

# Deep Steam Generator Successful

The first long-term field test of a downhole steam generator to free heavy oil from underground reservoirs has been successfully completed by Enhanced Oil Recovery Division 9755.

The test, conducted in a heavy oil field near Long Beach, Calif., ended with a 106-day run in which the generator operated approximately 75 percent of the time. Downtime stemmed from failure of surface equipment, not the downhole unit located at the bottom of a 2035-foot borehole.

The generator produced up to 800 cubic feet of 500°F steam a minute (1.2 megawatts thermal, 4 million Btu/hour), which was injected directly into a reservoir containing 12½ degree gravity oil—about the consistency of heavy molasses.

The test well was located near the center of a five-acre plot which had production wells at each corner. The field has been producing heavy oil since the late 1920s, most recently with the aid of water flooding to force oil into the production wells.

"The test generator was too small to substantially change production in the field," says Bill Marshall, 9755 supervisor, "although flow in one of the recovery wells did increase near the end of the test period. The test did demonstrate for the first time, however, that it is feasible to operate a downhole steam generator at depth for long periods of time."

The test was conducted in cooperation with the City of Long Beach and the Long Beach Oil Development Company, which monitored test production rates and now plans to continue flooding the field with steam from a larger, commercially available generator.

The commercial unit, based on the Sandia design, is to be developed and fabricated by Enhanced Energy Systems, Albuquerque, and is expected to be in operation by the end of the summer.

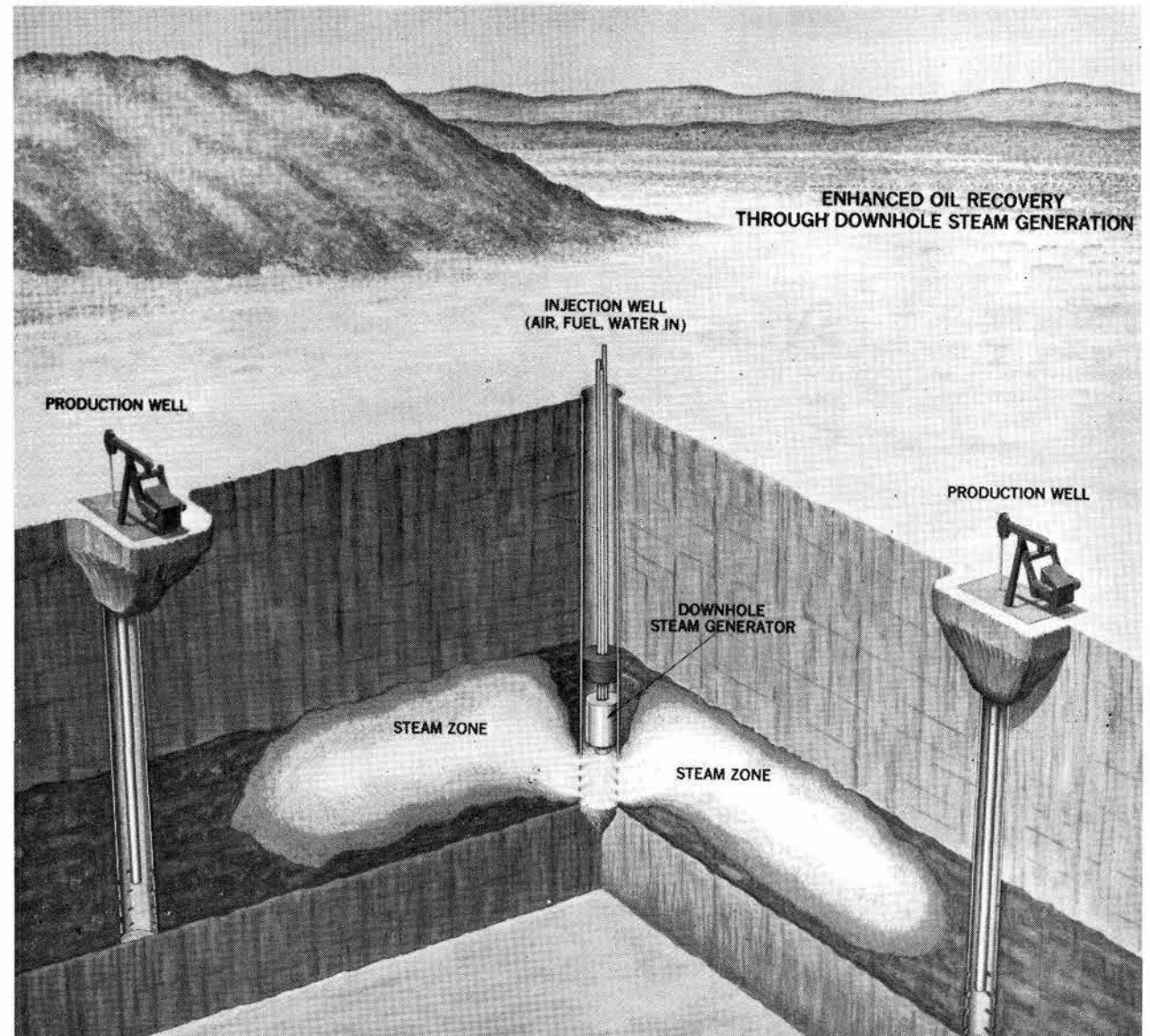
Marshall says areas requiring additional work include determining causes of aging

## \$1.7 Million Project

# New Laser Tracker Under Development

Red flame erupts from a bank of rocket motors and the sled shoots down the 5000-foot track, accelerating to Mach 1.6 within milliseconds. Then the test unit riding on top of the sled is tossed skyward and a parachute deploys. The sled sprays a plume of water as its undercarriage brake hits a trough of water between the tracks. Meanwhile, the parachute eases the test unit down into the target area. Elapsed time: less than eight seconds.

On a mound 2000 feet west of the impact area, Ken Bauhs (7521) assures that the requested data formats and film coverage of the test are provided from the computers and cameras in the laser tracker



HEAT IN/OIL OUT—Downhole steam generation softens heavy oil enough to permit its recovery. Sandia-developed steam generator, part of DOE's DEEP STEAM project, recently completed a 106-day test.

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in the test generator, determining how carbon dioxide mixed with steam and other gases affects steam flooding, identifying methods of efficiently sweeping more heavy oil from a reservoir, and developing generators that will operate on less refined fuels, thus lowering operating costs.

About 80 percent of the nation's five-billion-barrel proven reserve of heavy

oil will have to be freed with thermal techniques, such as steam injection, if it is to be recovered.

Downhole generators are a substitute for large surface generators. Such boilers require scrubbers to keep emissions within acceptable limits, and their effectiveness is confined to depths no greater than 3000

[Continued on Page Two]

and from cameras in another trailer on the east side of the track. This is the slave tracker, connected by microwave link to the laser tracker and computer-controlled to duplicate the photometric test data from a second viewpoint. The laser tracker is instrumented to provide three-dimensional trajectory and velocity data and both the tracker and slave are equipped with high-speed cameras and recording video cameras. The video provides instant playback of the test while computer-analyzed dynamic flight data are available within minutes.

Sandia's laser tracker and slave are unique in the weapons development testing

business. Without this advanced instrumentation, the heavy schedule of Division 7535 rocket sled testing in Area III could not be performed. Neither could the free flight rocket/trolley intercept tests or parachute development tests for antitank munitions be conducted at the Coyote Canyon Aerial Cable Site. In the Cable Site tests, the laser tracker and slave are moved to Coyote Canyon and actually control part of the tests. Command signals are programmed to be issued in sequence as certain test conditions and performances are met.

Heart of the laser tracker is a 12-inch-

[Continued on Page Four]

## Successful Deep Steam

feet because the steam cools before penetrating to deeper levels.

Downhole generators are expected to operate to depths of 6000 feet and should have much less difficulty in meeting air quality standards.

During the Long Beach test, analysis indicated that most of the pollution-causing combustion gases such as oxides of carbon, nitrogen, and sulfur remained underground and no reservoir plugging was observed.

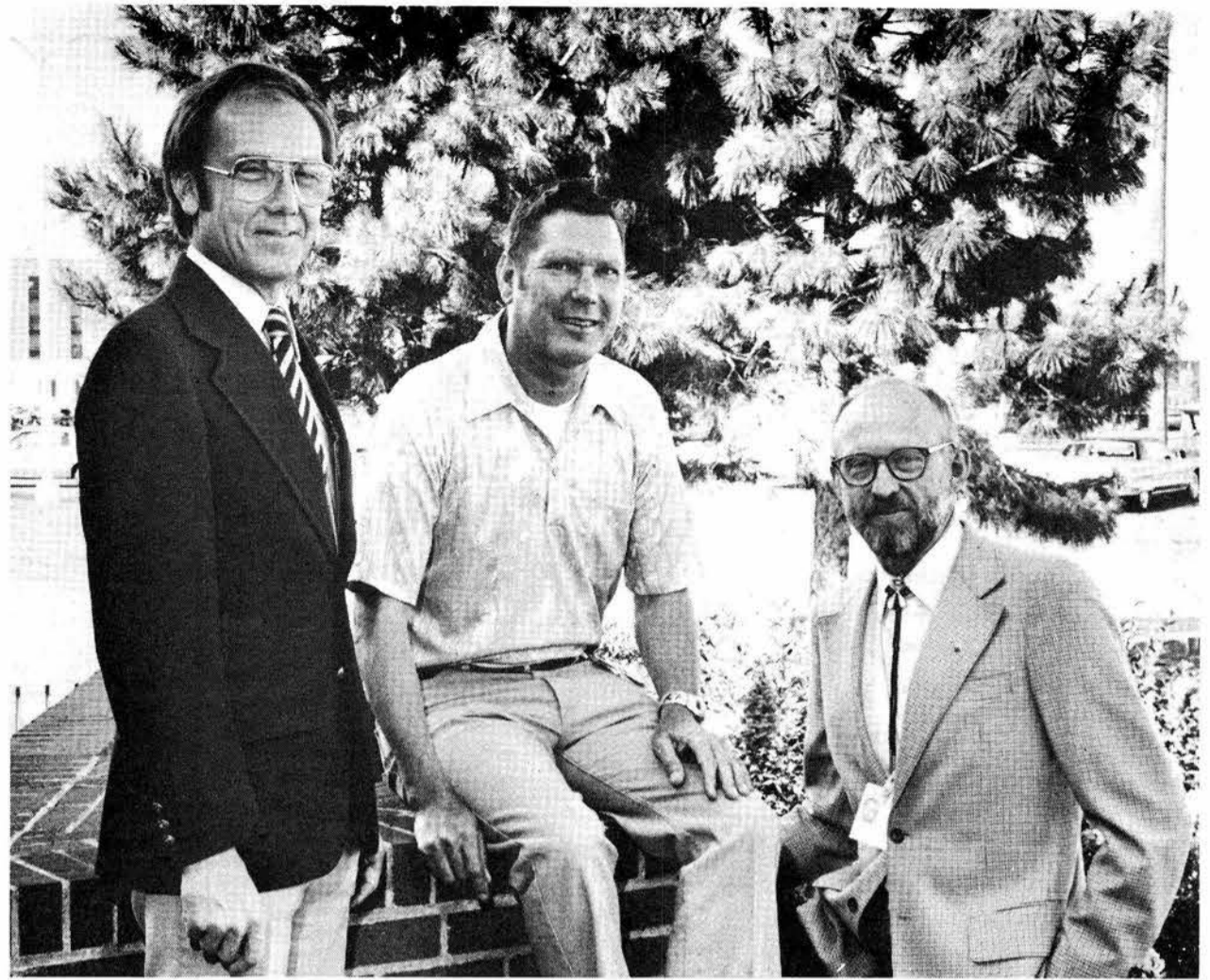
The test generator is 4½ inches in diameter and 9½ feet long, including a 3½-foot combustor and vaporizer section and a 6-foot instrumentation package containing pressure and temperature devices. The instrumentation section also controls the entry of air and diesel fuel into the combustion chamber and water into the vaporization chamber.

