

PARTICLE BEAM FUSION ACCELERATOR—Major construction work on this facility in Area IV has been completed, and it is expected to be in operation by next fall. It will have a dual capability: to accelerate electrons, producing intense bursts of x-rays to simulate nuclear weapons effects; and the

generation of high-current, high-voltage ion beams for use in producing fusion—the controlled thermonuclear reaction that ultimately may provide the solution to the nation's energy problems. Story on PBFA is on page 6.

LAB NEWS

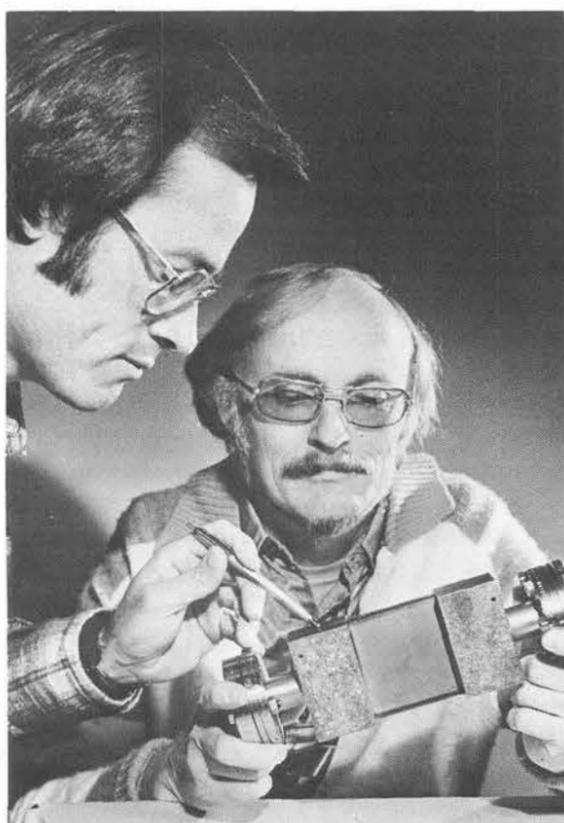
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NOVEMBER 16, 1979

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

Out of Weapon Technology

Labs Developing Neutron Generator for Cancer Use



DON COWGILL & FRANK BACON, both of Applied Technology Division 2352, examine target element of neutron generator designed for application to cancerous tissue. Some cancers appear to respond better to neutron treatment than to irradiation with conventional gamma or x-rays.

Sandia Laboratories has begun development of a neutron generator for use in cancer treatment. The two-year program will be supported by an \$800,000 grant from the National Cancer Institute.

The new project follows two years of research at the Labs to determine if technology used in nuclear weapon neutron generators could be adapted for use in cancer treatment. This work was supported by approximately \$600,000 in NCI funding.

The generators have long been used in weapons to produce an intense burst of neutrons to initiate an explosion, but it wasn't known whether the devices could be adapted to produce continuous beams of intense radiation for cancer therapy. The Sandia research indicates that the generators can be so adapted.

Neutron generators function by accelerating a beam of deuterium and tritium ions—atoms with their orbiting electrons stripped away—against a metal target loaded with deuterium and tritium.

The resulting atomic collisions cause some of the atoms of these heavy forms of hydrogen to fuse, producing excess neutrons which can be collimated into a beam.

Much of the work at Sandia on the cancer project has involved development of a target which could withstand the heat created by continuous ion bombardment. Temperatures at the target surface must be kept below 450°C to keep the target from disintegrating.

The target has been designed to consist of a 100x150mm, 50-micron-thick film of erbium or scandium metal containing deuterium and tritium. This film is deposited on a copper substrate containing cooling tubes through which water flows. This target has a projected life of about 100 hours.

Current work involves incorporating the target into a sealed-tube neutron generator and testing the generator to determine neutron production rates, target life, and

[Continued on Page Five]

Afterthoughts

It may be better just staying home--TWA has published a small brochure entitled "Tipping in Europe, the Middle East and the USA," which has to be one of the more dismal things I've read lately. It includes a chart listing the staggering number of people who, palms outstretched, expect a tip: waiters, chambermaids, bellhops, doorman, concierge, taxicab driver, airport porter, lavatory attendant, hairdresser and theater usher. Then it lists the customary tips to these people in 11 different countries.

Most of us expect to tip waiters and when, a few years back, some restaurants simply added a 10 or 15% service charge, that seemed a not illogical institutionalization of the custom and saved you, the customer, the bother of calculating and coming up with the right change. But let me now quote from this invidious chart concerning tipping of waiters in various countries: "Austria --5% over usual service charge; Egypt--10% over the 10% service charge; West Germany--5% over usual service charge; Greece--15% service charge, leave 5% to 10% more; Israel--10% of check over the 10% service charge." And more in the same vein. The supertip has arrived. It doesn't take an extraordinary degree of sensitivity to feel that one is somehow being had under this scheme. Tipping is essentially degrading to the recipient and demeaning to the giver--why does the custom persist?

* * *

More self-improvement--We're always on the lookout for ways for our readers to improve their cultural tone, so we were delighted to find important news in a flyer from that capital of kitsch, Las Vegas (not New Mexico, the other one). It seems that the Liberace Museum is now open for business: "See the world's rarest piano collection, classic and customized automobiles... plus a close-up look at the glittering and bejeweled million dollar wardrobe." Costing only \$3.50 to get in, the Liberace Museum surely will be right up there with the King Tut exhibit, Lenin's Tomb and others of that rank. Take the kids too--there's bound to be nothing like it in the free (or any other) world.

* * *

"In the queer mess of human destiny the determining factor is Luck. For every important place in life there are many men of fairly equal capacities. Among them Luck decides who shall accomplish the great work, who shall be crowned with laurel, and who shall fall back into obscurity and silence." George Washington by William Woodward
*js

Take Note

If you really want to know all about your antecedents, the Albuquerque Public Library has a Special Collections Branch with a group of books "... for those who want to find their family roots." The collection includes information on nearly every state in the union as well as some data on foreign coats of arms. And the library can borrow other books and microfilms on the subject from all over the country. The library is at 423 Central NE (the previous main branch); its number is 766-7720.

* * *

Visitors to the Labs on Oct. 30 included Jack Hobbs and Marshall Ryan, Controller and Deputy Controller, respectively, of the Department of Energy. VP Al Narath (4000) was host to these visitors. On Nov. 9, Rear Adm. R. H. Wertheim, Director of Strategic System Projects for the Navy, came to Sandia for briefings. EVP Jack Howard (2) was Adm. Wertheim's host during his visit.

* * *

An easy way to see the Zuni Pueblo's Shalako ceremony on Nov. 24 is to take advantage of the YWCA's bus tour to the ceremony which leaves the downtown YWCA parking lot at 5:30 p.m. The Shalako, consisting of a long series of dances and rituals, is one of the most important of the Zuni religious ceremonies. The trips consists of a stop for dinner in Gallup with a presentation on the meaning and significance of the Shalako. After the midnight ceremonies at the pueblo, the bus will return to Albuquerque. Cost of \$33.50/person includes transportation, dinner, and coffee and doughnuts. Phone 247-8841 by Nov. 21 to make reservations.

Sympathy

To Ruth Wright (2145) on the death of her brother in Pa., Sept. 29.

To Tom Sullivan (1253) on the death of his father-in-law, Oct. 30.

To Wayne Sebrell (1252) on the death of his father-in-law in Roswell.

To Frank Chavez (1474) on the death of his son in Albuquerque, Nov. 3.

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LARGE TROPHY for second place in a national pistol competition among DOE security and courier forces went to this Sandia team that shot a 2203 out of a possible 2400 in a standard police course. Members are Milt Lesica, Larry Torres, Dave Stout, Gary Malin, Byron Gardner and Harold Garcia (all 3432). Individual trophies were awarded for master, expert, sharpshooter and marksman classes.

Take Note

Three Sandians have been elected officers of the Livermore Valley Chapter of the American Business Women's Association for the upcoming year. They are: Karen Quock (8261), president; Deborah Nordell (8150), recording secretary; and Arline Harrell (8200), treasurer. For information on ABWA membership, call Karen on ext. 2413. The Chapter meets every third Tuesday of the month at 7 p.m. at Hap's Restaurant.

Congratulations

Mr. and Mrs. Lorenzo Asia (8272), a son, Lawrence Earl, Sept. 24.

Lollie Short (8161) and Al Nunez, married in Livermore, Oct. 6.

Dennis Sparger (8352) and Lori Peterson, married in Sunol, CA, Oct. 6.

Mr. and Mrs. Bill Wilson (8341), a son, Sebastian Mikael, Oct. 9.

Sympathy

To Lloyd Rothacker (8257) on the death of his brother in Los Angeles, Oct. 28.

To Vern Barr (8424) on the death of his father-in-law in Lakeview, Ore., Oct. 18.

ENERGY.
We can't afford
to waste it.

Retiring



Bill Ryan (8264)

LIVERMORE NEWS

VOL. 31, NO. 23

LIVERMORE LABORATORIES

NOVEMBER 16, 1979



IN CENTRAL PARK, John Martin (8161), right, approaches the finish line.

Martin Runs The New York

"Everyone who finishes is a winner," says John Martin (8161), a runner in the 1979 New York City Marathon. This was his third straight year for the annual October event, which consistently draws record numbers of participants, making it the largest marathon in the world.

John found this year the most difficult of his three outings—unseasonably high temperatures and high humidity produced stomach cramps in the late stages of the race. Nevertheless, he finished the 26-mile distance in a respectable 3:44:36, toward the middle of the field of more than 11,000 runners including some 1800 women registrants.

