candy, raw vegetables. Remember to drink some fluids as you go along. Water and fruit juices are good choices. Beverages containing caffeine (coffee, tea, cola drinks, and chocolate) and alcohol tend to dehydrate the body, depending on amount, so go easy on these items.

When you stop for lunch, make it mainly a rest stop and a time for another light snack. A desirable light lunch might include a thermos of hot soup, pita or pocket bread filled with salad or lean meat, bagels and Neufchatel cheese (a low fat cream cheese), and non-crumby cookies like brownies or fig newtons. High fat foods, such as cheese, salami and sausage should be eaten in small amounts if at all. Make them your après ski hors d'oeuvre.

Contrary to popular opinion, moderate exercise tends to decrease appetite for many people. So plan to eat light to enjoy your day's outing to the fullest.

Meals on Wheels: Lifeline for Homebound

In our society, growing old often means living alone. Not necessarily psychically alone, or friendless, or lonely, but simply being alone, with no one to depend on day-by-day but yourself.

When problems arise, when an individual becomes homebound, relatives and friends, often in a quandary, sometimes opt for the easiest solution and encourage the aging person to enter a nursing home long before he or she is ready to (or needs to) give up the comfort of home.

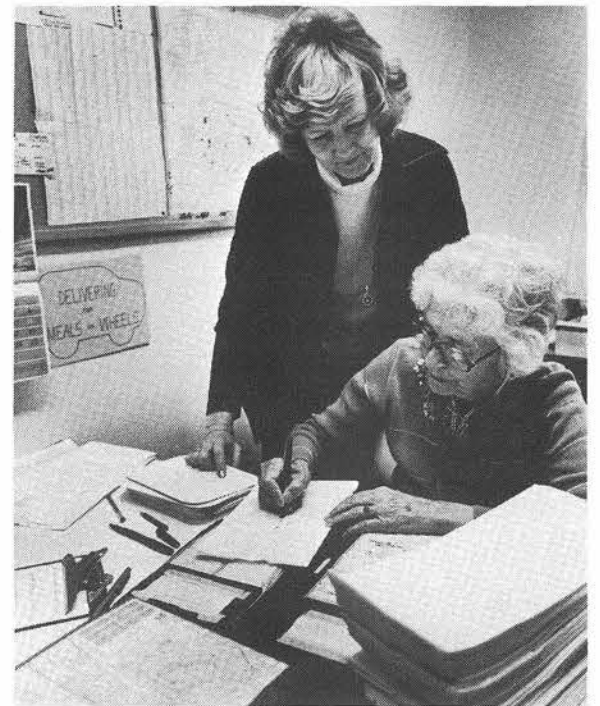
Often all that person needs is limited assistance. For many older people, the problem is that they can't shop for food, or perhaps can't prepare it if they have it. And being homebound, they obviously can't go out to a restaurant. Their needs are twofold: they need meals, and they need day-by-day contact with the outside world.

Since 1972, Albuquerque has had an organization which meets those needs. It's called Meals on Wheels. Run by executive director Bev Geck (wife of Bill, 3153), the volunteer organization depends on a great many Albuquerqueans including Sandians (retired, spouses, active) who deliver meals to the elderly, who become involved in their lives and who, in their daily calls, are able to ascertain that all is well.

Meals on Wheels has grown, serving 20 people in 1972 while today it daily delivers meals to 240 people. There are 22 routes that emanate from Anna Kaseman, Lovelace, Presbyterian, St. Joseph and University Heights Hospitals where the food is prepared and packaged for transport. Many of these meals, worked out between doctors and dietitians, meet special dietary needs.

"Our ideal is to have a driver and an assistant on each route," Bev told us. "That way, if we find a client with a medical emergency, one of the team can wait for help while the other continues with the delivery of meals. Too often, we have to send a driver out alone."

It takes 250 volunteers to meet the need for delivery teams, and Meals on Wheels is about 50 short right now. Thirty more people are needed, too, to coordinate the efforts of the drivers, checking them in and out. If there



MEALS ON WHEELS Executive Director Bev Geck (wife of Bill, 3152) and retired Sandian Geneva Howell prepare labels and tags for day's delivery of meals to homebound persons in Albuquerque.

is no answer when a driver delivers food, he or she reports this and the follow-up procedure begins.

"People have strokes, fall and hurt themselves, get sick," Bev explains. "Most often they are simply away from home with a friend or relative and have forgotten to tell us. But we never assume that."

Meals on Wheels, which has served over 300,000 meals in Albuquerque since 1972, is a non-profit organization that delivers meals Monday through Friday to any homebound resident in Albuquerque. Costs are minimal, can be met with food-stamps, and there is financial aid available to those who can't afford the full price. Churches, civic organizations and individuals contribute regularly to the program.

But the key is volunteers. "The program works," Bev says, "only because of the volunteers." If you're interested, contact Bev Geck at 843-9211, ext. 3822. With many Sandians already involved you could end up working with an old friend. • cec



RECENT SANDIA RETIREE Don Weldon and his wife, Lila, are two of many Sandians who volunteer their time and vehicles to deliver meals to elderly Albuquerqueans. Meals on Wheels day care coordinator Geneva Howell stands at right.