Air and fuel are fed through tubing into the combustion chamber, where the fuel/air mixture is ignited with a diesel engine glow plug or with a pyrophoric liquid that burns when exposed to air.

The instrumentation package is connected by cables to surface equipment such as air compressors, valves, pumps, and flowmeters and to computers that control the entire operation. All downhole components are designed to operate continuously in a 500°F, 1400 psi environment.

Development of the downhole steam generator is part of DOE's Project DEEP STEAM established in 1978 to identify techniques for recovering heavy oil from reservoirs below 2500 feet. Sandia manages the project.

"A major accomplishment of the project has been stimulation of new interest in downhole steam generation, an idea that dates back to the 1960s," says Marshall. "Now, several companies are working on units and displaying hardware at oil industry trade shows."



BOB TURMAN (4252), BOB BARTON (3421-1) and JOHN LEDMAN (7470)

## Supervisory Appointments

BOB TURMAN to supervisor of Pulsed Power Research Division 1252, effective June 1.

Bob has been at the Labs since June 1980 as an MTS in his current division. Bob's group is responsible for the pulsed power research on the PBFA-II accelerator and the Gigajoule Project that uses explosive generators and fast-opening switches for pulsed power applications.

Before coming to Sandia, Bob was in the Air Force for 11 years. His last assignment was at the AF Academy where he was a physics instructor. He earned his BS and PhD in physics from the University of Texas at Austin. Bob is active in his church and enjoys jogging and hiking. He and his wife Carol have two children and live in NE Albuquerque.

\* \* \*

BOB BARTON to supervisor of Vehicle Maintenance Section I 3421-1, effective June 1.

Bob has been a mechanic at Sandia for 13 years. Before joining the Labs he was a mechanic with local firms and served as a shop foreman for eight years at International Harvester.

He enjoys fishing and driving his dune buggy. He and his wife Wanda have three children and live in SE Albuquerque.

\* \* \*

JOHN LEDMAN to manager of Development Laboratories Department 7470, effective June 16.

John joined the Labs in 1962 as an MTS in the materials and processes group. His organization was concerned with joining development for components and struc-

tures with the study of fracture mechanics in materials development. In 1969 he was promoted to supervisor of the Process Metallurgy Division. For the past couple of years, John's division has been concerned with the behavior of materials at elevated temperatures. His personal work has been to apply modern fracture control theory to pressure vessels. John is a member of Sandia's Pressure Advisory Committee which has developed a training program and a safety practices manual.

John earned a BS in metallurgical engineering from the Illinois Institute of Technology and a PhD in metallurgy from Rensselaer Polytechnic Institute. He is a member and past chapter president of the American Society for Metals. John enjoys fishing, camping, hunting, and playing bridge. He and his wife Judy have two children and live in the NE heights.

## GSA Vehicle Sale Scheduled June 30

A GSA vehicle sale will be held June 30 at 10 a.m. at the KAFB-West theater, Bldg. 485. Enter the Base at Truman Road gate from Gibson Rd. SE, turn right at the first signal light, then drive two blocks to the theater.

Vehicles may be inspected at the GSA Interagency Motor Pool, 1800 12th NW, on June 28 and 29 from 8:30 a.m. to 3:30 p.m., and on June 30 from 8 to 9:15 a.m. Vehicles to be offered include: sedans, school buses, vans, pickups, stake trucks, flatbed trucks, forklifts, and a non-operating John Deere tractor. All items are sold "as is."

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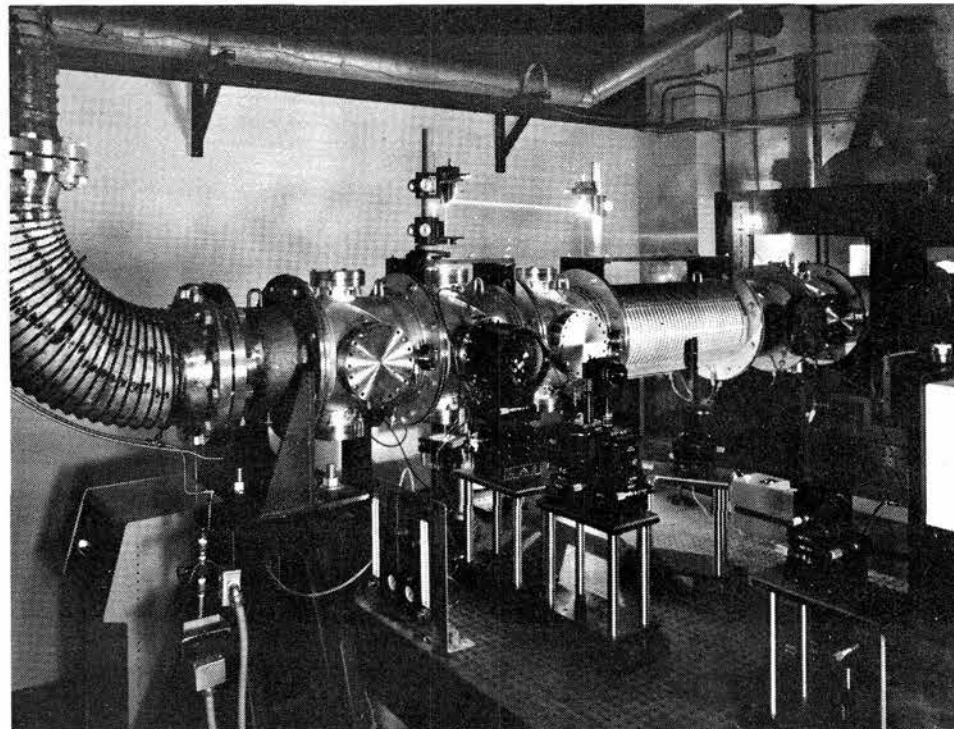
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RESEARCH TEAM conducting combustion-related materials research at SNLL includes Peter Mattern (now 8510), Bob Benner, John Hamilton (both 8342), and Alan Nagelberg (8313).



ATMOSPHERIC COMBUSTION exhaust simulator, with access for laser beams, is another apparatus used in combustion-related materials studies. In-situ Raman spectroscopic techniques reveal properties of material surfaces and the gas environment around them.

### Combustion-Related Materials Research

## New Diagnostic Techniques Developed

Applied Physics Division 8324 is developing new in-situ diagnostic techniques to study materials at elevated temperatures in combustion environments.

"Operating combustion devices at temperatures higher than today's levels could have large payoffs in terms of efficiency and costs," says Peter Mattern (now 8510). "DOE's Office of Basic Energy Sciences is funding our work to develop and use new methods to increase our understanding of corrosion, such as that attacking turbine blade materials and coatings at temperatures reaching 1100°C.

"To better understand failure mechanisms," Peter continues, "we need to identify and characterize chemical species in materials and coatings, as well as in the surrounding gases. In addition, measurements of structural symmetry, stoichiometry, impurity content, and temperature are required. To be of practical application, our experimental techniques should have high overall sensitivity and good spatial and temporal resolution. Such diagnostics would enable us to make more accurate and reliable evaluations of the corrosion resistance of materials for particular applications."

The main thrust of the research team—Bob Benner, John Hamilton (both 8342) and Alan Nagelberg (8313)—is to adapt a laser light scattering technique called spontaneous Raman spectroscopy to the in-situ study of combustion-related materials and environments. Post-exposure surface analyses supplement the in-situ Raman spectroscopic measurements.

Using apparatus instrumented for Raman spectroscopy, in which light from an incident laser beam is scattered from a sample and then analyzed, the team is investigating oxides and other compounds that form on the surface of some materials in high-temperature combustion environments. The shift of the scattered light to a frequency different from that of the incoming laser light fingerprints specific



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species; this, combined with the intensity of the scattered light, helps to determine the molecular composition and structure of the surface. The laser beam penetrates several tens of nanometers into the material, characterizing surface oxides or material changes in the surface during oxidation to this depth. Such data are important, for instance, in evaluating the effectiveness of new zirconium and yttrium ceramic coatings for turbine blades.