Two other marathons in the world, in Boston and Tokyo, have as much glitter as the New York. Tokyo's marathon is by invitation, and entrance to the Boston is by qualification (John ran in Boston last April). But New York's is a "people's" marathon where registration is open to anyone. John says that was readily apparent as the crowd started—nearly half of the field was first-time marathoners.

"We were quite literally shoulder to shoulder," he recalls. "For the first two miles, it was like running in an elevator. Then it thinned out as the race progressed through the streets of Brooklyn and the runners could finally establish their own pace."

The New York City Marathon follows an interesting course, winding through all five of the city's boroughs, starting from the Staten Island side of the Verrazano-Narrows Bridge, the longest suspension bridge in the world. Says John, "It's hard to describe your exhilaration as you run over the bridge, taking in the breathtaking view of lower Manhattan, feeling the press of the crowd."

"The course cuts through all kinds of ethnic neighborhoods. The Irish, Scandinavian, Hispanic, Italian, Greek, Black and Jewish sections of Brooklyn; the Polish and German populations in Queens; the mixed cultures on Manhattan's First Avenue; Spanish Harlem in the Bronx; Black Harlem in upper Manhattan; and finally, Fifth Avenue's well-heeled residents."

"At the finish line in Central Park you're cheered on by thousands of spectators lining the course along the last four miles."

This was John's 14th marathon. In training he puts in 6 to 10 miles daily, with longer runs of 12 to 20 miles on weekends.

"I confess I'm addicted to running," he comments. "But I like the positive feeling you get—the psychological lift—that comes with long-distance running. The marathon has its own special sense of achievement because of its distance and the tradition surrounding it."

Supervisory Appointments

JOHN WEBB to supervisor of Exploratory Radar Development Division 2345, effective Nov. 16. John has been with this division, which he now supervises, since coming to the Labs 10 years ago. Some of the more complex projects which he has worked on include advanced development work on the MC 2823 radar for the MK 4, a five-year Murine radar project and, more recently, development of a proximity fuze.

John received his BS and MS in 1969 from MIT. Before entering college he served four years in the Air Force. John is a senior member of IEEE and is an amateur radio operator. He and his wife Margaret have three children.

* * *

CHUCK GIBBON to supervisor of Integrated Circuit Process Development and Control Division 2142, effective Nov. 1. Chuck transferred to Sandia in 1978 from Bell Labs at Murray Hill, N.J., where he had supervised two groups—one working on surface studies and the other on integrated circuit processing. His work at Sandia has focused on processing development of silicon gate integrated circuits.

Chuck earned a BS in metallurgical engineering from the University of Kansas and a PhD in materials science from Notre Dame. Before joining Bell Labs he did post doctoral work at Argonne National Laboratory.

Chuck and his wife Judy share an interest in American Indian arts and crafts and enjoy living in the Southwest; Chuck also enjoys photography. The Gibbons have three children.

* * *

RON FOX to supervisor of Enhanced Oil Recovery Division 4738, effective Nov. 1. Ron joined Sandia in June 1967 as a member of an aerodynamics group working on ionized gas problems, fluid turbulence, underground testing and isotope enrichment. Since 1977, he has been associated with the Labs' deep steam project. Ron's newly created division will continue the deep steam project and work on heavy oil and tar sand recovery.

Ron earned BS, MS and PhD degrees in physics from Southern Missionary College, Washington University and the University of Tennessee, respectively. He is a member of the American Physical Society, the American Institute of Aeronautics and Astronautics, and a member of that group's fluid dynamics advisory panel; he belongs as well to the Society of Petroleum Engineers. Off the job, Ron enjoys numerous outdoor activities. He and his wife Sharon have two children.

* * *

JIM RICE to supervisor of Laser Chemistry Division 4218, effective Nov. 1. Jim first came to the Labs in October 1969 as a member of Sandia's post doctoral



NEW SUPERVISORS—(l-r): John Webb (2345), Jim Rice (4218), Chuck Gibbon (2142), Ron Fox (4738) and Barry Granoff (4731).

program. Assigned to an R&D group, Jim worked on high energy ion atom scattering. He became a permanent employee in 1971 and was assigned to a chemical laser division working on chemical kinetics. For the past several years, he has been working on laser research and development. In his new position, Jim and his group will investigate laser-induced chemical reactions.

Jim earned a BS in chemistry from Indiana University and a PhD, also in chemistry, from the California Institute of Technology. He is a member of the American Physical Society and the American Chemical Society. In addition to church activities, Jim enjoys jogging, backpacking and photography. He and his wife Linda have two children.

* * *

BARRY GRANOFF to supervisor of Process Research Division 4731, effective Nov. 1. Since coming to Sandia 10 years ago, Barry has worked in the carbon program doing graphitization kinetics studies, and on oil shale pyrolysis. For the past four years he has been concerned with coal liquefaction, studying mineral effects and disposable catalysts. In Barry's current division, work is focused on fossil energy programs dealing with coal liquefaction and gasification, as well as with oil shale.

Barry earned a BS in chemistry from City College of New York, and an MS and PhD in physical chemistry from Princeton. He is a member of the American Chemical Society and the American Association for the Advancement of Science. Barry's leisure interests include photography, jogging and cooking Chinese food. He, his wife Marianne, and two children live in the NE heights.

Motorcycle Followup

Earlier this year LAB NEWS carried an article on the pleasures and pitfalls of cycle riding. We urged any new rider to learn as much as he/she could before undertaking commuting or other riding in traffic.

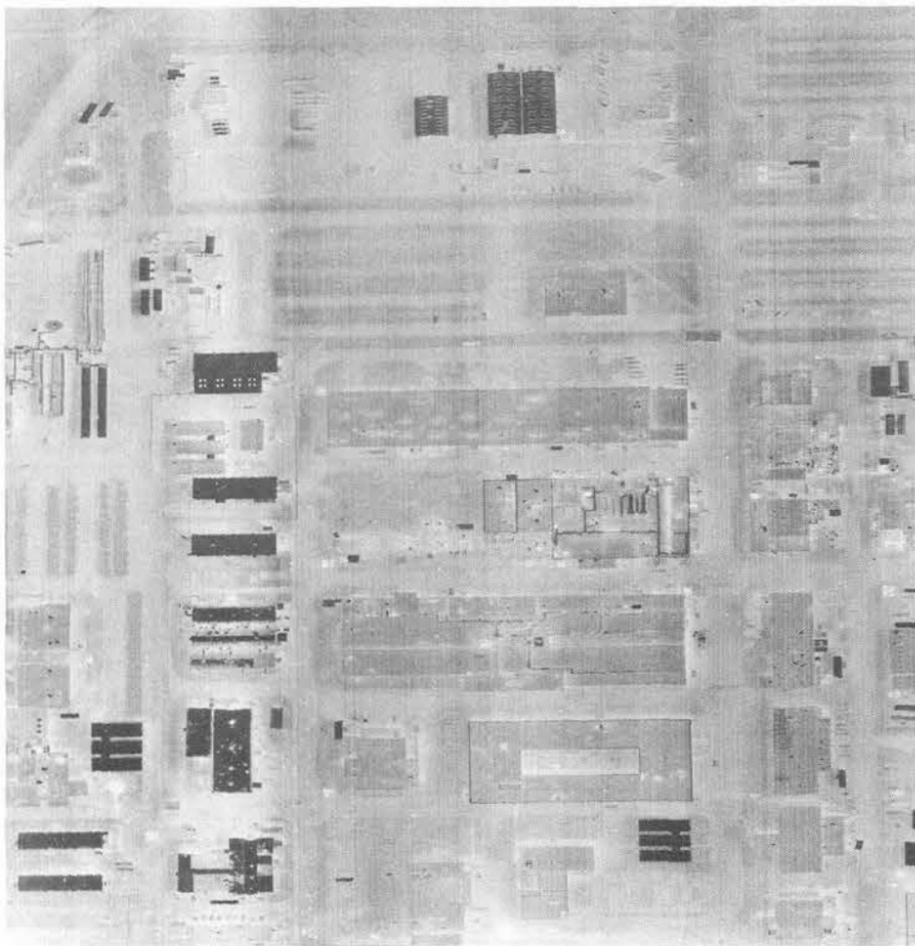
A cycle course was being offered on Base, but much of it was during work hours. We've recently learned of another course, entitled Motorcycle Safe Driving, that is being offered under the sponsorship of the Dept. of Motor Vehicles and the New Mexico Traffic Safety Board. The course consists of 20 to 22 hours of riding and classroom work and meets Monday through Thursday from 6 to 9 p.m., with the final session on Saturday from 8 to 5. All sessions are held at DMV on San Pedro, just north of Central.

The \$25 fee covers the cost of the motorcycle, helmet, books and gasoline, all of which are provided. Some insurance companies give lower rates to cyclists who complete this course; in addition, your completion certificate qualifies you for your motorcycle driver's license.

You may sign up at DMV or by calling the DMV registrar on 842-3065.



In Mathews, VA, they recently fired a teacher because he asked his 11th grade students to read and write a book report on Aldous Huxley's 47-year-old science fiction classic, *Brave New World*. In the face of parental objection to sexual and religious references in the book, the County School Board ordered the teacher to cancel the assignment—even though the book was freely available in the school library. When the teacher refused, the School Board notified him that his contract would not be renewed. (And so it goes in our brave new world.)