Take Note

The Albuquerque chapter of the Data Processing Management Association earned the chapter outstanding performance award for 1978. Many Sandians are members of the local organization. Ron Fugazzi (2625) and Pat Murphy (2626) were officers during the award-winning year. Local chapter meetings, held on the third Tuesday of each month at the White Winrock, include a dinner followed by a program covering a topic in business data processing.

* * *

"Winslow Homer's America," a collection of lithographs and drawings by one of America's outstanding artists, opens Sunday at the Albuquerque Museum on South Yale. Homer, best known as a painter of seascapes and ships, also worked as a freelance illustrator in the years around the Civil War. The exhibit features many of his drawings of the war which first appeared in *Harper's Magazine*. Other illustrations depict American rural life after the conflict. The exhibit will hang through March 4.

Also, the Bandell Collection, a photographic exhibit on downtown Albuquerque businesses as they appeared during the depression of the 30's, will run through May 1. Weekend hours at the Museum are 1 to 5 p.m.

* * *

Language students take note: UNM's Community College is offering German III this semester in addition to German II for advanced students. Registration is underway now at the Community College office, Yale and Lomas. Call 277-3751 for more information.

Youngsters age 7 to 14 might be interested in a conversational German course called "Fun and Fluency." Cost is \$20 for the 14-week course. Instructor is Joan Winter. Call 277-3751 or 294-1369 for more info.

* * *

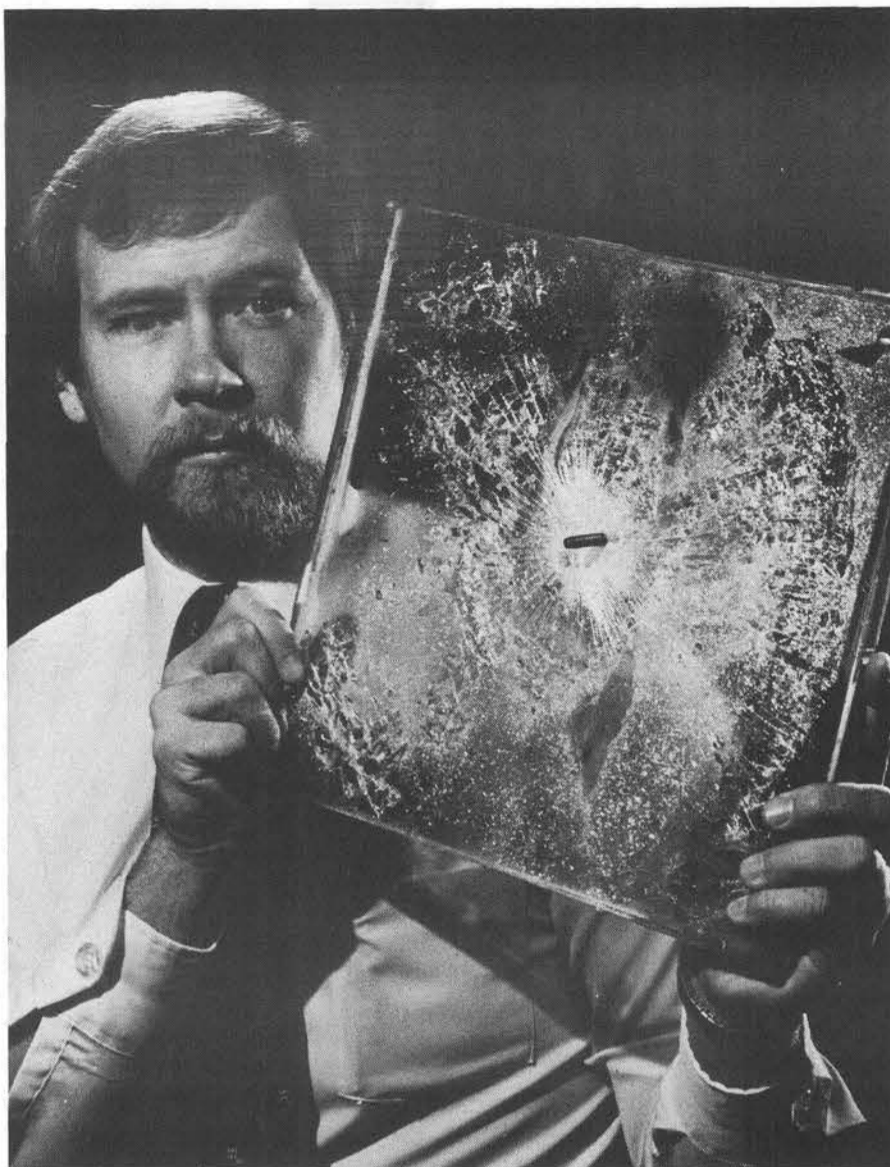
A workshop on the analysis of hydrogen in solids has been scheduled at Sandia Labs Jan. 23 to 25. Sponsored jointly by DOE's Division of Material Sciences and Sandia, the workshop will review methods for the quantitative analysis of hydrogen in solids, particularly the determination of microscopic information such as the lattice location, bonding and transport properties of hydrogen. Format consists of invited presentations plus discussion, and a large number of speakers from various laboratories are on the agenda. At the Labs, Dick Schwoebel (5110), 4-4309, is handling arrangements and may be contacted for further information.