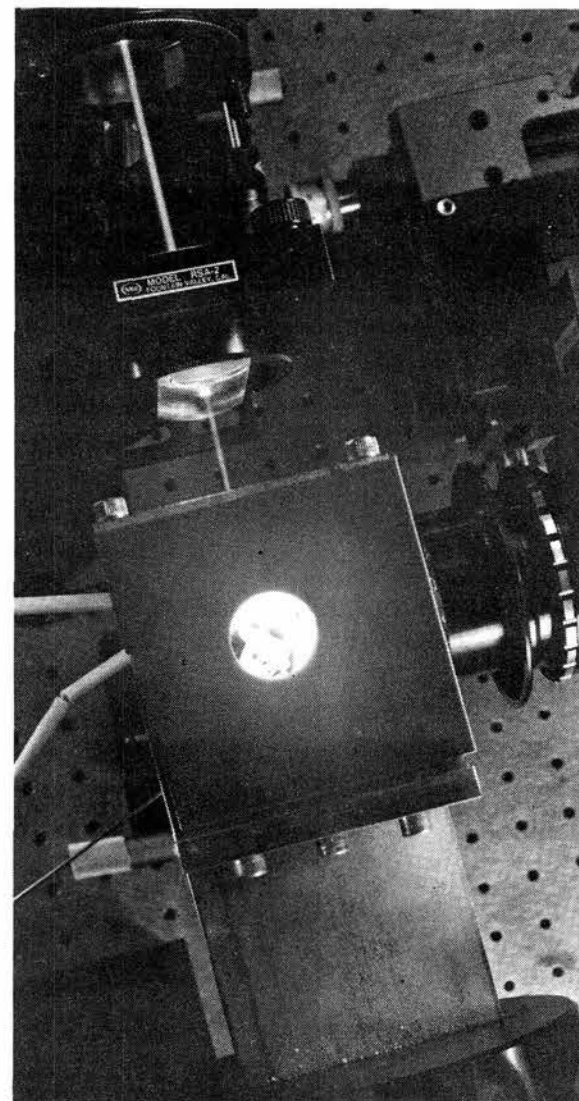
"These coatings function as thermal barriers that protect the turbine blade surface," Peter says. "The coatings reduce the surface temperature and limit interaction of corrosive species in the hot gas with the metallic substrate. Improving these coatings would bring the goal of higher, and therefore more efficient, operating temperatures a step closer."

In these and other studies, the researchers are working closely with companies like Pacific Gas & Electric and Westinghouse. Industry is also very interested in studying corrosion of materials in molten-salt and in nuclear reactor environments, to which similar techniques apply.

"The basic techniques we are developing have applications in a wide range of problems," Peter adds. "As we refine the diagnostic tools and add theoretical modeling and analysis, we can make major contributions."

### Sympathy

To Jose Ignacio (8257) on the death of his father in San Jose, April 10.



FURNACE USED by Division 8342 heats materials and coatings to temperatures approaching 1100°C. Laser beam enters the combustion chamber from the top, and scattered light is collected by lens at right. The intensity and frequency shift of the scattered laser light provide a measure of the molecular composition and structure of the constituents in the chamber.

## Laser Tracker-II

diameter mirror in a gimbal mount driven by high-speed torque motors. A five-watt laser beam is directed through a system of mirrors onto a reflective target mounted on the test unit. The beam is reflected back to the gimbal mirror and onto the surface of an image dissector which continually corrects the angle of the mirror to keep the target centered. The image from the mirror is also directed to the high-speed cameras and the video recording camera by beam-splitting optics.

The constant moving between Area III and Coyote Canyon is one of the reasons behind the decision to build a second laser tracker (LT-II). The \$1.7 million project is centered in Digital Systems Development Division 1521 under Jack Mortley.

"It takes about a day to relocate the laser tracker and its three support trailers," Jack says. "Relocation is particularly time consuming when the unit ping-pongs between the track and the Canyon. Constant adjustment of the unit's precision optical and electronic systems is required.

"The new LT-II will eliminate this problem. In addition, it will provide a three-fold increase in performance. The LT-II is being designed to support weapon development tests for the coming decade."

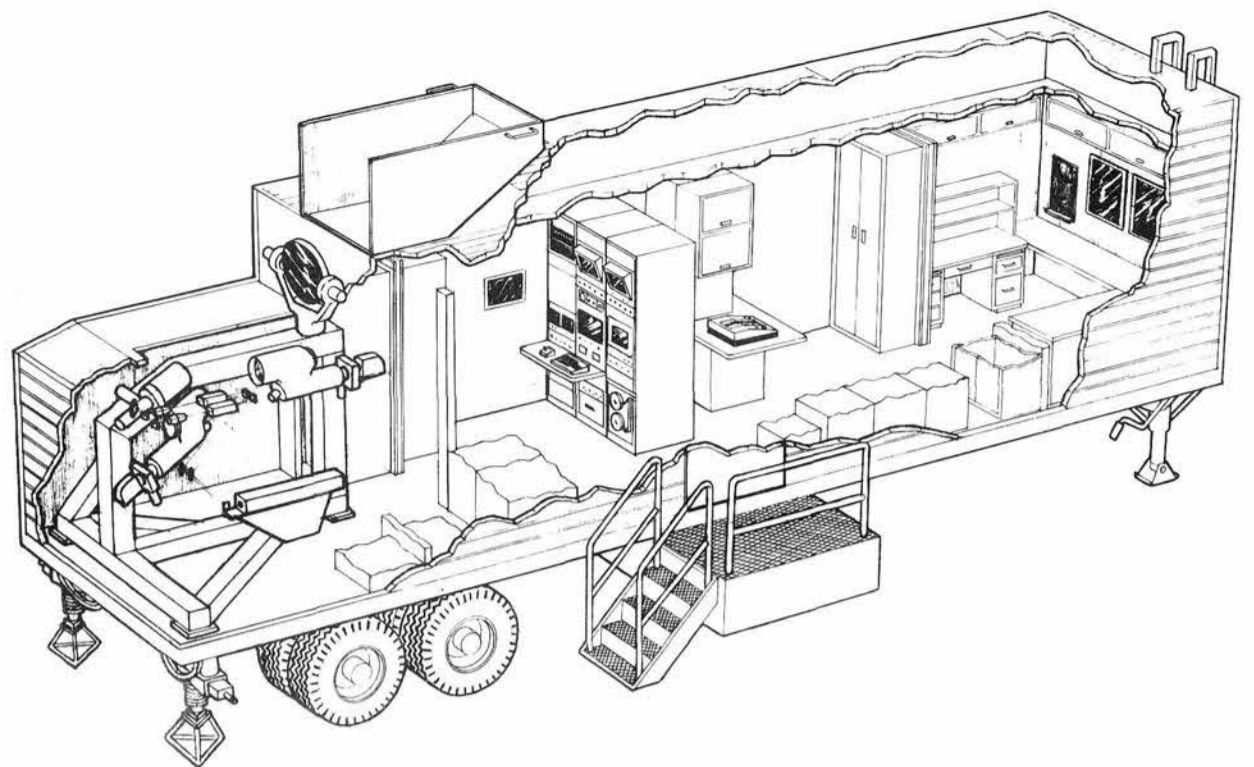
The LT-II will build upon technology developed for the LT-I, a commercial unit purchased in 1968. The unit never met design requirements, and a settlement was made with the supplier.

Sandia reworked the instrument until it became operational with limited reliability in 1972.

"It worked, but there were drawbacks," Ken Bauhs says. "The data acquisition was minimal, and all data were only recorded. The tapes went to a data processing center for reduction, and several days could elapse before we had test results. I got the job of second-generation design/development to bring the tracker up to its current capabilities of tracking and control. The slave tracker was also built as part of this effort."



NOW THAT most employee personnel files are computerized, much bulky paper and manual filing are eliminated. Jennie Tischhauser (3532) urges all employees to check carefully the printout of their file which they will receive shortly.



ARTIST'S SKETCH of Sandia's new Laser Tracker-II shows optical bench at left with its automatic leveling features, computer banks and control desk in the center section, and staff work area at right. The laser beam originates in the component at the base of the optical support bench, traverses a path to the gimballed mirror, then to the target. The target image is analyzed continually to drive the mirror, keeping the target centered. The new LT-II, under development by Division 7521, will be operational in late 1984. Paul House of Tech Art made the drawing.

Don Thalhammer (7521) is the project leader for LT-II development.

"The most necessary improvements in the current design," Don says, "are to increase the gimbal's dynamic performance, make the control system more intelligent and adaptive, and enhance the human engineering of system operations. With these improvements, we could track faster rockets and projectiles from advanced air guns. We can also add an acquisition-on-the-fly capability for locking onto free flight rockets or aircraft.

"The LT-II is also being designed to operate as a test command center with the LT-I and slave as extensions. This will increase the range of testing. At Coyote Canyon, for instance, we could use one tracker to control the test until a mountain or other obstruction gets into the field of view, then 'hand-off' control and tracking to the second tracker.

"If the 5000-foot sled track is lengthened," Don continues, "we could cover the longer sled run using both units."

The most important features of the LT-II are a larger mirror and new drive motors. The larger mirror area will

provide more light for the cameras and greater tracking stability at large mirror angles.

Other improvements:

—Automatic leveling of the optical bench.

—Improved position encoders and ranging electronics for greater three-dimensional coordinate accuracy.

—Addition of five microcomputers to the electronics systems to provide automatic focusing, zoom control, and adaptive gimbal control plus safer control of the laser beam. (The beam will not illuminate programmed exclusion areas.)

Don reports that the contract for the LT-II mirror, its gimbal mount, and drive motors is placed for final development and fabrication. The 10' by 40-foot trailer that will house the LT-II is being modified by a supplier. The new LT-II should be operational in late 1984.

Jeff Campbell (7521) is developing part of the computer and digital system. Gary Phipps (7556) is responsible for the electro-optical systems. Bill Love (7523) is handling control system design and Bob Hughes (7556) is performing mechanical design.

### Computerized Personnel Record

## All Employees Will See Their Files

Ever wonder what's in your personnel file as it now stands in Sandia's computerized system? You'll get a chance to see a printout, make corrections, add information, or ask questions during the next few months.

Mailing of individual records starts today to people in the 7100 and 8100 organizations. The schedule calls for mailings to the remainder of 7000 and 8000 in the next few weeks, then to 2000, 3000, 1000 and 9000 in sequence through December.

"Employees are asked to review and check this document carefully," says Jennie Tischhauser (3532) who heads the Employee Record Review Project. "This printout contains the information that will be the basis of all your personnel actions starting next fall. If you bid on a job, this record will be the one your prospective supervisor will see and use (along with those of your competition) to select interviewees for a job opening. It is extremely important that the record be accurate and as complete as possible."

## Take Note

Photos from the Retiree Picnic will be posted in the Coronado Club on July 6 and will remain on view throughout the month.