THERMAL INFRARED SCANNING is a relatively new technique to discover heat loss in buildings and underground steam lines. It also helps pinpoint moisture-laden roof insulation. These infrared photographs (left is north), taken at night by an Army Mohawk aircraft on a training mission out of Ft. Huachuca, aided Plant Engineering people in finding some problem areas in Tech Area I. In photo at left, Bldg. 836 is the rectangle with open patio (lower center). Metal roofs photograph black on infrared film. Heat loss in a steam line is indicated by the small white circular area south of Medical Bldg. 831 (motorcycle parking area). Photo at right shows Tech Area near Gate 10 with

Bldg. 894 in the lower center left. Note white line between north end of Bldg. 894 and south end of Bldg. 893. This indicates another leak in a steam line. (Water in roadside ditches also photographs white.) Mottled gray areas in the roof of Bldg. 894 indicate collected moisture—problems which are now being fixed. Hal Baxter (3652) arranged for the aerial survey by military aircraft and is responsible for interpreting the data. Film from the survey is now undergoing electronic color enhancement for a more refined temperature coded picture of Sandia's buildings. This will produce valuable information for Sandia's continuing energy conservation efforts.

Continued from Page One

Labs Developing Neutron Generator for Cancer Use

beam size. Work is also underway to eliminate impurities, such as oxygen and copper atoms, from the ion beam. These impurities cause target damage and reduce neutron production.

The prototype sealed-tube generator is expected to produce 10 to 20 trillion neutrons per second with an energy of 14MeV. A portion of these neutrons will be collimated into a 10x10-centimeter beam, which will irradiate the patient with a dose of 10 to 20 rads per minute during treatments lasting about five minutes. These are the beam characteristics cancer researchers believe are required for effective treatment.

If development and testing of the new tube are successful, the next step would be to incorporate it into a compact, rotatable-beam machine for clinical use. Cost of such a machine is projected to be \$1 to \$1.5 million—one-third to one-half the cost of the larger, more complex cyclotrons being proposed to produce neutrons for cancer treatment.

One possible disadvantage of the new generator is that the target must be replaced after about 100 hours of use. However, Sandia researchers feel that a movable target can be designed in which the ion beam impacts against different points, increasing target life to 300 to 500 hours, necessitating a target change only once a year.

Efficacy of neutron irradiation of cancers is not fully established, although preliminary research at medical institutions in the U.S. and abroad indicates

that at least some cancers respond better to neutron treatment than to irradiation with conventional gamma or x-rays.

The effectiveness of neutrons is thought to stem primarily from the fact that they interact with the nuclei of atoms, producing atomic fragments which in turn produce effects which are more likely to damage a cancerous cell than are the effects produced by x-rays or gamma-rays, which interact only with the electrons in an atom.

A second advantage of neutrons is that they appear more effective against oxygen-deficient cells than x-rays or gamma-rays. Such cells are often found within cancers.

Radiation treatment of any kind owes its effectiveness to the fact that cells which are dividing rapidly—the prime characteristic of cancer—are more sensitive to radiation than normal cells and less able to repair themselves.

By administering radiation in repeated, carefully controlled doses by beams of the proper energy and orientation, it is possible to kill malignant cells while sparing normal cells in the surrounding tissue. The neutron generator is expected to be compatible with this general requirement, producing beams which are powerful enough to reach subcutaneous cancers from various angles so that intervening tissue can be spared.

The neutron generator is one of several products of Sandia's nuclear weapons research which have medical applications. "The advanced nature of weapons research and development often leads to appli-

cations outside the field of defense," says Frank Bacon, who heads Applied Technology Division 2352 where the generator is being developed.

Other medical applications of weapons technology include an artificial pancreas, being developed in cooperation with the University of New Mexico for treatment of patients with diabetes, and the laminar flow clean room concept, developed at Sandia in the early 1960s and now used worldwide in hospital operating rooms.

Others contributing to the neutron generator project are Robert Walko, Donald Cowgill, Robert Bickes, Jack Boers, Alfred Riedel, and James O'Hagan, all from Div. 2352.

Speakers

W. B. Bopp (2457), "Computer Graphics, Some Current Mechanical Applications," AFPRO Manufacturing Engineers Workshop, Sept. 6, KAFB.

J. T. Holmes (4713), "The Solar Power Tower," Albuquerque Section, American Society of Civil Engineers, Sept. 12, Albuquerque.

R. L. Iman (1223), H. P. Stephens (4538), J. M. Davenport (Texas Tech.), R. K. Waddell and D. I. Leap (both USGS), "Sensitivity Study on the Parameters of the Regional Hydrology Model for the Nevada Nuclear Waste Storage Investigations," 5th annual meeting of DOE Statistical Symposium, October 1979, Gatlinburg, Tenn.

D. C. Reda (5633), "Roughness-Dominated Transition on Ablating Blunt Bodies at Hypersonic Speeds (The Noretip Problem)," 32nd annual meeting American Physical Society, Division of Fluid Dynamics, Nov. 18-20, University of Notre Dame.

Fusion Is Goal of Particle Beam Facility

Scientists at Sandia have made major advances in generating and focusing light ions and will now employ these atomic particles in a large inertial fusion accelerator—the Particle Beam Fusion Accelerator—currently under construction in Area IV.

The rapid progress in generating intense ion beams could ultimately speed development of fusion reactors which would generate energy by imploding small fuel pellets of deuterium and tritium.

The initial implosion experiments using ion beams were conducted by a group, headed by David Johnson of Beam Experiments Division 4244, which used the Labs' Proto I accelerator to produce beams with a current density of 400,000 amps per square centimeter.

"This represents a ten-fold increase in energy density over our original experiments conducted last February," says Glenn Kuswa, manager of Particle Beam Fusion Research Department 4240.

"The progress here, as well as our improved understanding of ion flows that we gained from studies by Jeffrey Quintenz and James Poukey, led to our decision to employ ion beams rather than electron beams in the Particle Beam Fusion Accelerator.

"We'll retain the capability to accelerate electrons to produce intense bursts of x-rays to simulate nuclear weapons effects," says Glenn, "but the thrust of our fusion effort will be generation of higher-current, higher-voltage ion beams with reliably positioned focal points."

The change-over from electrons to ions is not expected to slow development of the facility. Recent investigations indicate that both electrons and ions can be accelerated with essentially the same equipment by reversing the polarity of the machine's transmission lines and by modifying the diode in which the beams are generated.

Electrons are negatively charged particles which orbit atomic nuclei and carry electric current; ions are the charged particles produced when orbiting electrons are stripped from or added to an atomic nucleus, usually by heating.

The PBFA is being built in two stages. PBFA I, to begin operating next fall, will produce 36 radially-converging particle beams capable of irradiating fusion targets with approximately 30 trillion watts of power in pulses lasting 40 billionths of a second. This machine will operate until early 1983 when it will be shut down for upgrade to PBFA II. The upgrade calls for an increase in the power output up to 100 trillion watts. It will be ready for testing in 1985.

The new accelerator, being constructed under DOE's inertial confinement fusion program, will operate by passing electric current through a series of capacitors, switches and transmission lines, eventually forming beams of particles that impact on the surface of a small sphere filled with deuterium and tritium.

If beams of sufficient intensity are

focused onto a properly-designed target, atoms of deuterium and tritium will fuse, releasing energy which, in a full-fledged fusion reactor, would be used to generate heat to power a turbo-generator.

The fuel pellets would be injected into the reaction chamber at the rate of perhaps 10 per second, producing micro-explosions which would release energy equal to detonation of about five pounds of TNT. These small thermonuclear explosions would generate more energy than would be required to produce them.

To gain any worthwhile net power from such a reactor requires that the fuel in the pellet be heated by the particle beams to about 100 million degrees C and be compressed to about 1000 times liquid density. This will require beams with an instantaneous power level of at least 100 trillion (100,000,000,000,000) watts.

The PBFA is an experimental accelerator and will irradiate only single pellets, producing insufficient fusion reactions to explore reactor technology fully. However, success in the experiments could ultimately lead to construction of experimental power reactors which could be in operation within 20 years after pellet ignition principles are established.

Sandia researchers began experimenting with electron beam fusion in 1972, and electric pulsers with outputs up to ten trillion watts have been produced. The experiments were an outgrowth of the Labs' extensive program of simulation of nuclear weapon effects. Research with ions began in 1977, and beams of one trillion watts have been produced. The fusion program has, in its turn, led to improved simulation of weapon effects.

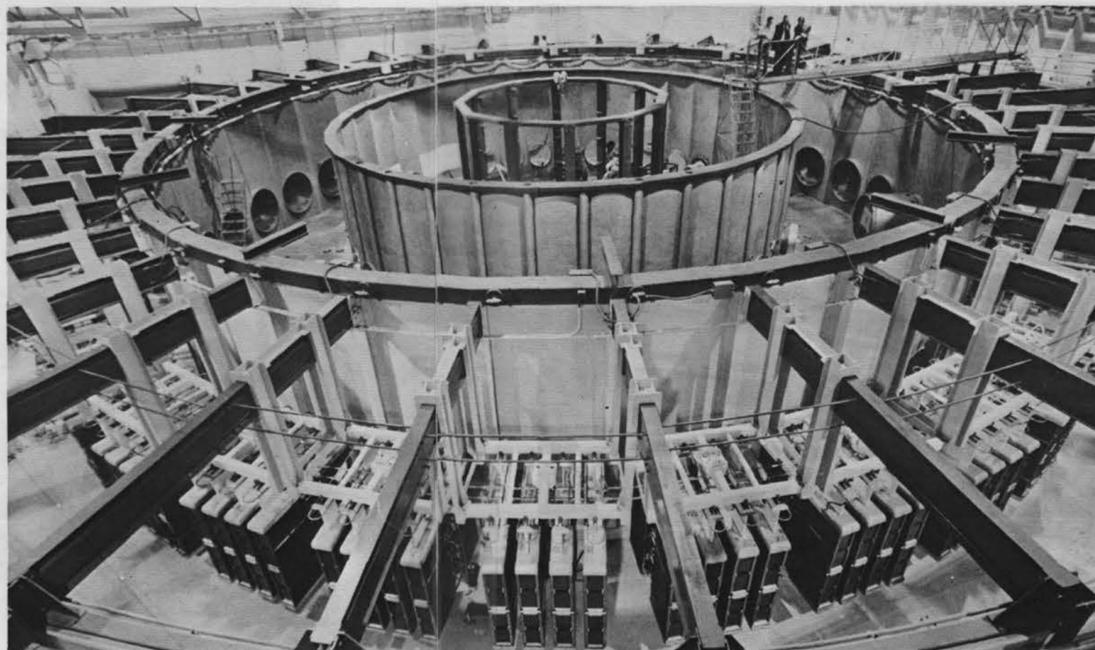
The interest in light ions (carbon, oxygen, and others whose mass places them in the lower half of the periodic table of elements) stems from the fact that they are relatively easy to accelerate (compared to heavy ions such as uranium) and have deposition characteristics which make them superior to electrons.