* * *

Doug Balcom, chairman of the American section of the International Solar Energy Society and Asst. Energy Division Leader for Solar Programs at LASL, will be the speaker at the January meeting of ASME on Wed., Jan. 17 (8 p.m. in the Isabella room of Kirtland Officers Club West). In discussing passive solar heating and cooling of buildings, Doug will describe the characteristics, advantages and disadvantages and costs of five different design approaches.

* * *

Visitors to Sandia last week included representatives from the House Committee on Science & Technology/Subcommittee on Advanced Energy Technologies and Energy Conservation. They were Reps. Mike McCormack (D-Wash.), Eldon Rudd (R-Ariz.), Wes Watkins (D-Okla.) and New Mexico's Manuel



NEW ARMOR — A .30 caliber armor-piercing round is embedded in the polycarbonate back layer of a transparent armor developed at Sandia. Impact of the projectile pulverized the first two layers — a thin sapphire sheet and Pyrex glass laminate. Cliff Ballard (5845), above, developed armor for use on vehicles that transport radioactive materials.

Tough Stuff

Labs Armor Stops Rifle Fire

The medievalists' search for the perfect armor (which offers universal protection yet weighs nothing) is one step closer to realization with the recent development at Sandia of a transparent ceramic armor that is lighter and more effective than existing modern armor. Designed for use on vehicles which transport radioactive materials, the new armor is also significantly less expensive than conventional armor with similar capabilities.

The armor — layers of sapphire, glass, and polycarbonate — is 65mm thick and weighs 119 kilograms a square meter. It is made of commercially available materials and costs about \$14,000 a square meter.

Key element in the armor is a thin, low-cost sapphire front layer which blunts or diverts the pointed steel core of .30 caliber

armor piercing projectiles, greatly reducing their penetration capabilities. Ballistics tests show the armor to be 100 percent effective against such AP projectiles fired at standard velocities.

"At present, polycarbonate laminate or glass/polycarbonate composites, which weigh 155-175 kilograms a square meter and are at least 70mm thick, are used for protection against .30 caliber AP rounds," says Cliff Ballard of Sandia's Ceramics Development Division 5845. "But their weight makes them undesirable.

"Using single-crystal sapphire, the Army has developed an armor which is effective against AP rounds and is lighter (about 30mm thick and 80 kilograms a square meter)," says Ballard. "However, it costs about \$54,000 a square meter. This cost precludes its use in all but the most critical applications."

The Sandia armor consists of four layers of Pyrex glass (each 9.5mm thick) sandwiched between a 0.625-mm-thick sapphire front layer and a 25.4-mm-thick laminated polycarbonate backing plate. The Pyrex glass laminate holds the front layer rigid during impact, while the backing plate deforms, absorbing much of the projectile's kinetic energy. The backing plate also acts as a spall shield that protects against flying debris.

The new armor has been tested at impact velocities ranging from 815 to 873 meters per second, standard for M-1 rifles loaded with .30 caliber AP rounds. The rounds were usually found intact, either embedded at an angle in the polycarbonate or with the armor debris scattered in front of the test sample.

Sapphire and glass completely pulverize within a 20-30 mm radius around the impact point, leaving the polycarbonate exposed. Radial fractures of the sapphire and glass extend 25 to 75 mm from the impact point.

Lujan. The congressmen were briefed by Mr. Sparks and then toured solar and E-beam facilities. Additional briefings were given on Labs programs relating to conservation, nuclear waste and geothermal energy sources.

* * *

Geraldine Heyer (3145) was eating lunch recently at a restaurant in Coronado Center when she heard a commotion. A small girl about three years old had choked on a piece of hard candy, and her parents were holding her upside down pounding on her back without success. Gerry went over, took the child and performed the Heimlich maneuver, and out popped the candy. The child's color returned quickly. Gerry took Sandia's CPR course about a year ago. The maneuver, taught in the CPR course, consists in embracing the choking victim from the rear and forcefully thrusting upwards with the clenched hands between the stomach and the rib cage.

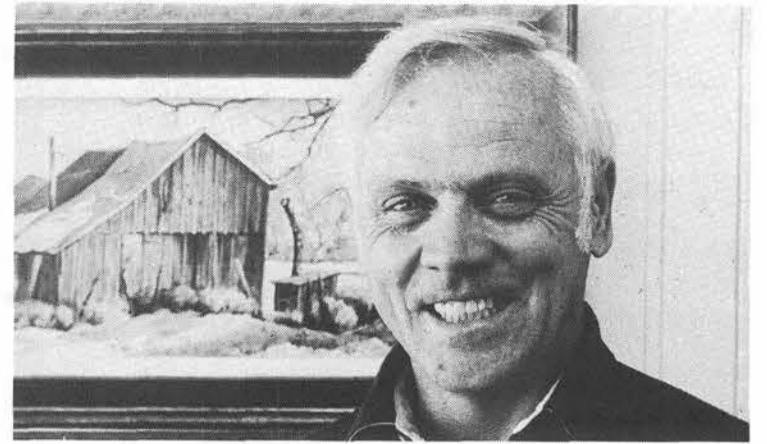
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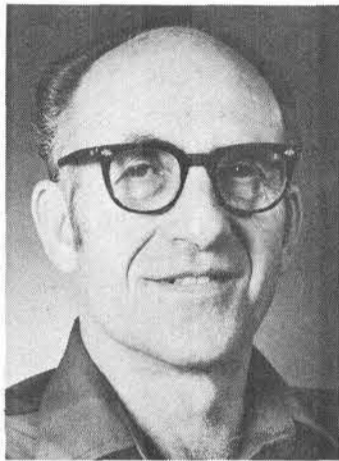
Jess Wright - 1423 30