\* \* \*

**Clockwatchers:** On June 30 your day will be a bit longer than usual. That's because the minute between 5:59 and 6 p.m. (or 4:59 and 5 for our Livermore contingent) on that day will contain 61 seconds. And *that's* because in order to keep broadcast time (as in the time tick at 120 on your phone) in step with the rotation of the earth, it's necessary to add a second. That, in turn, is because the rotational motion of the earth around its own axis is slowing—very slightly, to be sure, but enough that when compared to atomic time (more properly, Temps Atomique International), it needs adjustment every year or so. Thanks, Grover Hughes (1246), for help with this one.

\* \* \*

The American Lung Association of New Mexico has established an annual award to be given to the outstanding volunteer in the area of prevention and control of lung disease in New Mexico. The new award will be called the Clinton P. Anderson Award in memory of the former U.S. senator who founded the New Mexico Tuberculosis Association in 1917. Nomination forms for the award are available at the Albuquerque office of the Lung Association at 216 Truman NE (265-0732).

\* \* \*

A garden tiller that locks in reverse gear can plow up feet along with gardens. If you own one of certain heavy duty models of "Roto-Spader" or "Giant-Tiller" marketed by Sears or Roper, you can call a toll-free number for a replacement clutch control and linkage that will eliminate the locking-in-reverse-gear problem. Jot down your tiller's model number and bring it to LAB NEWS to check it against a list of Sears and Roper models for which free replacement kits are offered.

## Fun & Games

**Sharpshooting**—Results are in for the 1982 NESRA-NRA national pistol matches. Sandians were led by the .22 pistol team of Daven Bennett (9415), K. K. Ma (2331), Bob Davis (4221), and Dick Vivian (7211), which finished fourth among 39 teams entered. The precision air pistol team—Bennett, Ma, Vivian, and Ray Mosteller (7132)—finished second among 15 entries. A total of eight individual awards were collected by Ma, Davis, Bennett, Mosteller, and George Edgerly (7471), shooting pistols, and by Dave Overmier (7585), shooting the precision air rifle. Thirty-four Sandians or dependents participated in this year's competition.

Ron Iman (7233) has been elected a Fellow of the American Statistical Association in recognition of his contributions to the profession, including his research in nonparametric statistics and sensitivity analysis as well as service to the association on both a local and national level. The citation will be presented to Iman at the annual meeting of the ASA in Cincinnati on Aug. 17.

\* \* \*

*The Cumbres & Toltec Scenic Railroad* is the title of the latest addition to the LAB NEWS/S. Hwy. 14 Village Project collection. The book, published by the UNM Press, is both a history of the narrow gauge line and a description of its rolling stock and the 64-mile track between Chama and Antonito. Now owned jointly by the states of New Mexico and Colorado, the historic railroad operates during the summer months, giving tourists and railroad fans a glimpse of magnificent scenery and old-time steam locomotive railroading. The book contains many photographs; it sells for \$8.95 with proceeds going to the project.

\* \* \*

Art Arenholz (3520) and Dan Lopez, executive director of the New Mexico Advisory Council on Vocational Education, will discuss vocational education on "Somos Bilingües en KOAT" on July 4 at 9 a.m., channel 7. Moderator of the show is Julia Gabaldon (3163).

\* \* \*

Tierra del Sol Council of Camp Fire is offering a four-day camp for women at Camp El Deseo near Cuba on July 26-30. A number of outdoor activities are included. Cost is \$60. For a brochure, call the Camp Fire Service Center, 265-8786.

\* \* \*

John McKiernan, supervisor of Project Engineering Division 9742, recently was named a member of the board of



BOB BACA (3432) displays a traveling trophy he won recently as the top gun in the New Mexico Associates/FBI Academy statewide pistol tournament. Bob scored a perfect 100 on the combat-type target range. A retired captain with 21 years in the Albuquerque Police Department, Bob joined Sandia Security a year ago.

governors, American Society of Mechanical Engineers.

Active in ASME since 1951, John was chairman of the New Mexico Section in 1956, secretary of Region VIII in 1960, and national vice president in 1971. Since 1973, he has served on the policy board and as chairman of the national member interests committee.

\* \* \*

Retiring this month and not shown in LAB NEWS photos are Perfecto Romero (3615), Robert Middlesworth (9225), W. L. Shoemaker (1120), Hadley Rowe (3613), and Hugh Pierson (1834).



MORE COLLECTIVE  
NOUNS FOR R&D LABS

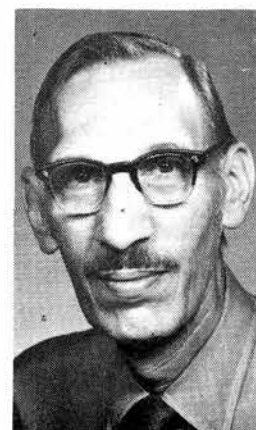
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## Sympathy

To Bill Huntman (2645) on the recent death of his father-in-law in Oklahoma.

To Robert Peet (7126) on the death of his father in Mesa, Ariz., June 4.

## Death



Frank Francis of Electronic Property Materials Division 1815 died June 18 after a short illness. He was 64.

He had worked at the Labs since October 1949.

He is survived by his widow and a daughter.

\* \* \*

**Basketball**—A summer league is now organizing. The 10-game, six- to eight-week season starts July 5 with each team playing one or two games per week. Team rosters and \$100 team fee should be turned in to Tom Lenz, recreation manager, by July 1. He's at the Coronado Club, 266-7557.

GATHERED at the Rape Crisis Center are the three persons responsible for a computer system that compiles and analyzes rape data. Left to right are Lt. Bob Casey of the Albuquerque Police Dept., Cecilia Chang (2626), and Lynn Rosner of the Rape Crisis Center.



## To Catch a Rapist, Use a Computer

One of the grim statistics of our time is that rape is the fastest-growing crime in the United States—and one of the most frustrating to do anything about. According to the FBI, only 10 percent of the victims report the assault. Of those who do report, very few actually prosecute, usually because of lack of evidence.

In 1979 Sergeant (now Lieutenant) Bob Casey of the Albuquerque Police Department (APD) and Lynn Rosner of the Rape Crisis Center were interested in computerizing rape data. They wanted to establish a system that would quickly and efficiently search out, match, process, and analyze data on known and unknown rapists. This way the *modus operandi* of a rapist could be recognized and suspects tracked.

"APD had no money available for this project, so Sergeant Casey turned to the community for help," says Cecilia Chang of Personnel Systems Design Division 2626. "A non-profit project called 'ORDAIN Rape Project' was then set up. I got involved because I was working for the City of Albuquerque while attending UNM. Since I had worked for Digital Equipment Corporation, I volunteered to approach my former boss, Tom Stockebrand, for help. He was most supportive and immediately arranged to have his company donate a terminal and printer to APD. At about the same time, UNM's Office of the Medical Investigator offered us free use of its PDP11-70 computer.

"Rapists, like most other criminals, tend to use the same methods over and over again, establishing a *modus operandi*. Imagine digging through stacks of files, looking for a rape suspect described as about 5 feet, 10 inches tall, weighing 175 pounds, carrying a knife, and picking up victims from parking lots. This is the kind of matching APD and the Rape Crisis Center have to do frequently, and it's what led to computerizing rape data."

Cecilia designed a computer system known as Online Rape Data Analysis Information Network (ORDAIN) to automate the matching process. When certain essential features of a rape are keyed in, ORDAIN does all the searching and matching, and in seconds provides a list of similar previous cases. ORDAIN can be run on any computer that supports ANSI-Mumps and MEDUS/A, a general purpose data base management system developed by the Harvard School of Public Health.

"MEDUS/A is inexpensive, easy to

install, and 'speaks' in English rather than some exotic computer language," says Cecilia. "The system can be adapted to any kind of crime with unpredictable patterns, as well as to engineering problems, say, to pinpoint weapon component failures. In fact, Los Alamos uses an ANSI-Mumps system to analyze nuclear health hazards.

"Rape Crisis Center personnel interview victims, using the form we designed for computerized systems, and the police do the data entry and analysis. The Rape Crisis Center needs more volunteers to conduct interviews as well as to enter data so as to assure greater accuracy."

Cecilia points out that there's a lot of computer talent at Sandia, and that these people would be of immense value to other community projects that need to be computerized. She adds that Sandia was instrumental in initiating the computerization of rape data: "Two years ago, some funds were left over from ECP. With this money, the Rape Crisis Center purchased its first minicomputer."

Cecilia designed the sex crime computerized data base system in six months on her own time, working evenings and weekends. It also became the basis for her Master's project at UNM in computer science. Recently, she presented a paper at the Law Enforcement Data Processing Management Symposium at Williamsburg, Va. In June, Cecilia will present another paper entitled "Using MEDUS/A to Help Police Capture Rape Suspects" at the Mumps Users Group meeting in Denver.

"Sandia has been very supportive," she says, "letting me attend conferences and publishing my papers. And I'll be happy to provide information to employees who think the data base system I designed might be useful in their own work."

## Events Calendar

June 26—Chamber Orchestra of Albuquerque, 8:15 p.m., Albuquerque Little Theatre, 247-0262.

June 30—"Folk Religion in a Changing Mexico," July 7—"The Aesthetics of Pueblo Ceremonialism," illustrated lectures for "Fiestas of San Juan Nuevo, Ceremonial Art from Michoacan, Mexico," 8 p.m., Maxwell Museum.

July 2-4—Indian Pueblo Cultural Center, Native American Arts and Crafts Fair, Pueblo dances daily, craft demonstrations.

July 3—American Legion Fireworks show, University Stadium, 8 p.m., 243-1901.

Q. Some time ago I asked whether SNL employees could use the photo copying equipment [Xerox, Kodak, etc.] for personal use if they could put money in some sort of "coin box" located near the machine. Several arguments were presented to dispose of such an idea. The idea still appeals to me for a number of reasons. I again propose that SNL institute the above practice on a trial basis. To counter some of the earlier arguments: The monies accumulated in the collection boxes could be picked up by the service personnel while repairing or maintaining each piece of equipment. Revenue could be applied directly to reducing the cost of the service contract or particular repair order. This begs the question of use of government property for personal use but, in my opinion, should be interpreted as a "benefit."