Ions are at least 2000 times heavier than electrons, thus travel more slowly and stop in the thin layer of the outer shell of the pellet without emitting penetrating x-rays which heat and degrade the pellet before implosion is complete.

Ions have the further advantage that beam power can be "bunched" at the target by increasing the voltage during a pulse so that slower moving ions at the head of the pulse are overtaken by faster moving ions late in the pulse. Bunching, it is believed, can increase the power of a pulse about five times.

Overall, ion beams are calculated to be three to 10 times more effective in imploding pellets than are electron beams of equal power, and the physics of ion absorption on the pellet surface is less complex. The pellets used in current experiments are gold or plastic shells a few millimeters in diameter, with walls .002 to .04 centimeter thick.

"Pellet physics is the key problem in



inertial confinement fusion," says Glenn Kuswa. "Use of ion beams gives one a great deal more latitude in pellet design."

The experiments conducted in the past year by David Johnson are important because they show that it is possible to produce an intense ion beam despite the severe limitation that while ions carry the same electrical charge as electrons, they are much heavier. This means that when electrons and ions are accelerated by a machine, the lighter electrons, traveling in the opposite direction at near the speed of light, carry about 40 times as much energy.

To produce an efficient ion beam, the electrons must be suppressed, and Johnson's experiments on the one-trillion-watt Proto I accelerator have involved use of pulsed current-carrying coils to create a strong magnetic field to deflect the electrons.

The field is formed parallel to the particle emitter surface (anode), forcing the electrons to move in very long paths before they reach the anode, while the heavier ions continue largely unperturbed to the target. Up to 80 percent of the electrons have been suppressed by this technique, paving the way for efficient generation of ion beams.

Cornell University and the Naval Research Laboratory are also working on electron suppression techniques, the latter using a high current diode which not only emits ions but produces a self-magnetic field without use of a coil. This concept is also being considered for application in PBFA.

Once the electrons are suppressed, the ions can be focused geometrically by using a concave anode to bring them to a focal point where they would either impinge directly on the pellet or would enter ionized discharge channels to be transported to the target in a reaction chamber filled with hydrogen or some other gas.

The gas serves as an external source of electrons to neutralize the ion beam space charge and, in a full-fledged reactor, would absorb blast products—debris and



x-rays—that might damage the reactor wall.

Developing ways to reduce the natural divergence of the beam and the magnetic effects caused by the flow of ion beam current so that the beams focus tightly as they approach the target is a problem area on which Sandia researchers are con-

centrating at present. Currently, they are producing ions (carbon ions as well as protons) from an insulating anode within a metallic substrate. The electrical discharge flowing across this insulated surface forms a plasma (ionized gas) from which the ions are accelerated. Later experiments will use injected ions from an ionized puff of gas, probably helium.

Feedback

Q. Since so many Sandians now travel abroad on business, would it be possible to make available more self-study materials in various foreign languages?

A. We appreciate the inquiry concerning the availability of foreign language self-study materials. Although the technical library does not have such materials, Education and Training Division 3522 does have foreign language courses in its Self-Study Program. Courses are available

in German, Russian, Spanish, French, Italian, and Polish. You can enroll in one of these courses or obtain information concerning materials and suggested prerequisites by calling Rose Chavez on 4-1047. Your inquiry suggests that there may be more need for these materials than we thought. We plan to put a notice in the Lab News or Sandia Bulletin to alert employees that they are available.

J. R. Garcia—3500

Fun & Games

Skiiing—If you're a truly gifted athlete with cat-like agility and superb coordination, and you're well insured besides, then it just may be possible that you don't need lessons to learn to ski. On the other hand, should you either out of modesty or out of fact not quite measure up, then the Coronado Ski Club has such a deal for you: the Sandia Peak Alpine Lesson Program, six days of lessons, not for the going rate of \$40 but for only \$30. The five-day lift package that goes with the Alpine program runs \$35. Send your application to Walt Westman through Dale Buchanan (4314) before Dec. 15.

Ski trips still open include Steamboat Springs, Jan. 12-19, Bob Butler, 4-4940; Dillon, Feb. 3-8, Lyle Wentz, 4-1915; and Utah, March 15-20, Art McMullin, 4-1115.

Pentathlon—Dave Douglass sent us results of the New Mexico AAU Throwing Pentathlon held last month. In this contest, participants throw a variety of artifacts: the hammer, discus, shot, javelin and 35-lb. weight. Certain values are assigned, according to distance thrown, and the five values gained by each participant are summed up for a grand total. Rich Cernosek (1254) had a 2777; Bruce Engler, 1707; Robert Martinez, 1658; and Dave Douglass, 2149. Dave took first place with his score in the men's 40-49 bracket.

Triathlon—Ron McCurley, a contractor employee to the Labs, again took first in this contest on Nov. 4 with a 1:00:21, two minutes faster than his winning time of last year. Now called the Jay Benson Memorial, the Triathlon consists of ten-miles by bike, five by running and a quarter-mile swim, all back-to-back. The Coronado Club sponsored the event which this year had 55 entrants.

Arts & Crafts—This facility, located on Kirtland West in Bldg. 954, offers classes in various subjects—photography, pottery, macrame and ceramics, to name a few. A pottery class is scheduled to begin Nov. 29 and run for four sessions from 2 to 4 in the afternoon (it's aimed at dependents). Cost is \$12. You can get additional information on 4-0222.

Women's Basketball—C-Club rec manager Skip Dougherty reports that several Sandia women are playing league basketball alongside male players, but a number of women have expressed interest in a women's basketball league. Play would begin on Nov. 26 and continue through March. If you're interested, call Skip on 4-8486.





HOME OFFICE for today's First National is still downtown—at the First Plaza.

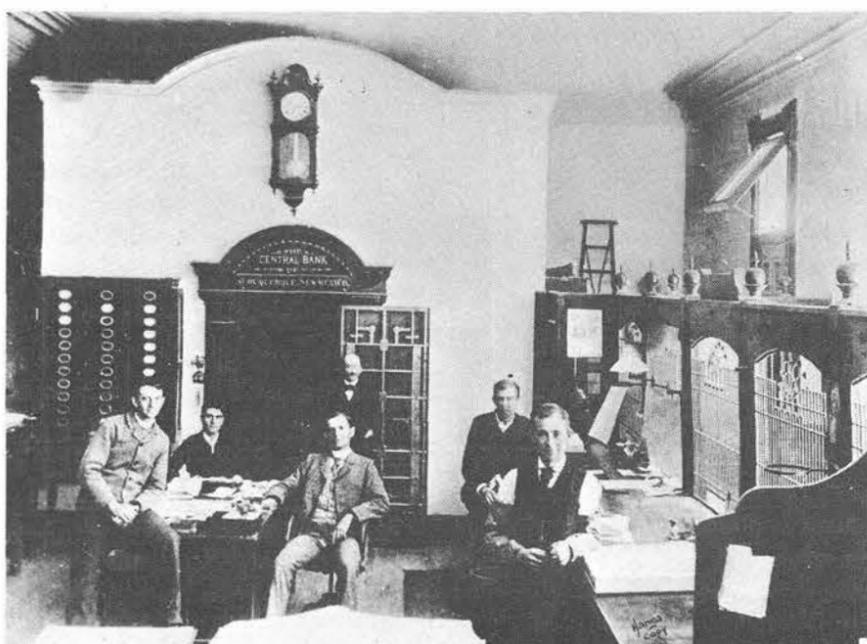


TODAY THE SITE of the Central Bank on Romero Street is filled with galleries and shops. When the bank moved to New Town in 1884, the building became a general store. Some of the original walls still stand in the present-day building.



THE CORNER of 3rd and Central in 1923—First National opened the doors of "the most modern office building and banking house in the state" at this location in 1923.

BANKING ROOM of the First National in 1888. Located on Gold Avenue in an ornate new building, the bank was in the center of New Town's financial district which included Albuquerque National and the Bank of Commerce.



Our Town

Bank May Be Longest in Downtown

Albuquerque is fortunate in its relative abundance of structures that go back to its very beginnings in the early 1700s. Old Town retains much of that beginning and, for nearly 200 years, Old Town was the center of trade, religion and culture.

But then the railroad came along in 1881, and New Town developed to the east and, with it, the commercial and business institutions of modern Albuquerque. One of the oldest of those institutions (if not the oldest) is the present-day 1st National Bank.