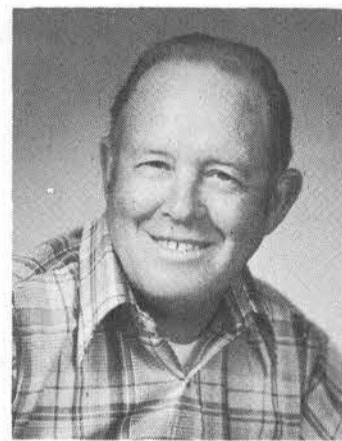
C.B. McCampbell - 2160 30



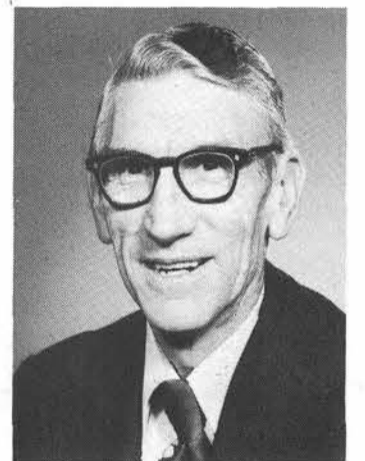
Herb Anderson - 1223 30



Wayne Trump - 3521 15



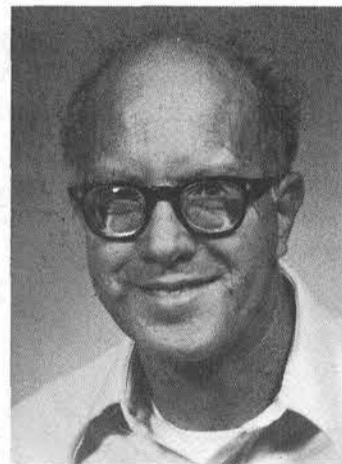
Harold Malmquist - 8257 20



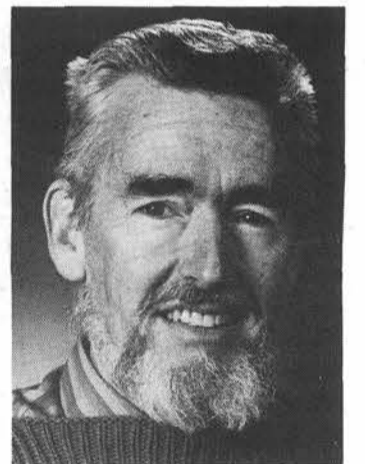
M.B. "Lucky" Sanders - 2433 30



Dez Brown - 8312 20



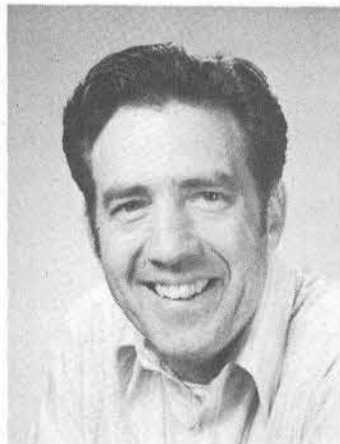
Charlie Eden - 3172 25



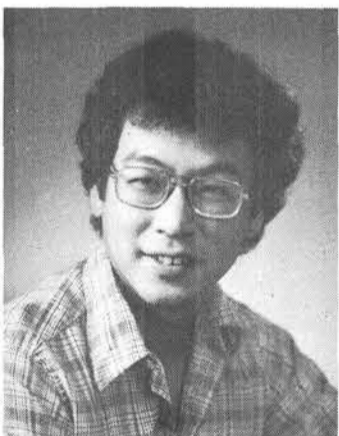
George Dalphin - 3144 15



Tom Takahashi - 1132 30



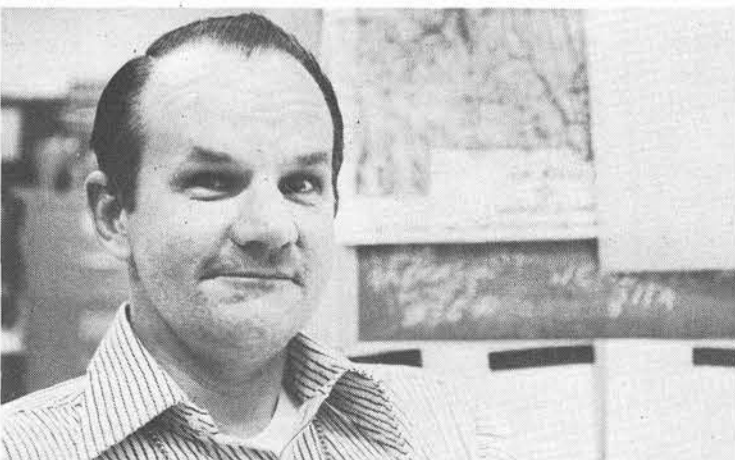
Henry Schoeppe - 8166 20



Dennis Ariizumi - 8441 10



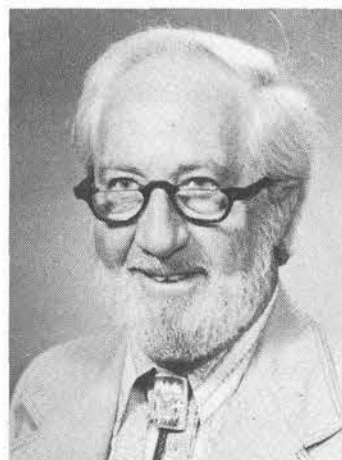
Joe Pitti - 3417 30



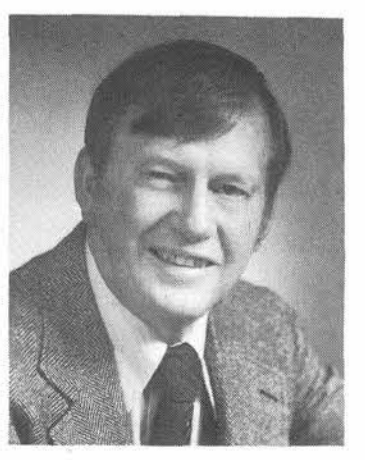
Harold Roberts - 1132 20



Tom Bozone - 1423 25



Malcolm Shannon - 1541 30

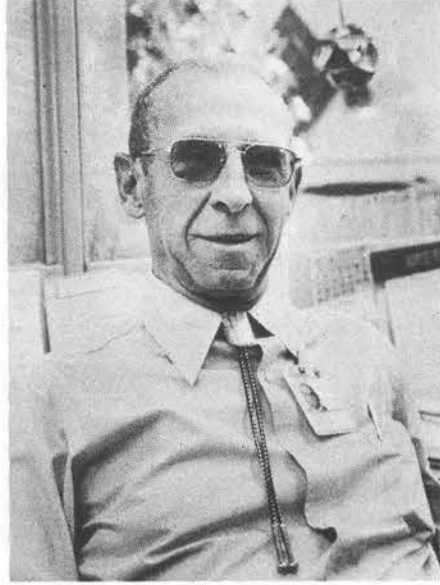


Connie Visbeck - 8151 20

Retiring



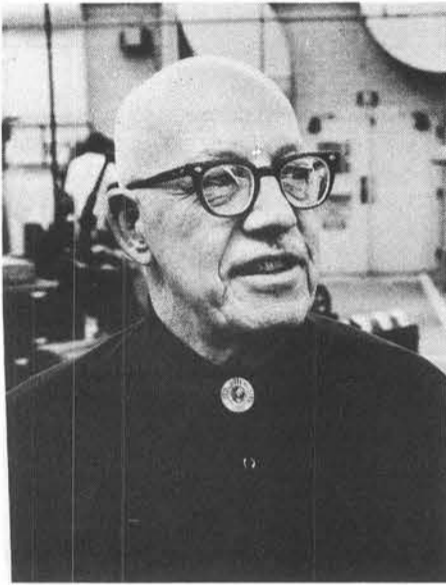
Joe Asturias (1247)



Wamon Cope (3426)



Gene Abbott (3541)



Francis Shea (1481)



John Hilger (1481)



Paula Asturias (3531)



Jim Allen (1171)

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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.