A. Because of your previous request as well as the interest of some others, we did look into the possibility of using our copiers for personal copying and returning the proceeds for such copying to the government. Our legal department and DOE/ALO have stated that this cannot be done. The only option open to us was to look for a concessionaire who would offer this service. As you know, a copier was installed in the Credit Union for this purpose but was withdrawn by the concessionaire because it proved to be unprofitable. What it boils down to is that personal copying should only be done off the premises and outside working hours.

We admire your integrity and hope that other Sandians share your concern about the incorrect use of government property, but unfortunately we feel that we have exhausted all avenues on this question.

K. A. Smith—3100

Q. Last year, Technical Institute Equivalency [TIE] graduates were sent a questionnaire seeking information concerning the possible accreditation of the TIE Program. An accompanying memo indicated that Out-of-Hours courses taken at Sandia would be transferable to any college. A TIE graduate would have junior-level status at a university.

I have not heard about any possible

July 3, 9—Santa Fe Opera, "Die Fledermaus" (in English); July 7—"The Marriage of Figaro" (in English), 9 p.m. Albuquerque box office at the Broadway, 2nd floor, Mon.-Sat., 10 to 1 & 2 to 5.

July 5-29—(Sun. through Thurs.) Children's Story Hour—Indian Legends, Spanish *Cuentos*, and Tall Tales with storyteller Joe Hayes, 7-8 p.m., Wheelwright Museum grounds, Santa Fe. Free, bring blanket to sit upon, parking on Camino Lejo.

Through July 5—"Busy Body," comedy, Barn Dinner Theater, 281-3338.

developments concerning this except that the accreditation team gave Sandia very high marks. I am presently considering taking evening courses towards a bachelor's degree, and acceptance by a university of my Sandia courses would spare me many years of effort and avoid considerable duplication of courses if credit were granted for Sandia's courses. What is the present status of the accreditation effort? What is the attitude of Sandia management towards accreditation?

A. The memo to which you refer mentions the possibility of accreditation of the TIE Program. It has since been determined that accrediting Sandia's TIE Program would be very difficult. It would require that Sandia petition the State Board of Educational Finance to become a degree-granting institution. It is not an objective of Sandia to compete with local educational institutions. The second major factor against accreditation is that instructors would have to be "approved" and the general format of out-of-hours TIE classes would have to be altered to meet the more rigid standards of the accreditation board. This might defeat one of the objectives of the Out-of-Hours Program, which is flexibility. Sandia would also have to receive accreditation in the non-traditional industrial category. This occurs very infrequently.

A more promising route is to merge our TIE Program with that of UNM. Their new, expanded two-year Electronics Technology Program is scheduled to begin in the fall of 1982. Once it is operating in full, we hope to have interested TIE participants and graduates attend that program. They would have to take the extra English, social science and humanities credits needed to complete an accredited two-year degree. It might be possible to obtain advanced standing for the coursework completed at Sandia and eventually obtain their degrees from UNM.

Any action regarding the above options will require approval from the University Programs Education Committee and appropriate committees at UNM. If you have additional questions, please contact the Education and Training Division 3521.

J. R. Garcia—3500



IN THE TECPUBS nerve center, 3152-1 supervisor Angie Gurule (left) watches chief clerk Maggie Henry working at the word processor terminal. Jan Willis (3152) observes the display/graphics terminal that formats what Maggie types and shows on the screen what the finished page will look like.

## TECPUBS

### **New Name, New Look, New Capabilities**

There's a new look these days over at TECPUBS—and that includes the name. It stands for TECHNICAL PUBLICATIONS Center which encompasses the following divisions: Tech Writing 3151, Composition 3152, and Tech Art 3155.

The talented folks at TECPUBS can now produce a professional, typeset SAND report—a far cry from the familiar typewritten, double-spaced publications of years past.

"In our new two-column typeset format, we can get two to two-and-a-half pages of typical typewriter/printer output on one of our pages," says Jan Willis, head of 3152. "We can control the number of characters per line to fit more text on a page. This is a considerable savings in the cost of publishing SAND reports and, in addition, you get a professional-looking, easy-reading, aesthetically pleasing report."

The heart of TECPUBS is the Sandia Text Editing and Processing System (STEPS). It consists of Atex text processing equipment, an Autologic phototypesetter,

and other equipment to produce high-quality, camera-ready copy.

"We have about 60 fonts—a font being a particular style and size of typeface," says Jan. "Our phototypesetter also has diacritical marks for any language—accents, umlauts, cedillas. An example of our versatility is that we've done some reports in Spanish—we don't have all fonts but we can get them if they're needed.

"We also have the capability to transfer files to STEPS from Wang and Lexitron word processor disks and cassettes as well as from most computer nine-track magnetic tapes.

"STEPS can set math equations of the same quality as those found in textbooks from leading publishers or the principal scientific journals.

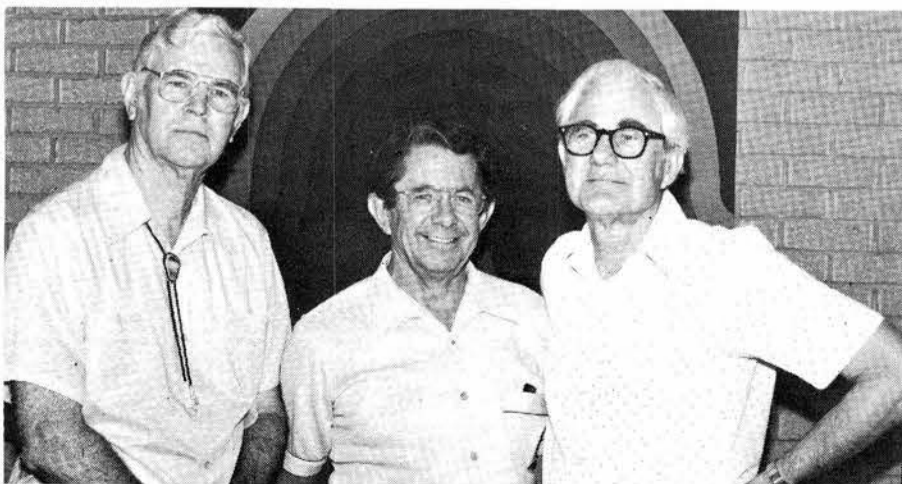
"We're very responsive to authors—changes are no problem *except* after we get to page makeup. Turnaround time has improved tremendously with this automation—reports are available when you need them. We feel that we can do better than any other service available either in-house or from outside firms. Our software continues to improve—our compositors keep up with the state of the art by continuing training."

Jan says that among other wonders, TECPUBS will soon have a Shaffstall Media Com 3300—a "black box" that provides conversion from a variety of word processors and computers into the Atex over telephone lines. Also a computer dictionary is being developed for the system to automatically check the spelling of 120,000 words.

Unfortunately, no machine is being planned to write the report for you.

Jan adds that tech writing, art, and editing services are also available. There is a chargeback system for TECPUBS services. Call Jan at 4-4930 for more info.

## **Retiring**



Louis Stam (9363), Bob Guerin (3254), and Melvin Oberst (7247).



Ray Brin (7450)

**MILEPOSTS**  
**LAB NEWS**  
**JUNE 1982**



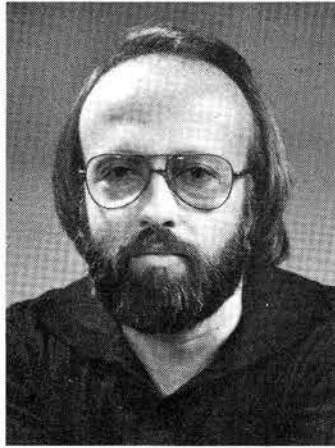
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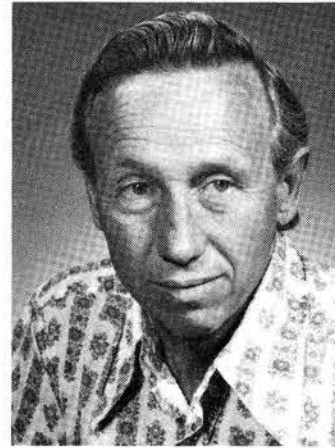
Floyd McFarling - 7417 30



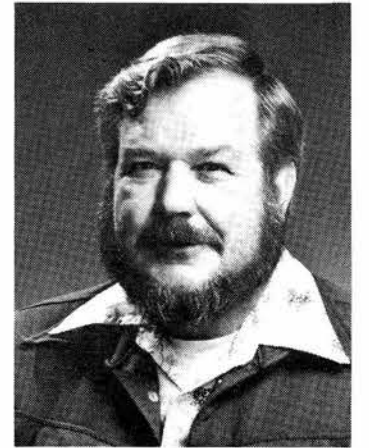
Don (2545) and Mina (1633) Carnicom 25



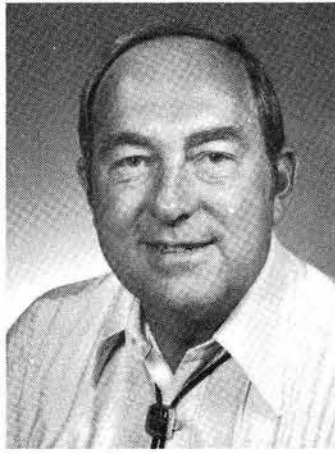
Terry Bersie - 8274 15



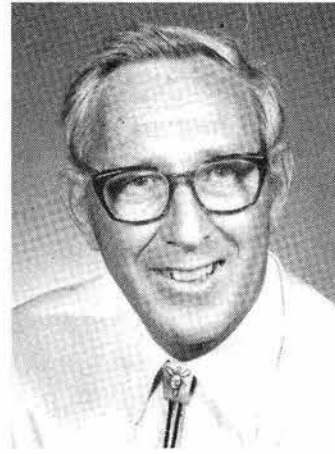
Donald Bertholomey - 7424 20



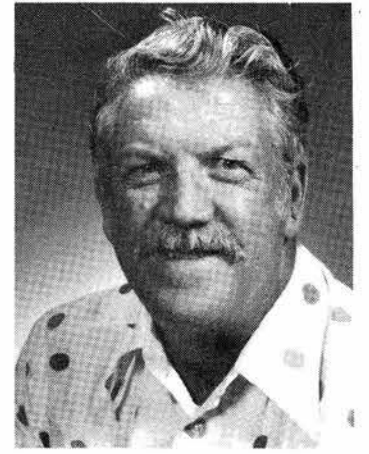
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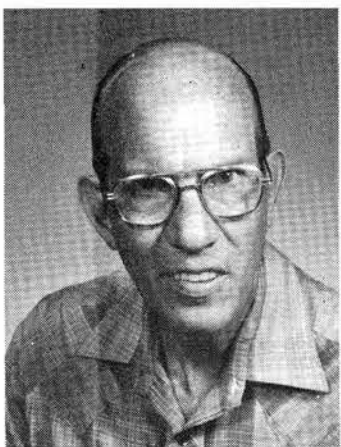
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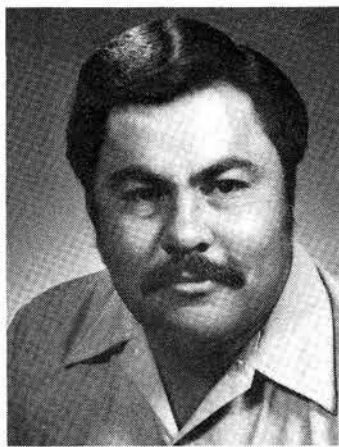
Warren Taylor - 2551 30