Two brothers, Joshua and Jefferson Raynolds, opened the town's first bank in 1878. The Central Bank of Old Albuquerque, located along Old Town's Romero Street, prospered and, by 1884, when it became apparent that the business district would be in New Town, the brothers purchased control of the 1st National, which had opened in 1881 at 2nd and Gold Ave. The economy then was largely based on the wool trade. Early bankers held cash for the wool growers and advanced them trade credit. As the wool business increased, Albuquerque became a commercial banking center.

These pictures show some of the history of the bank. The early ones come from the archives of the 1st National.

A Place for Building and Learning To

If you're into working wood (or would like to be), the biggest bargain in town is the Base Wood Hobby Shop. For sixty cents an hour, you can have access to one of the best-equipped shops in the area—and they'll even help you learn to use the equipment.

We talked recently with John Saylor, manager of the shop, and his assistant, Norm Jordahl. Understandably proud of their facility, they gave us the full tour, from the well-stocked tool crib through two well-lighted, well-laid-out, immaculately clean shop areas. The overall impression was one of wonder. Surely, we thought, with all that equipment, one could safely tackle any building project from plain hinged boxes to spooled and spindled chairs and chests with shaped edges and dovetailed drawers.

John Saylor confirmed our impression, quickly ticking off these major power tools available in the shop:

- two 10" table saws (one set up for ripping sheets of plywood)
- two radial arm saws (a 14" and a 16")
- three bandsaws (a 14" and two 20")
- three drill presses
- a 9" power mitre saw
- three power sanders (a dual 24" disc sander and two combination sanders with 12" discs plus horizontal and vertical belt sanders)
- a 12" jointer
- two table shapers (½" spindle and ¾" spindle) with 100 cutting heads
- a 24" variable speed jigsaw
- two 12" swing wood lathes
- a bench-mounted router crafter

In addition to these standard items, the shop also has a 24-inch surface planer that can handle wood stock up to 9½ inches thick and a uniplaner that can safely plane wood down to the thickness of a sheet of sandpaper. "You could make your own toothpicks on this machine," John told us. "But we wouldn't encourage it."

The shop also has a full line of hand

Oops!

If you cut out that handy table in our last issue that showed the hours of operation of the various recreation facilities, then please make the following corrections: the wood shop is open 11 to 5 on Sundays; and the auto shop is open 9 to 5 Saturdays and Sundays.

tools and portable power tools—sanders, drills, sabresaws, planers, routers, clamps of all kinds, dowling jigs, glues, and wood fillers (just to name a few). Another plus is that the Wood Shop also provides safety gear—shop aprons, hearing protectors, goggles and face masks.

You can't get a full course in cabinet making at the Hobby Shop, but you can get basic instruction and help along the way in the more complicated procedures. Before you can use any of the power tools, John told us, you have to be certified. "And before we certify anyone," he said, "we have them read shop procedures, job safety standards and operating instructions on



the power tools they want to use. Then we show them how to use the equipment and stand by until we're sure they're qualified to use the tools safely on their own."

If you're long on desire and short on ideas of what to make or how to make it, the Wood Shop has several books on cabinet making plus hundreds of plans on items like indoor and outdoor furniture, cabinets and clocks.

"About all the hobbyist needs to bring is material and hardware—and we can even help there," John told us. "If they'll check with us first, we can give them discount coupons good on the purchase of hardwood from local suppliers."

To get to this cornucopia of good things for workers in wood, go south on Wyoming past the Atomic Museum to "M" St. Turn right on "M" and go west through a gate in a chainlink fence and past several large warehouses on each side. Just before you exit the fenced area onto Texas St., turn left and go south a hundred feet or so. The Wood Hobby Shop is housed in Bldg. 20440, a metal building.

One word of caution: Don't ask John or Norm for a mortising machine. "As far as I know," John says, "that's the only piece of equipment we still need."

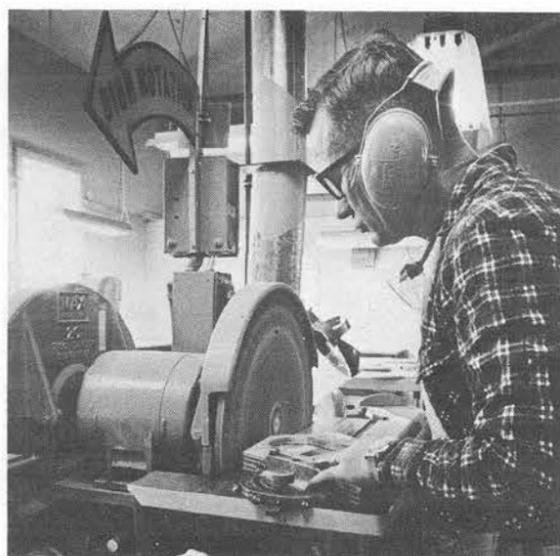
Hours at the Wood Hobby Shop are: Monday and Tuesday - closed; Wednesday and Thursday - 1 to 9 p.m.; Friday - closed; Saturday - 9 a.m. to 5 p.m.; Sunday - 11 a.m. to 5 p.m.

•cec



Nielsen ratings are a life-and-death matter to TV. A minute percentage shift can topple top executives, cancel contracts, put producers and performers back on the street. According to the *Wall Street Journal*, Nielsen surveys have discovered another ulcer factor. Seems there's been a slow but consistent decline in the total number of people who watch television. The gang at Nielsen has tried to reassure the industry that natural factors (like the shrinking size of the average family) account for viewer decline. If they'd stop watching their counters long enough to turn on and watch their TV's, they might just discover some other causes. Like boredom, for example.

ONLY HALF THE BASE WOOD HOBBY SHOP STORY. In addition to the large shop room shown above, there's another beyond that's equipped with a bandsaw, a radial arm saw, a table saw and a surface planer. Shop furnishes safety equipment (goggles, ear protectors, aprons, face shields), and patrons are checked out and certified on equipment like the bandsaw and the dual 24-inch disc sander (both below) before they're permitted to use the power tools on their own. Sixty cents an hour buys unlimited use of shop equipment.