TRANSPORTATION

- '77 DODGE VAN, 318 (basic), \$400 under book; Apache pop-up camper, 1977, \$1350 or assume trailer prmts. at CU. Pritchard, Box 5, Jemez Springs, NM, 1-829-3659.
- '66 MERCURY, std. trans. Riley, 869-2119.
- '75 GRANADA GHIA, 4-dr., loaded, new tires, low miles. Hopper, 292-3059.
- '74 AUDI 100LS, AT, AC, AM/FM, \$400 under retail value \$2500. King, 299-9184.
- '76 FORD Ranger XLT, F-150 pickup w/shell, AT, AC, PS, PB, AM/FM/8-track, openable rear window, wired for CB, reg. gas. Thompson, 298-5800 after 5:15.
- '71 BUICK Riviera, new radials-exhaust system & brakes. \$1300. Marquez, 344-8583.
- '73 GREMLIN-X, V-8, Auto., Air, Levi interior, \$1200. Burd, 884-9133.
- '69 PONTIAC GTO, low mileage, AC, PS, PB, AT, \$750. Owyong, 294-1884 after 6.
- '74 NOVA Custom Hatchback, V8, AT, PS, PB, AC, 30,000 miles, below book: \$2500. Jones, 881-1918.
- '77 FORD Maverick, 6-cyl., 3-spd., 12,900 miles, \$2650, priced below book. Reif, 294-7644.
- '55 INTERNATIONAL Metro Step Van, not running, but good body, \$800. Huston, 293-2538 after 7.
- '75 CHRYSLER Cordoba, vinyl top, AC,