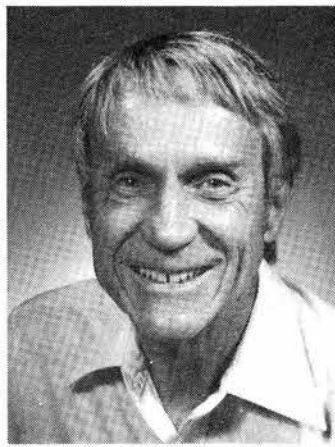
Harold Myers - 2551 30



Ray Cooper - 9338 15



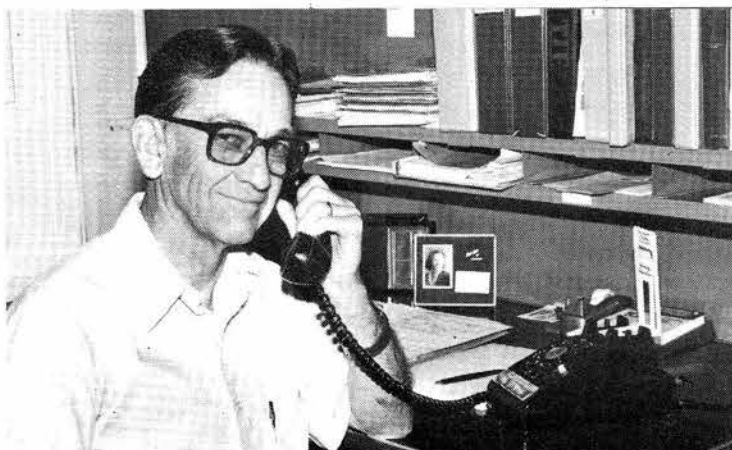
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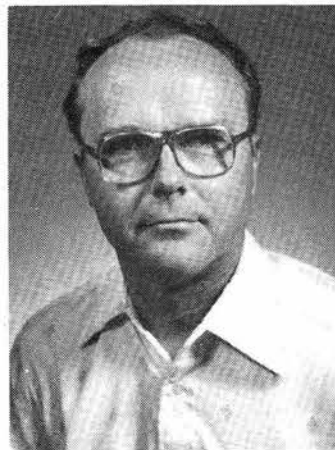
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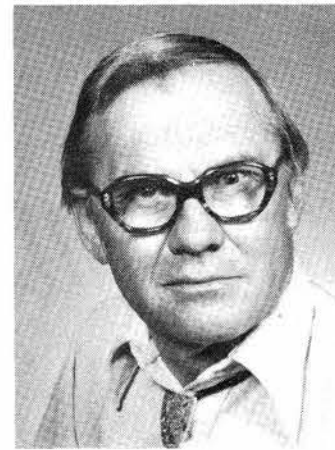
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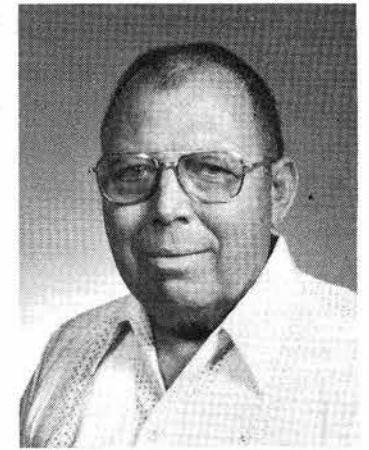
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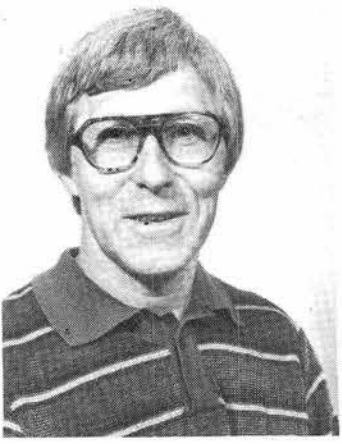


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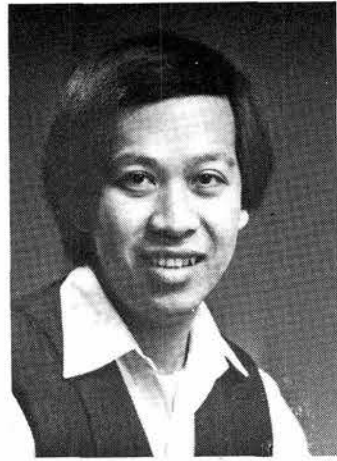


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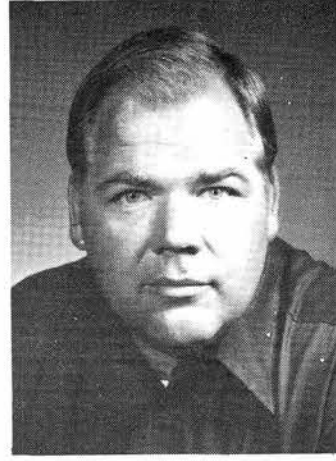




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Robert Chan - 8466 10



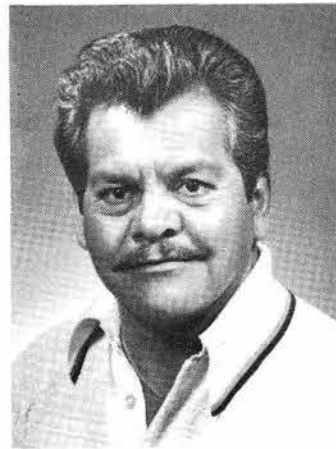
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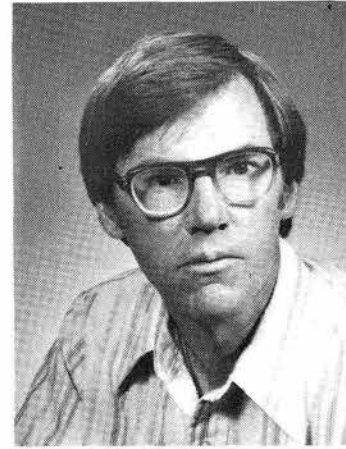
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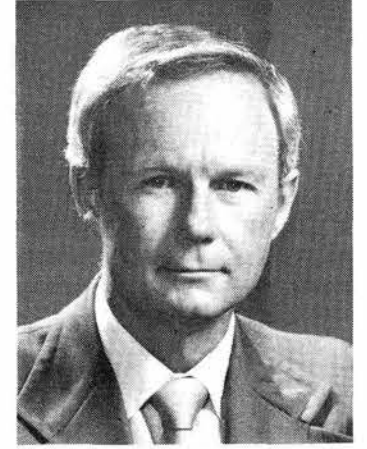
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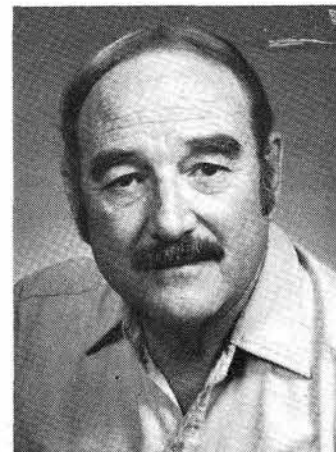
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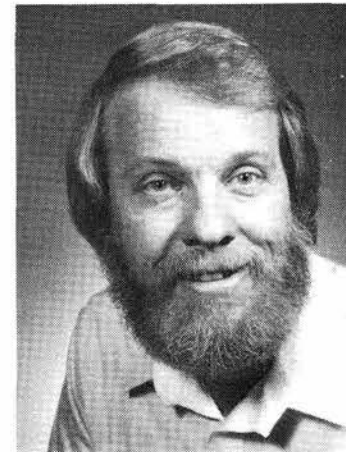
Al Watts - 324 15



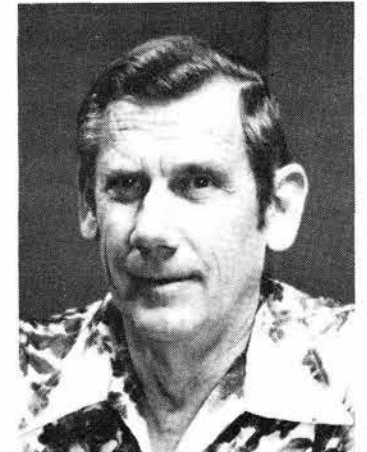
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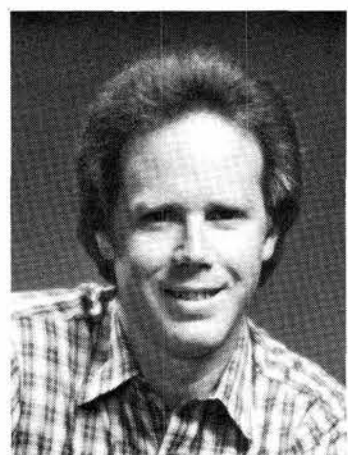
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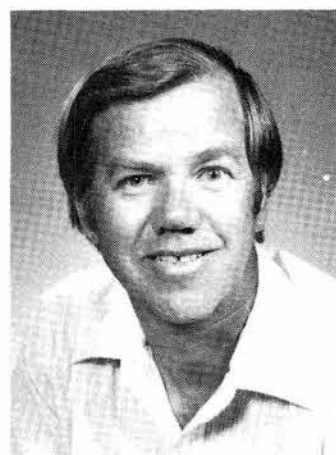
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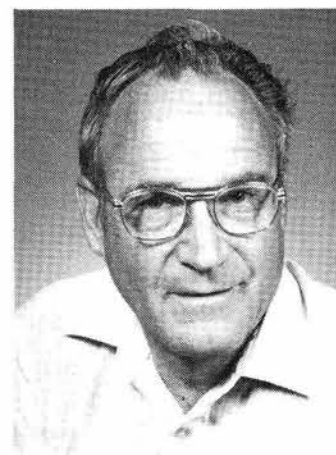
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Don Kasberg - 8442 15