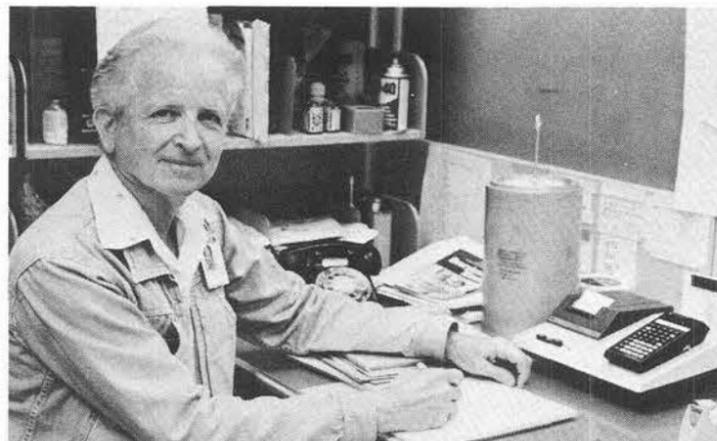
MILEPOSTS

LAB NEWS

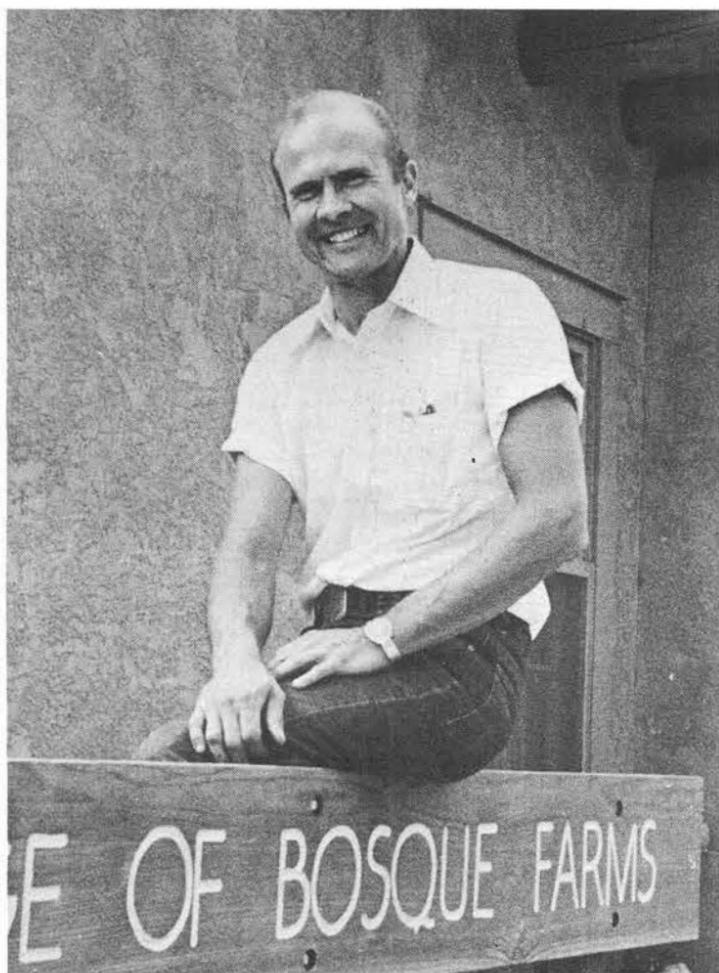
NOVEMBER 1979



Ken Tschritter - 8441 15



Howie Mauldin - 2162 30



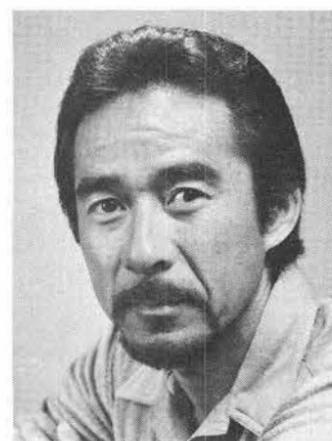
Bob Fisher - 5836 15



Ed Neidel - 2166 30



Ed Stout - 1137 30



Dick Shimada - 8271 20



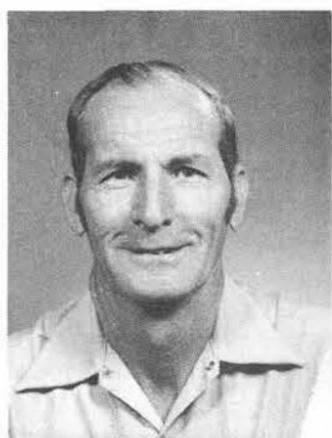
Joan Madsen - 8423 20



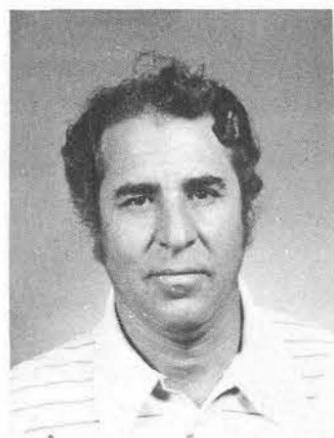
Howard Lindell - 4311 30



James Cordova - 1474 10



Perry Randall - 1472 10



Juan Garcia - 3154 10



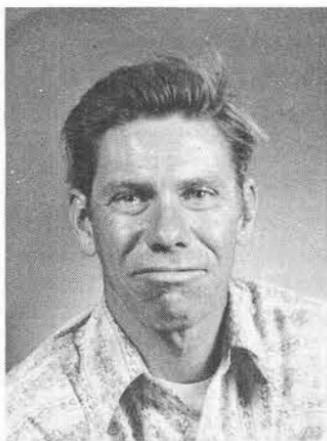
Don Cook - 4731 15



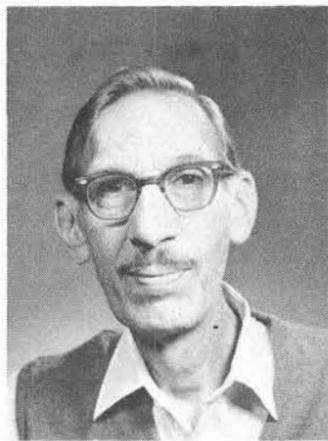
Jack Cyrus - 2524 20



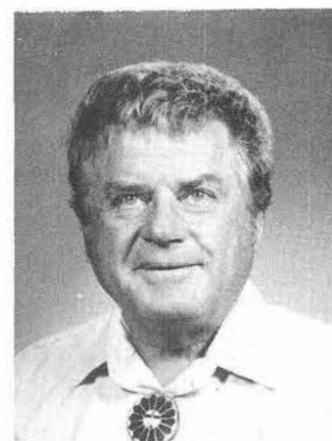
Marjorie Michaud - 3152 20



Terry Demaree - 1541 15



Frank Francis - 5815 30



Al Kaping - 3733 25

Classified Ad Rules Clarified

The LAB NEWS staff has the firm conviction that of all things printed in the paper, the classified ads get the most readership. And we know that the ads get results.

We believe the rules are simple. They're printed at the head of each issue's collection of ads. Yet by the deadline, Friday noon before the Friday of publication, we always have a dozen or so ads that can't be published. Many have no name—this must be included. Others give an office phone number; it's your home phone that should be listed so that you conduct your business on your time, not Sandia's. Some ads are clearly commercial—apartments (plural) for rent; piano lessons; firewood for sale. Others are sort of commercial, like the Sandian who has a

condo at a resort area that he rents out from time to time.

In this issue of LAB NEWS, we've included a new rule: No more than two insertions of the same ad. We've concluded that by the time we've run your ad twice, your merchandise has had pretty good exposure; further insertions would likely be unproductive or, in the case of something with a commercial flavor, would be lending undue support to a profit-making venture.



Talk about one-upmanship. Years ago, comedian Ed Wynn invented a banana with a feather in it in case anybody ever asked him for one. Now researchers at UCAL have invented a computer with responses so paranoid that psychiatrists interviewing it with a teletype machine can't distinguish its responses from those of mental patients. (Good night, Ed, wherever you are.)

LAB NEWS Holiday Schedule

Here is the publication schedule for LAB NEWS during the holiday period:

Publication Date	Deadline for Ads
Dec. 7	Nov. 30, 12 noon
Dec. 21	Dec. 14, 12 noon
Jan. 11	Jan. 4, 12 noon

Holidays being observed at the Labs include Thanksgiving, Nov. 22, and the Christmas and New Year shutdown. Because Christmas falls on a Tuesday, Monday, Dec. 24, has been designated Energy Conservation Day so that the Labs will be shut down from the close of business on Friday, Dec. 21, through Jan. 1. Friday, Nov. 23, is a normal work day, but many organizations will be operating with limited staff.

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

CLASSIFIED ADVERTISING

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

RULES

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

MISCELLANEOUS

- SANDIA LABS caps, \$4.25. LAB NEWS office, Bldg. 814, S. Hwy. 14 Village Project.
- HAM transceiver 10M through 80M Swan 260, 115AC-12VDC w/mike, \$250. Elliott, 268-0083 after 10 a.m.
- VAN type luggage rack & ladder, new, \$20 ea. or both for \$35. Konkell, 299-5108.
- 1 SET tire chains, fits 14" 8.25 up, 15 in. 7.75 up; enclosed car top carrier; open cartop carrier. Hanson, 298-2120.
- WALL BLOCKS, 6"x8"x16", lg. quantity, plain & decorative, 25 cents ea.; box springs, \$35. McCutcheon, 884-7682.
- TURKEYS, hens & toms, \$20 you dress, \$25 dressed; camper shell for imported pickup, \$220. Lackey, 898-6638.
- CORNET, Reynolds, \$100. Stirbis, 299-5363.
- FOUR white spoke 15"x10" wide wheels w/8-hole mounting for late model 3/4 ton Ford pickup; used 14/32x15 tires, mounted, \$50 for everything. Bosworth, 869-6736.
- 2 BAR STOOLS, Kays lifetime guarantee, \$90 pair; maple dining set, 4 captains chairs, 2 leafs, \$290; desk, chair, \$35. Paul, 299-6387.
- LEICA CL 40mm lens, \$300; Leica M series Leitz 90mm f2.8 Elmarit, \$140; Nikon Nikkor SC 55mm f1.2, \$140; Holubar Royalite 2-man mt. tent, \$50. Mattox, 821-3945.
- BINOCULARS, 20x50 coated lens, leather case, \$25; 4 16.5x10 8-ply tires, 2 hwy., 2 traction, \$20. Baca, 265-3881.
- INFINITY speakers & matching bases; Maxell UD/XL open reel tape; Sears tool grinder; classical tapes & records. Norris, 877-6415.
- 3-PIECE solid maple bunk & trundle bed combination, \$100; mattress & box springs, \$25 ea. Doyle, 299-7567 after 5.
- POTTER'S WHEEL, 1/2 hp American wheel w/splashguard, professional quality, \$275. Carlson, 242-4493.
- SONY Betamax SL-7200A, 1 hr. model. Tafoya, 883-6090.
- RCA stereo turntable w/built-in radio & 8-track & speakers, \$90; clarinet, B flat, w/case, \$100. McKay, 256-3911.
- FOUR 11x15 Jackman rims for Bronco, 3 w/tires, \$100. Lopez, 265-3296.

- HUMMEL plates & bells; Ethan Allen Kling dining room set, 9 pieces. Fitzgerald, 265-3055.
- UNITED AIRLINES 50% discount tickets, good through Dec. 15, \$25 ea., 4 available. Wyant, 298-0371.
- REFRIGERATOR, w/freezer, \$100. Zucuskie, 881-4086.
- SHOEI motorcycle fairing w/signals, \$90, fits most cycles; free Siberian Husky cross puppies, to good home. Barnard, 831-4114 evenings.
- CULLIGAN water conditioner, fully automatic, used less than 5 mos., \$285. Farnsworth, 865-6160.
- HOCKEY equipment: gloves, shin guards, helmet, etc. Marder, 268-9643.
- 4 WOODEN screen doors, \$10 ea.; tire chains for Datsun/Toyota, \$15; TV antenna rotor & control, \$30. Falacy, 293-2517.
- CHEST TYPE FREEZER, 10 cu. ft., \$100. Tyler, 294-2310.
- '68 10 1/2' overhead camper, self contained, heater, running water, \$850 or best offer. Padilla, 842-6035.
- SNOW TIRES, studded, 1 pr. F-78-14, \$16/pr.; ski boots, Hanson Simba child's model, size approx. 12-1 1/2, new w/flo paks, \$35. Healer, 298-6967.
- WASHERS, \$20, \$35; Water-Pik/auto. toothbrush, \$20; shower-massage device, \$15; hair style-dryer, \$20; manicure/razor, \$20; rangehood, \$15. Hawkinson, 281-5239.
- SKIL chain saw, 3.0 cu. in., 16 in. bar, \$100. Konrad, 294-2807.
- TWO United Airlines 50% discount coupons for flights until Dec. 15, \$50 for pair. McKiernan, 255-2277.
- STEREO, Technics AM/FM receiver, Technics turntable, 2 AQS 500 speakers. Ziegler, 266-2903 after 7.
- NORMAN ROCKWELL figurines; hanging light fixtures; built-in dbl. oven; bedroom set; drape rods. Otts, 299-3423.
- BETHANY pick-upper: cab-high, extends to full height, ice box, stove, table, heater, sink, storage, 2 lg. dbl. beds, \$1000. White, 877-4149 or 293-2219.
- ICE SKATES, women's 6 1/2 narrow, black, Riedell, \$15; men's size 11D Fleetwing, \$8; lg. 2-burner Coleman stove, \$20. Dalphin, 265-4029.
- SKIS, 195's, Head, poles, \$50. Hesch, 881-9874.
- PIANO, Emerson upright, bench, \$595; 4 700x15 mobile home wheels-tires, \$50; complete basketball goal set, \$20. Duliere, 296-4785.
- VIDEOTAPES, blank 2 1/4 hour, VHS format, RCA, Panasonic or JVC, \$18. Barnard, 256-7772.
- RANGE, avocado, 30" Corning cook top, self-cleaning oven. Smith, 821-5534 after 5:30.
- GARDEN SHREDDER, 6 hp; Sears elec. hedge trimmer; weed burner; dbl. waffle iron w/griddle. Liguori, 256-3613.
- HEAD 360 skis, 200 cm, \$50. Keeling, 296-9729.
- FIREBIRD fireplace heating system, 5 2" tubes, 21wx23hx19d, \$15; black wire mesh fp screen w/brass trim, fits opening 39wx26h, \$15. Freyermuth, 299-2053.
- DRILL PRESS; machinist's vise; tires, G78-15, 5-hole rims, 3 good, 1 spare; floor buffer. Lambert, 293-8825.