- PW, PS, Cruise control, \$3800/make offer. Riley, 821-6431.
- '69 PLYMOUTH Fury III, 4-dr., AC, radio, PS; also have 30.06 rifle. Mora, 881-2150.
- '75 HONDA 550, 12,000 miles, \$1100. Long, 266-4616.
- '76 MGB, red, 17K miles, \$4600. Thalhammer, 298-8521.
- '69 CHEVY ¾-ton, 350 CID, AC, PS, PB, camper spcl., utility box, 80,000 miles. Pilkington, 883-0223.
- '72 COUGAR XR7, AT, AC, PS, AM-FM-8-track, 47,000 miles, \$1500. Beeson, 299-6132.
- '72 FORD pickup, ½-ton w/AC, aux. tank, camper shell, \$2100. Mancuso, 296-4178.
- '71 FORD ½-ton pickup, 4-spd. trans., 57,000 miles, 3 gas tanks, camper, boot. Dean, 299-3281.
- '76 SOUTHWIND MOTORHOME, 28½', self-contained, low mileage, sleeps 6, all extras, lg. engine, AM/FM/CB, power plant, \$14,600. Bassett, 898-1840.

MISCELLANEOUS

- TRASH BAGS, city approved, \$4/box, \$20/case of 6, South Hwy. 14 Project. LAB NEWS office, Bldg. 814.
- TWO General Premium steel radial snow tires, HR70-15, mounted on 5-hole wheels, used part of 1 season, \$50. Wuttke, 298-0677.
- GENERAL ELECTRIC dishwasher. Riley, 869-2119.
- CRYSTAL swag light, \$5; flame bar stool, padded, \$6; Cosco folding chairs, \$4 ea.; Samsonite wardrobe & train case, \$25. Young, 256-9158.
- TWO steel garage doors, 8'x7', all related hardware included, \$40 ea. Wheeler, 281-3321.
- COMPLETE under dash AC for Chevy pickup, \$40. King, 299-9184.
- PIONEER AM FM in-dash car stereo, fits most cars, speakers available. Quintana, 883-8739 after 5.
- CARPET, nylon, candy stripe, 11'x13' w/pad, \$20. Trump, 299-5162.
- RARE ROOSTERS, \$2 ea.; few Bantam roosters, \$3, pigeons, \$1; will trade; need calf or small pig. Lackey, 898-6638.

- O'KEEFE & MERRITT gas range, chrome top w/lg. grill, oven & 2 broilers, pan drawer, fold-down shelf. Joseph, 299-6989.
- KING SIZE firm mattress & springs, 2 sets of sheets & pillowcases, \$125. Sharp, 867-2815.
- REGISTERED Bassethound pups, \$175 ea., \$75 down to hold prior to selling date (2/24). Horton, 255-7661.
- ELEC. STOVE, 30" white, \$40. Blossom, 299-6709.
- 39Z CHRYSLER "Hemi." Rare Offenhauser six duce intake w/Stromberg carbs, stock short block & heads, \$475. Gibbons, 299-2863.
- BALDWIN Orga-Sonic concert organ w/better quality Leslie speaker, solid walnut cabinet & bench, \$750. Lyon, 299-9423 or 294-4324.
- SEARS' 8'x10' storage building w/cinder block foundation & tie-down hardware, has repairable damage, best reasonable offer. Stone, 821-5070.
- SEAT COVERS, clear vinyl for 1977 Vega Hatchback, front & rear seats, never used, \$30. De Vargas, 255-4490.
- DINING ROOM SET: all teak Danish modern table, 59"x38" w/6 chairs, \$450. Zanner, 281-5594.
- BALDWIN PIANO, upright, nearly new, \$500; Encyclopedia Britannica in book case, \$50; books & record sets, various prices. Slesinger, 299-4626.
- GARAGE SALE: Sat. Jan. 13, 9 a.m. 652 Marquis NE (east at Grand & Juan Tabo, right on Marquis: appliances, bdr./DR furniture. Shepherd, 296-1238.
- DINING ROOM breakfast, 50"wx71"hx16"d, w/glass doors, \$150; alum. folding roll-a-way bed, \$25. Syler, 299-2941.
- COOK TOP, drop-in, 4-burner, white. Pilkington, 883-0223.
- ICE AUGERS, 1 9" Mustad, 1 Fin Bore, take your choice, \$15. Sheaffer, 255-9473.
- SINGER port. case for Model 247, \$20; ladies suede jacket, size 16, gold,

- new, \$25. Liguori, 256-3613.
- AM RADIO w/speaker, from '73 Chrysler, \$8; 2 H78-15 Atlas tires, both for \$20. Walter 296-7062.
- ARGUS slide projector w/Airquipt magazines; AM/FM cassette recorder; snow tires w/wheels to fit Pinto; gold carpet, 9x15, blue carpet, 12x20. Puk, 298-4080.
- 2-TONE gold shag carpet, 200+ yds., \$700, best offer; 95 moving boxes, 6 wardrobes, offer. Brown, 298-1303.
- TRAVEL TRAILER, 14' Eagle custom coach, sleeps 4. Dean, 299-3281.
- TWO B&W port. TVs, \$15 ea. Benson, 268-3586.
- VIOLIN, full size, w/bow & case, \$95; stereo record player w/AM/FM radio, \$30. Becktell, 299-7511 after 3.
- LOVE SEAT, red, \$125. Miller, 293-1206.