David Skogmo - 9216 20



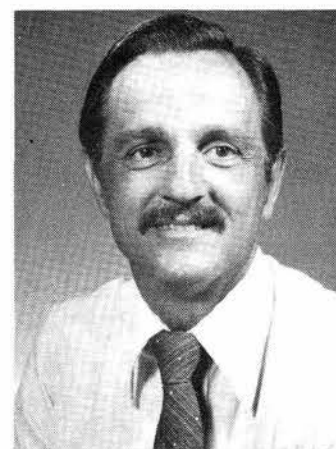
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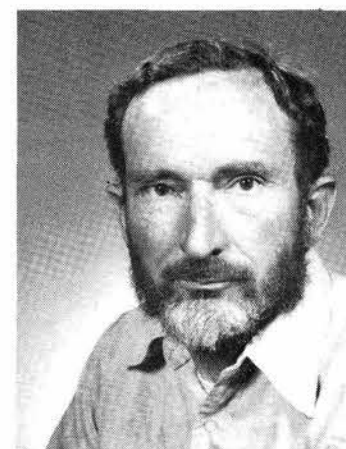
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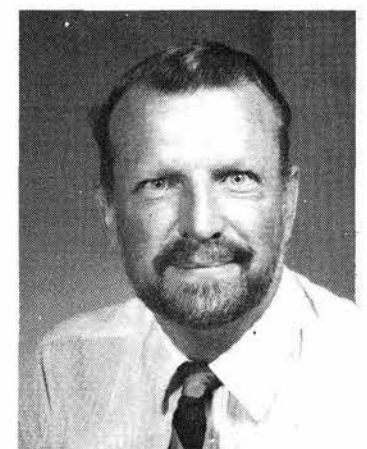
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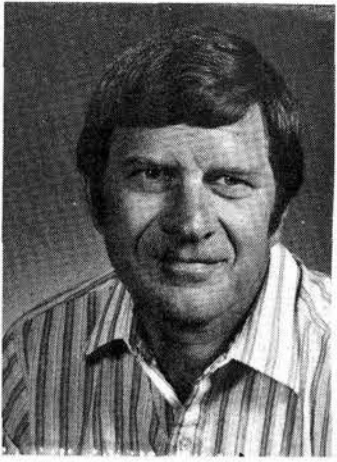
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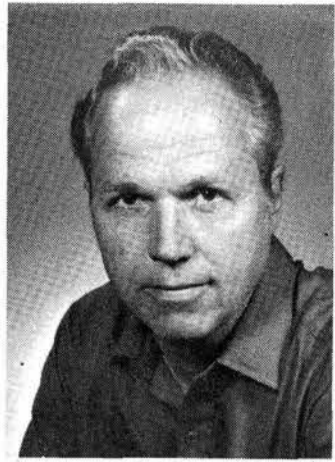


Jeffery Lawrence - 334 15



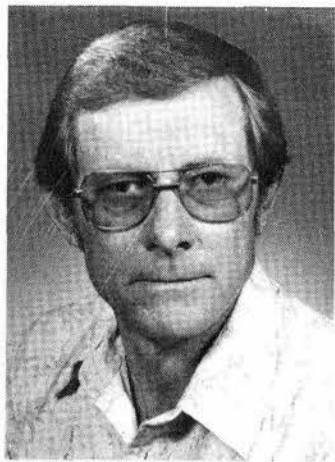
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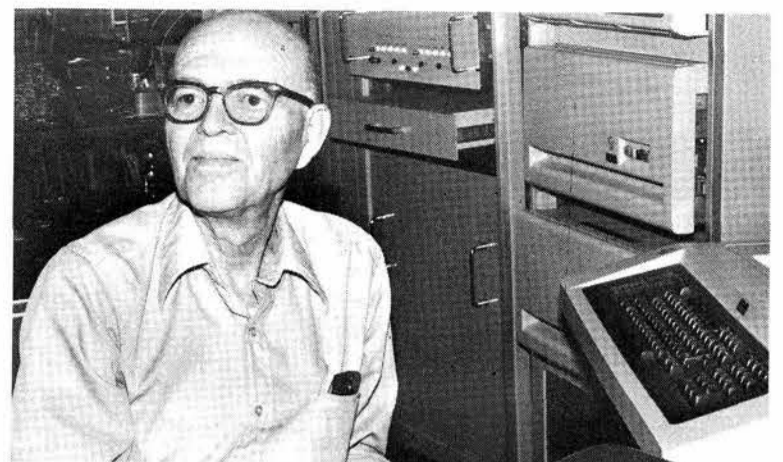
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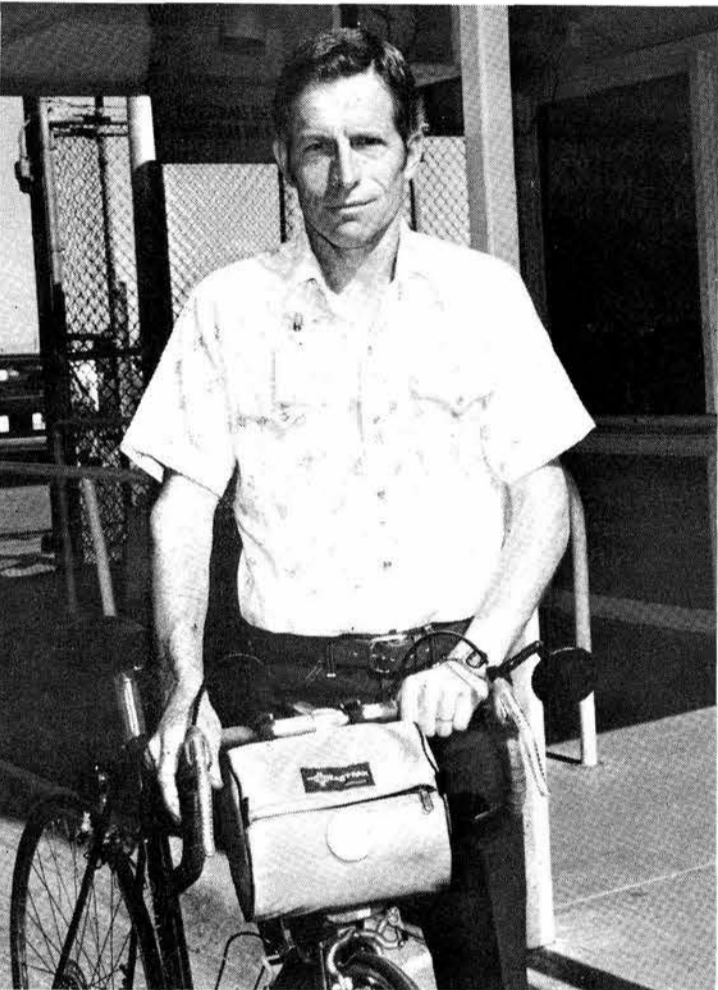
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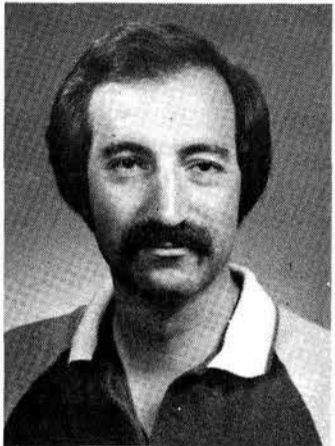
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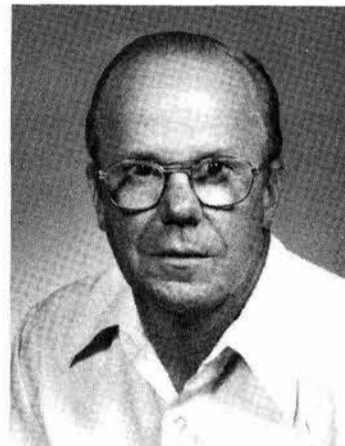
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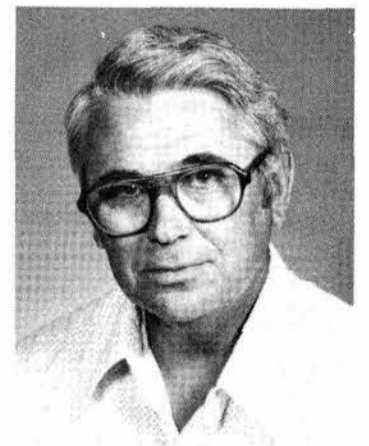
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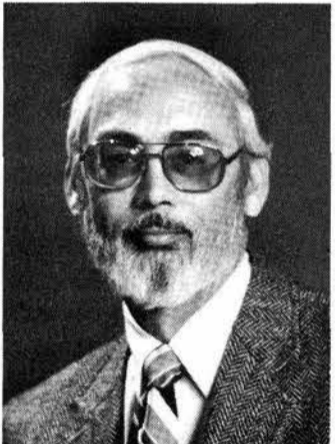
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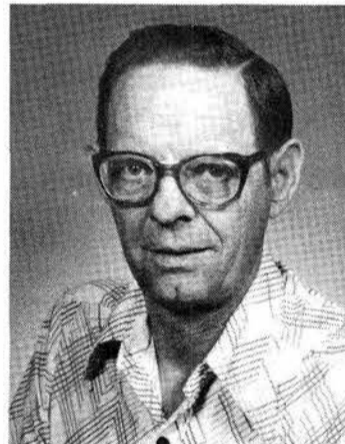
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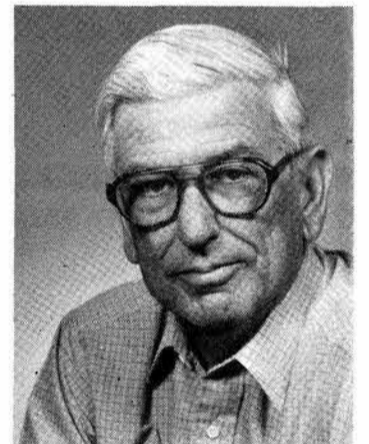
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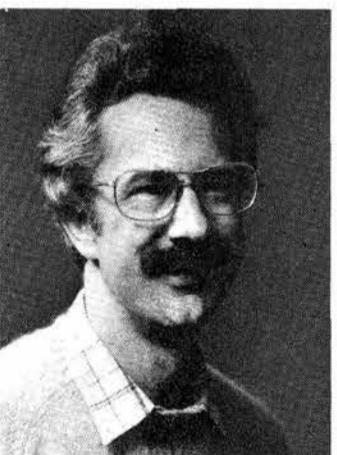
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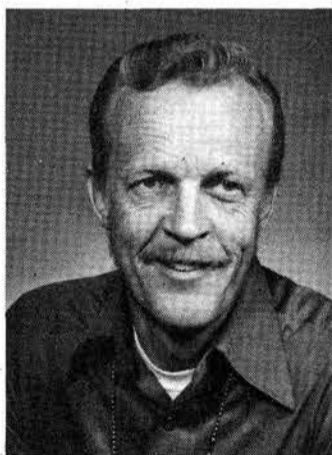
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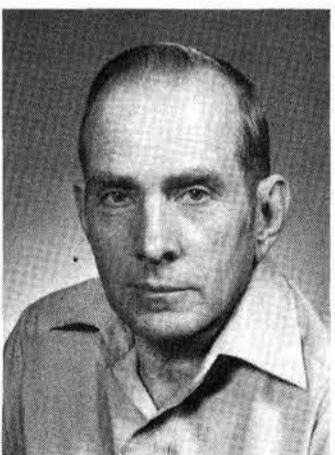
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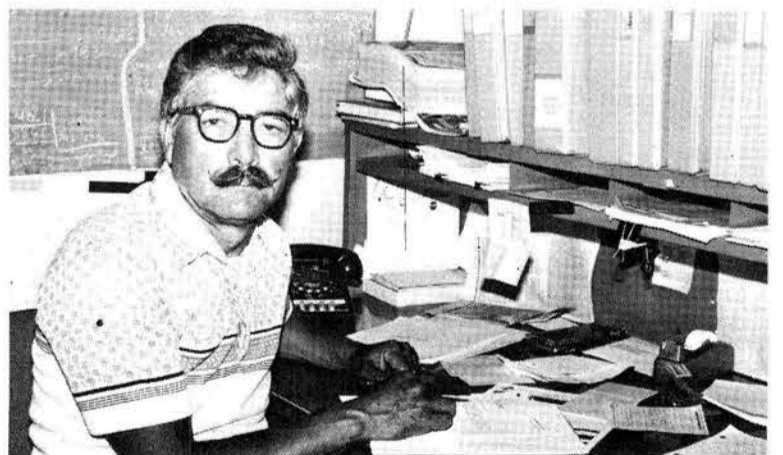
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Al Winblad - 9259