- SHOPSMITH Mark V, bandsaw, jointer, many other attachments, \$1750; woodworking bench, misc. accessories, \$250; Dynamic skis, Salomon bindings, \$75. Ernst, 266-5495.
- RC P-38 Lockheed Lightning, partially assembled, 2 .61K9B R/C engines, \$150; young male cat, shots. Siemers, 296-0651.
- SKI BOOTS, Nordica GT, new style, size 7M, soft, new \$170, sell for \$85. Stevens, 299-6086.
- FOUR EA. L-60-15 radial tires, Super-Track & mags wheels, lock & logs, 6-hole. Garcia, 299-8778.
- WINCHESTER Model 70, 7mm Rem. magnum w/Redfield 2X-7X scope; Browning 20 gauge auto. shotgun, Belgian made. Sebrell, 821-4227.
- OSCILLOSCOPE, 15 MHZ bandwidth, dual trace, \$500. Belding, 294-7443.
- SLIDE PROJECTOR, Revere 808, 15 slide trays w/carrying case, \$50; Boy Scout uniform parts, 25 cents per item. Kepler, 298-5652.
- CRIB, Simmons maple w/mattress, \$50; Strollee playpen, fully padded, \$25; Strollee lg. tray high chair, \$8. Turner, 293-4790 after 5.
- DRILL PRESS, Chicago machine tool table model, tilt table, 12-speed, lease \$50/yr., sell, \$250. Sutherland, 266-1734.
- EARLY AMERICAN SOFA, brown herculon tweed, \$50. Mowrer, 281-5595.
- 9" TABLE SAW, Rockwell, \$125; push lawn mower, \$5; new table top hair dryer, \$20. Wrobel, 255-3062.
- BICYCLE, boy's 20", \$30; hand crocheted afghans, 36"x60", \$25; new SB radial tire, E73-14, \$18; motorcycle carrier for car, \$10. Barham, 298-7304.
- PUPPIES, St. Bernard cross, 8 wks. old, \$10 ea. Cox, 281-3109.
- CROSS COUNTRY SKIS, 215cm, \$20. Southwick, 281-3782.
- FOUR 8-hole 16" Chevy wheels, non split rims w/700x16 hiway 6-ply tires, \$100. Brown, 873-2777.
- FOUR SB tires, approx. half tread left, BR 70-13, \$40; four 14" wheels, 4-hole, \$6 ea. Wilkinson, 299-8327.
- WOOD ROCKER, \$50; Royal elec. typewriter, needs repair, \$50; Sears port. 8-tk player w/tapes, \$20. Hobart, 255-7749.
- TWO sets of sliding glass doors, \$20 ea. set. Montoya, 883-9115.
- CARPET, gold nylon shag, approx. 12x14, \$50. Luikens, 881-1382.
- SKIS, Cubco bindings, 200cm, \$15. Shunny, 265-1620.
- POWER PACK, 20vDC, toy transformer Model DC-2, Aurora brand, 6' cord, \$5. Smith, 292-0825.

TRANSPORTATION

- '65 CHEV, 4-dr., sedan. Rodriguez, 345-0212, 344-5723.
- AMF moped, new, \$350. McDaniel, 299-6189.
- '67 PLYMOUTH, PB, PS, 4-dr., 318 ci, \$375. Perea, 255-7831.
- '76 CHEVY Luv w/camper shell; '78 Plymouth Arrow Jet, both low mileage, high mpg, \$4000 ea. Canfield, 299-9628.
- '73 PONTIAC Bonneville 2-dr., AC, PS, PB, new battery, 2 new tires, \$1200. Cordova, 345-0619.

- '77 T-BIRD, 38,000 miles, sun-roof, PS, PB, AC, AM-FM-8-TK, new radials, tilt steering wheel. Romero, 255-6228.
- '78 MAZDA GLC, 30 mpg, under 15,000 miles, AC, asking Book \$3800. Thigpen, 345-6312.
- '47 CHEVY pickup, 1 ton, converted to 12-volt, bucket seats, motor needs work, \$1000 or best offer. Armijo, 268-7645.
- '75 VW BUS, 7-pass., AC, radio, carpet, \$4200. Pryor, 344-2931.
- '71 DEL-STAR 12' fiberglass bass fishing boat w/trailer, 15 hp engine, swivel chairs, oars, life jackets, fishing box, \$900. Kaminski, 877-2988.
- '63 CORVAIR 4-dr., AT, R&H, SR tires, \$2500. Kerr, 299-7527.
- '66 PORSCHE 911, white, AC, full instrumentation, 90,000 miles, \$5600. Kjeldgaard, 268-8835 evenings.
- '69 CHEVROLET Impala sport coupe, single owner, \$600. Dugan, 821-0691.
- '73 SCOUT II, 4-wd, 60,000 miles, loaded, ski rack, new SB radials, \$2500 or best offer. Sutherland, 266-4069.
- '74 MUSTANG II, AT newly rebuilt, low mileage, \$1750. Mattox, 821-3945.
- BIKE, BMX Deluxe, chrome Roger Decoster, Cook Bros. forks, new blue tuff wheels, redline dbl. goose-neck, \$150. Pierson, 292-1857.
- '78 DODGE Omni, low mileage, 4-spd., extended warranty. Afanasjevs, 296-4527.
- '69 VW stn. wgn., new paint, recent rebuilt engine, AT, \$600 or best offer. Chavez, 831-9591.
- '74 FORD Custom clubwagon van, 12-passenger, PS, PB, AT, dual air, 3/4 ton, below wholesale, \$2650. Schindewolf, 897-0470.
- '71 CITABRIA airplane, 1/5 share, \$1800. Reed, 884-8643.
- '77 KAWASAKI 900-Z1, 14,500 miles, \$1200. O'Malley, 831-4403.
- '76 PIPER ARROW airplane, well equipped, \$30,000 or make offer. Payne, 299-5966.
- '79 YAMAHA XS-750F full dress fairing, bags, custom dbl. touring seat, CB radio, many extras, \$2995. Brooks, 296-6870.
- '77 OLDS Cutlass, 6-cyl., AC, \$3695. Syme, 296-4758.
- '77 LAYTON travel trailer, 18', loaded; Ford F250 4x4, 428, AT, PS, PB, tilt, cruise, AC, comp. air, AM-FM-tape, radials. Campbell, 294-6000.
- '75 HONDA, custom paint job, 8" fork, 3 bent bars, crash bars, headers, Bell jumping helmet. Castellano, 265-8219.

REAL ESTATE

- '77 NUWAY, 14x70, 2-bdr., 2 bath, set up in 4-Hills MHP, will sell below appraisal. Johnson, 299-0346.
- 1 1/2 LOTS plus '72 Tourite 12'x60' mobile home, near Elephant Butte Lake. Cordova, 881-2209.
- 5 ACRES, N. 14, 1 mile NE Sierra Vista, trees, views, \$30,000, terms. James, 296-2582.
- 2 1/2 TO 10 ACRES, on mesa approx. 4 miles east of Los Lunas, utilities across st., below appraised value, terms. Farnsworth, 865-6160.

- '71 14x70 Lamplighter mobile home, 2-bdr., 2 bath, washer, dryer, carport, shed, new AC, Meadows Adult Park, \$15,500. Henderson, 821-8033.
- NW HOME, 4-bdr., mother-in-law quarters, 2 fp, 2 bath, view, \$59,500. O'Malley, 831-4403.

FOR RENT

- 2-BDR. HOUSE, 1326 3rd St. SW, \$175. Gallegos, 344-3290.
- 1/2 ACRE in Bosque Farms, has all hook-ups, \$55/mo. Armijo, 268-7645.
- APTS: 1-bdr., balcony, unfurnished, Grove SE, \$180. Whitham, 883-0061 or 299-9292 evenings.
- OPEN STORAGE, fenced for RV, boat, camper; also 10x10 metal storage building. Liguori, 256-3613.
- 3-BDR. home & horse facilities in Los Chavez, 35 mins. from base on I-25, \$290/mo. Reynolds, 299-7367.
- 3-BDR, 1 1/2 bath, FR, fp, RV parking, avail. Dec. 15, 6 mo. lease, 1st, last & DD, \$395/mo. Seward, 268-7116.