REAL ESTATE

- 1972 MOBILE HOME for sale or rent. Sena, 296-5919.
- SHARE PURCHASE & retire: 160 acre island private land in national forest SW Utah, ideal solar heating, gardening, Maak, 294-3207.
- 3-BDR., 1½ baths, LR, DR, kitchen, laundry, single garage, lg. fenced lot, near base. Forsythe, 298-4034.
- 3-BDR. Bailey & Ward home, 1 yr. old, dbl. pane windows, R-30 ceiling, landscaped, assume 9% FHA loan or refinance. Kerschen, 821-2848.

WANTED

- BASEBALL & FOOTBALL CARDS; top prices paid for your cards 1800-1972. Keck, 294-5593.
- BORROW OR BUY *National Geographic* magazine, March 1968. Caskey, 294-3218.
- WHEEL, 15", 6-hole for Chevy or GMC pickup. Coleman, 299-2377.
- EXERCYCLE w/speedometer, in good working condition. Padilla, 345-7660 after 5:30.
- RELOADING equipment for handguns cals, 7.65 mm Luger, 44 cal. Mag.,

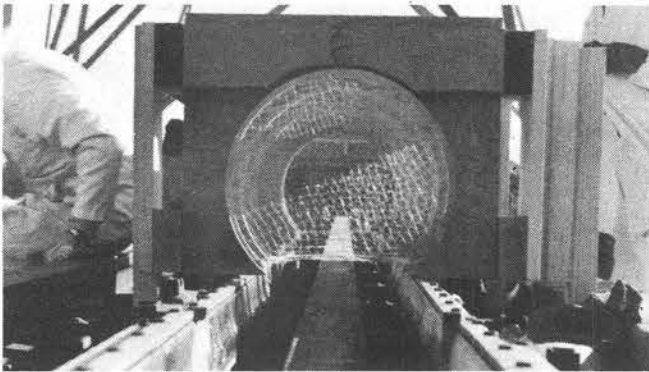
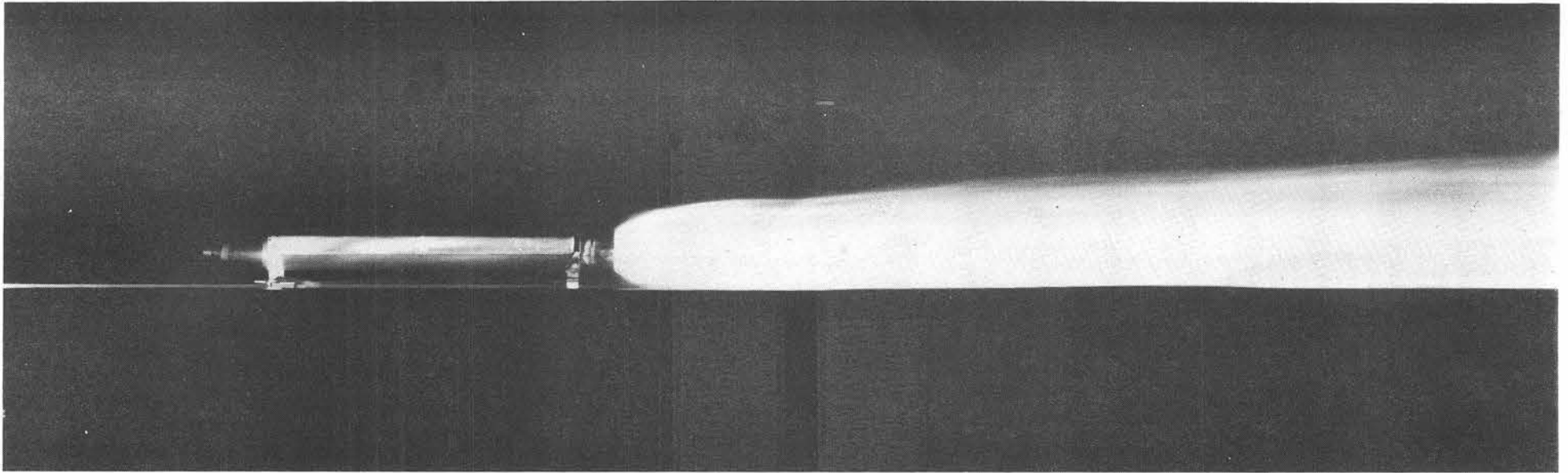
- 357 cal. Mag. or 38 Spcl.; brass for some. Pilkington, 883-0223.
- BABY CRIB w/mattress. Geer, 298-7914.