WANTED

- TIRES, new or used 78-15. Burton, 869-2541.
- CHRISTIAN Contemporary group forming; need drummer, bass & keyboard player. Ortiz, 831-0274.
- GIRL'S size 10, warm, ski parka. Lewis, 296-7896.
- 20" BOY'S bike & playground equipment, must be reasonable. Thigpen, 345-6312.
- DOG HOUSE for medium-sized dog. Castellano, 265-8219.
- YELLOW CANOE of type sold by K-Mart this past summer. Baxter, 344-7601.
- ENCYCLOPEDIA: Britannica or Americana, less than 15 yrs. old. Hartman, 293-2862.
- TELEPHOTO & wide angle lens for Argus C-44 camera. Harris, 255-6577.
- FEMALE roommate to share expenses of spacious home in Valley, includes dishwasher, washer/dryer, fp, den, reasonable. Fortune, 877-1465.
- RIDE or car pool from Rio Rancho Circle K to Area 1. Pace, 292-2874.
- CHILDCARE by mother of 2 toddlers, in my home, near Base, any age, \$25/week. Wrobel, 255-3062.
- SPEAKER SETS from stereo system or equivalent. Stuart, 299-9190.
- PARALLEL BAR or drafting machine (for drafting table purchased at Sandia salvage yard.) Wilson, 296-5965.
- DRIVER of the car that hit a white 1974 Nova in front of Motor Pool parking lot on Nov. 8; please call 4-8687 (or anyone who saw the accident). Dolores Ulibarri, Org. 3533.

LOST AND FOUND

- LOST—10 keys in leather key case, brown wallet, bifocal sunglasses, ladies' Timex watch w/gold band.
- FOUND—Man's silver cuff link, man's RH fur-lined glove. LOST AND FOUND, Bldg. 832, 264-1657.

Spaghets Tonight, Lobster Tomorrow

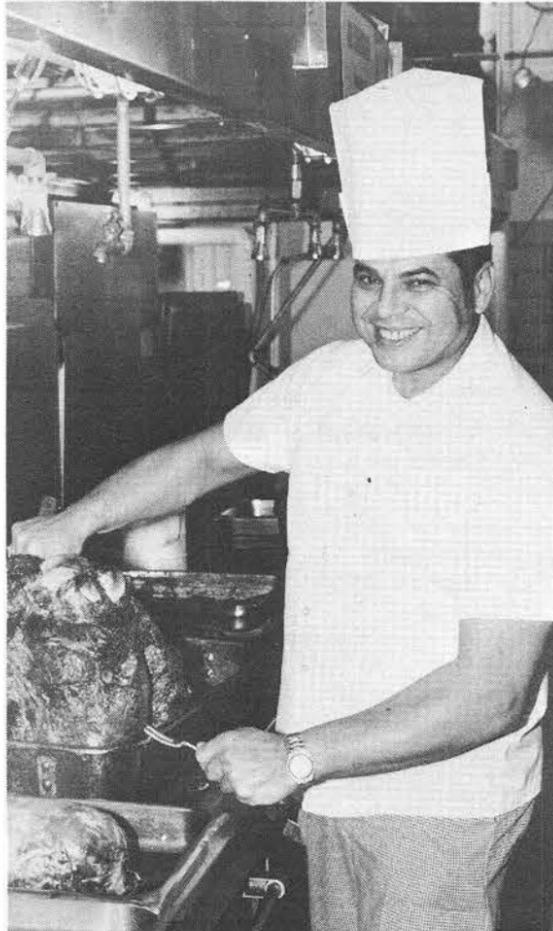
TONIGHT is a three-way treat at the Club. Denny Gallegos (3743), singer/guitarist of note, entertains in the lounge from 5 to 7 p.m. The Mellotones, one of the swingiest groups in the city, plays in main ballroom starting at 7:30. The Club's new kitchen staff serves a super Italian buffet spread—spaghetti, ravioli and lasagna—all you can eat from 6 to 8. All of this and Happy Hours prices (cheap), too.

TOMORROW is the big one. It's called a surf and turf special with lobster and sirloin steak plus a group called Alma on the bandstand. Call the Club office, 265-6791, *right now* to find out about reservations.

NEXT FRIDAY, Nov. 23, seafood Newburg is the menu feature, a group called Double Take plays for dancing. Denny entertains again in the lounge. Call the Club office by mid-week to reserve buffet tickets.

TEENAGERS should enjoy "Dunn's Dancing Machine" playing for a teen dance Saturday, Nov. 24, from 8 to 11. Member parents must pick up tickets for their youngsters.

TRAVEL—A different kind of trip to Mexico is now being offered. Lyle Thompson, a former teacher at California's University of Redlands, has made more than a dozen trips into Mexico in which he takes up to nine people on a "small and personalized travel trip." On a typical trip, Guadalajara, Guanajuato, San Miguel de Allende and Mexico City are visited,



HENRY PEREZ, new C-Club chef.

though the itinerary can be altered according to wishes of the group. The idea is to get closer to the Mexican culture than one does following the Acapulco/luxury hotel route. Length of the tours runs from 16 to 28 days, with costs being \$375 for the 16-day, \$450 for the 28-day. Cost includes all transportation within Mexico and all board and room. You pay air fare from Albuquerque to Guadalajara, now running \$110 round trip. Travel director Frank Biggs (4231) would like to determine if Sandians are interested in this kind of

Full-Time Chef Joins C-Club

Henry Perez recently joined the Coronado Club staff as its full-time chef. He comes here from California where he worked 22 years in food service, including positions with the Los Angeles Country Club and Saga Food Service, and as chief chef for the executive dining room of McDonnell-Douglas.

"Years ago," Henry says, "I worked a few months at the old Leonard's Steak House on Central, married an Albuquerque girl and brought a little real estate. Now I'm glad to be back. California is too crowded. I'm building a house, and Albuquerque is home now."

In addition to the Friday night Happy Hour buffets and the big special events at the Club, Henry also works a full schedule preparing food for the private parties, luncheons and dinners held at the Club.

"Club facilities are available for rental to any group with Coronado Club affiliated members," he says. "We can handle anything from hors d'oeuvres for eight to full-course dinners or luncheons for 400. We also have a 'carry-out' catering service where we prepare everything, deliver it and even provide the chafing dishes."

outing and asks that those who are call the C-Club on 265-6791. Frank will then set up a meeting to explain the proposed trips in greater detail.

UPCOMING EVENTS—Kid's Christmas Party Dec. 8 with Santa Claus, special entertainment, goodies. Super Singles Mingle Dec. 14 in the Eldorado Room with Yolanda and Trio, program of fun.

Events Calendar

- Nov. 16-17—NM Symphony Orchestra Concert, guest conductor, Milton Katims, 8:15 p.m., Popejoy, 842-8565.
- Nov. 18—"Singing Together on a Sunday Afternoon," concert of barbershop quartet music featuring The New Mexichords and The Enchanted Mesa Choruses, 3 p.m., Kimo Theater.
- Nov. 18—Music Vespers Series: Gene Ives (4330), baritone, 4 p.m., First United Methodist Church, 4th & Lead.
- Nov. 18-Dec. 24—Festivo de Artesanias, Textiles & Crafts Co-op all-member Christmas show, opening 1-5 p.m., daily 10-6, 323 Romero NW, #3.
- Nov. 19—Travel Film, "Mexico," 7:30 p.m., Popejoy.
- Nov. 20—The Cecil Taylor Unit, second concert in the New Mexico Jazz Workshop's New Music Series, 8 p.m., Kimo Theater.
- Nov. 23-24—Los Novicios Craft Guild Christmas Show, Fri. 10-8, Sat., 10-6, Four Seasons motel ballroom.
- Nov. 23-25—The Nutcracker, NM Symphony Orchestra & Texas Ballet Company, 7:30 p.m., S-S matinee 2:15 p.m., Popejoy.
- Nov. 23-Dec. 5 [weekends]—"The Lion in Winter," Tiffany Playhouse, 8:15

- p.m., Sheraton Mercado Mall, Old Town.
- Nov. 24—Christmas Parade, downtown, 10 a.m.
- Nov. 29-Dec. 1—The UNM Orchestra & Chorus present "The Messiah," 8:15 p.m., Popejoy.
- Nov. 30—Navajo rug auction, Crownpoint, NM, elementary school, 7 p.m.
- Nov. 30—The Denver Symphony, 8:15 p.m., Popejoy.
- Nov. 30—Dec. 1-2—Solar Fair, Youth Hall, State Fairgrounds, 842-2585.
- Nov. 30-Dec. 1, 6-8—UNM Dept. of Theater Arts: "The Power of Mute Persuasion," seven choreographers present works ranging from baroque and classic to flamenco and contemporary style, 8 p.m., Rodey Theater.
- Nov. 30-Dec. 15—Albuquerque Little Theater, "Come Blow Your Horn," Tues.-Fri. 8 p.m., Sat. 6 & 9, Sun. 2 & 8, 242-4315.
- Dec. 1-2—The 4th Dirk Schneider's Festival of Artists & Craftsmen, 10-9, Convention Center.
- Dec. 4-9—UNM Dept. of Theater Arts, "The Rimers of Eldritch," Dec. 4-8 at 8 p.m., Dec. 9 at 2:30 p.m., Experimental Theater, 277-4402.