FOR RENT

- 3-BDR. home, 1 full bath, N. Valley, Callahan, 843-6025 after 5.
- 2-BDR., unfurnished apt., dishwasher, stove, refrig., SE of Juan Tabo & Central, \$215/mo. + gas, elec. Martinez, 821-8692.
- SKI CHALET near Taos Ski Valley, deluxe accommodations, fully equipped kitchen, sleeps 8. Peet, 294-1250.
- HOUSE in NE heights (Eastridge area), available between 8/1/79 & 9/1/80, terms are somewhat flexible. Reif, 299-2665.
- 3-BDR. HOUSE, 1 bath, separate dbl. garage in rear yard, \$300/mo. Long, 296-2590.
- CHIMNEY RIDGE townhouse: 2-bdr., 2 baths, fp, atrium, clubhouse & pool privileges, \$395/mo. Frye, 255-8364.
- 3-BDR. NE, modern, 1¼ bath, FR, fp, carpeted, drapes, kitchen appliances, fenced, garage, \$365/mo., first, last, DD. Follstaedt, 883-1649.
- PARADISE HILLS, new 4-bdr., \$425/mo. + DD. DeBaca, 897-2975.

LOST AND FOUND

- LOST — Ladies fluffy tan suede gloves, bi-focal safety glasses, man's "Altar" wristwatch w/grey band, man's black Russian-type curly fur hat, contacts in white plastic case, man's black/gold knitted wool hat, man's black nylon glove w/leather palm, man's lt. brown leather glove, ladies' India cotton scarf.
- FOUND — Hopi bird iac, woman's white barrette, silver loop earring for pierced ear. LOST AND FOUND, Bldg. 832, 264-1657.



MK12A Tested on Rocket Sled

A TEST SERIES at speeds up to Mach 6 on the MK12A impact fuze was recently completed on Sandia's 5000-foot rocket sled track in Area III. Reaction of the fuze to snow, rain and ice particles was tested along with its electrical output when impacting into a dirt target. Tests were performed for the Air Force SAMSO organization. At left, (direct center of photo) is a simulated ice particle target which consisted of tiny nylon beads glued onto hairnets — a flimsy quarter-inch mesh material. Ground snow was simulated by a box of nylon chips. Bill Kampfe and Dave Preston of Track and Cables Division 1535 were test engineers for the project. Billie Pierce (1556) headed the photometrics effort. Harold Rarrick (1535) was test program manager.

Coronado Club Activities

Wolfpack Going To Tucson

HAPPY HOUR TONIGHT sees a group called Natural Persuasion on the bandstand, a choice of lobster tail or New York strip steak on the buffet. Next Friday features Shalako making music, the Club's famous steamship roast beef on the buffet. The Coronado Grand Squares will perform at intermission time. Call the Club office, 265-6791, by mid-week to reserve your buffet tickets.

THE BIGGIE this month is a shrimp peel on Saturday, Jan. 27, with the works — clam chowder, baked potato, green chile and like that. Reserve your tickets by Jan. 20. This might be a good time to use the new \$2.50 discount coupon attached to your Club calendar. The thing that makes this event outstanding is the Mellotones playing for dancing. One of the finest musical groups in the city, the Mellotones feature the big trumpet of Freddie Omstadt. Tickets are \$7 for members, \$8 for guests.

SINGLES MINGLE Friday, Jan. 19, starting at 4:30 in the Eldorado room. Munchables, door prizes, and a singalong

with Yolanda are part of the fun. Mark your calendar now.

A NEW SQUARE DANCE CLASS for beginners starts Monday, Jan. 22, at 7 p.m. in the main ballroom. Instructor is Cal Campbell, caller for the Coronado Grand Squares. You can try this a couple of times and see how it goes before enrolling for lessons. The 20-week course costs \$40 per couple.

CORONADO SKI CLUB meets Tuesday, Jan. 16, for a social hour and a program of ski instruction by Tom Lang, Sandia Peak ski school director.

CORONADO WOLFPACK travels to Las Vegas and San Diego Jan. 25-28 to see the Lobo Games. The works costs \$268 (dbl) or \$307 (single). Call Pro Padilla, 4-3462, for more info.

The Wolfpack is also planning a charter bus trip to Tucson for five days starting Feb. 14 to view the Tucson Open golf tourney. Lodging, breakfasts, cocktail parties and bus fare costs \$148 (dbl) and \$200 (single). Call Pro for more information.

TEENAGERS disco Jan. 20 from 7:30 to 10:30 with music provided by Rick Dustin. Member parents should pick up tickets for their youngsters.

FIRST TRAVELOGUE NIGHT this year is set Wednesday, Jan. 24, at 7:30 p.m. in the main ballroom. Bob Woods (4715), who professes to be an amateur historian and archeologist, will show slides of Greece and the Greek Islands taken last summer. The program is free.

RETIRED CLUB MEMBERS will party starting at 4:30 today in the Eldorado room. Entertainment, munchables and a Happy Hour bar are scheduled.

Retiree Notes

Bill Allison, a safety engineer while at Sandia, writes from Reading, Pa.: "So far (since retiring) I have worked on nuclear power plant safe design, MHD, OTEC, coal gasification, coal dust explosion prevention, and liquid oxygen (LOX) hazard control . . . I've published papers on *Preventing Cable Insulation Fires*, *Human Engineering*, and *Motivation by Example*. Also spoke on the subject *Profitable Hazard Loss Control* at the National Safety Congress." Bill retired from Sandia five years ago.