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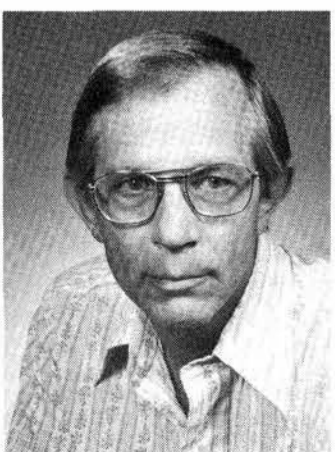
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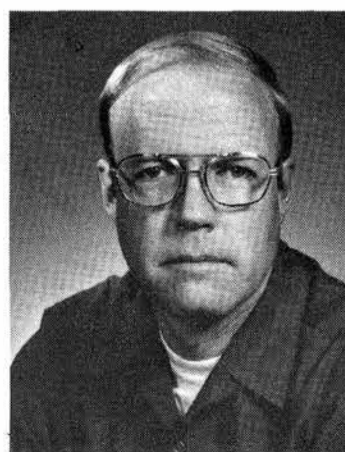
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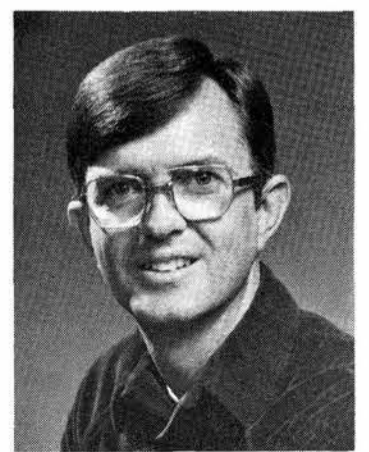
Jim Manweller - 1651

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William Hale - 324

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Charles Ray - 8272

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# Highlights for World's Fair Visitors

Need to travel to Oak Ridge on business? You may want to take off a couple of days and take in the World's Fair in nearby Knoxville as well.

Need to travel to Knoxville to see the Fair? You may want to take in the new visitor attractions in nearby Oak Ridge as well. Here are some of the sights to see.

At the Fair, the United States Pavilion is this country's energy showcase. The six-level glass and steel structure houses exhibits of high energy technology and U.S. energy strategies for the future. After the Fair, it will remain on site as an energy research center. The Clinch River Breeder Reactor Plant Project will occupy the center space in the America's Electric Energy pavilion.

Just a 30-minute drive away is Oak Ridge where the DOE's American Museum of Science and Energy provides visitors with an up-to-date, self-guided tour of over 200 exhibits in nine major exhibition halls:

—The self-guided motor tour of the "Energy/Environment Loop" (ORNL facilities and areas of interest in East Tennessee) features: roadside overlooks with panoramic views of the Gaseous Diffusion Plant, the historic Graphite Reactor, the Aquatic Ecology Laboratory,

the University of Tennessee's Arboretum, and two TVA power facilities—Bull Run Steam Plant (fossil) and the Melton Hill Dam (hydro).

—Two exhibits—"Oak Ridge Story" and "Oak Ridge Today"—present the history and the current responsibilities of the installation.

—The "Energy Science Lab" presents the basics of science through play, exploration, and discovery.

—"Energy: An American Experience" shows how pioneers generated energy with their own muscle and with wood, wind, and water.

—The "Age of the Automobile" exhibit focuses on the evolution of America's most loved plaything and most-hated necessity.

—The "Energy Arcade" features an enjoyable way to get the facts on alternatives to fossil fuels. Stroll the midway and play computer games.

—The exhibit hall on "Earth's Energy Resources" highlights oil, natural gas, coal, hydropower, and geothermal energy.

—Complete the tour of exhibition halls at the "Energy from Atoms" exhibit, which provides basic information on nuclear fusion. See the model of a nuclear reactor,



ALBERT EINSTEIN AND FRIEND—A young visitor to Oak Ridge's American Museum of Science and Energy views a large photograph of the physicist.

walk through a model of the Tokamak fusion reactor, play the laser fusion game and track subatomic particles through the cloud chamber.

In addition, the Museum has exhibits on loan from other facilities for the six months of the World's Fair (May 1-Oct. 31).

## 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 (MO125).

#### 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

- CHAIR w/cushion, green-white-yellow; shower curtain, red-pink striped; 96" curtain rod; 2 vinyl sliding doors w/track, 7½ x 3½; 4 wheels for 9.50x16.4 Chev. tire. Hitchcock, 294-5153.
- ROPER Supermatic range w/top swing-out broiler; ping pong table; misc. yard items. Trollinger, 268-3414.
- KASTINGER ski boots, size 10, \$35; lg. alum. dog shipping crate, \$200; ham gear: transceiver, monitor scope, 73's. Hunter, 294-2877.
- CAR SEAT, Strollee Wee Care, w/"cool cover," \$25; potty seat; diaper pail. Koski, 822-1122.
- APT. SIZE DRYER, 120V, \$95; yellow bathroom set w/shower curtain, \$10. Spears, 266-9782.
- GUITAR, Yamika, acoustic, 12-string, \$150; 3-pc. sectional sofa, red, \$75; 3 wingback chairs, green, \$35 ea. Martin, 299-3004.
- MODERN yellow vinyl/alum. couch, \$50; white velvet queen size spread; 2 sets matching drapes & valances, \$75. McDowell, 299-6222.

- WORKBENCH, \$25; free-standing fireplace, \$25. Mozley, 884-3453.
- FREE PUPPIES, mixed Pit Bull & Blue Healer, no papers. Garcia, 344-0784.
- DINETTE set, \$150; trundle bed, \$130; 2 lamps, \$35 ea.; 2 chrome/glass shelves, \$80 ea. Lloyd, 299-5614 after 6.
- BABY-SIZE CHEST, white wood, three drawers & hanging storage. O'Bryant, 268-9049.
- EMERSON port. stereo, deluxe full feature, FM/AM cassette recorder w/metal tape/cue & review tape deck, AC/DC. Durand, 821-3064 after 5.
- CHAIR, high back, reversible T-cushion, orange-brown fabric, \$30. Russell, 292-3279.
- VIVITAR 75-205/f3.8 zoom lens w/macro, Canon mount, takes 58mm accessories, \$150. Kawka, 299-1216.
- WINDOW air conditioner, Whirlpool 5000 BTU, \$100; 4 rear brake rotors for Cadillac Eldorado, \$125. McCormick, 821-2092.
- ICE BOX, Coolerator brand, 8 cu. ft., metal construction w/white enamel paint, will hold 50 lbs. ice, \$35. Donohoe, 299-4076.
- KITCHENAID dishwasher, needs motor, \$40. Horton, 883-7504.
- GE REFRIGERATOR, 18 cu. ft., white, top freezer, 18 mos. old, \$475. Aronson, 898-8893.
- MOTOR ELEC. 1½ HP, 2-spd., 3-phase, 220 volt, conduit & assoc. switch boxes, \$55. Walston, 296-0372.
- REFRIGERATOR, modern style, runs but has slow freon leak, \$50. Bloomquist, 821-3018.
- PUPPIES, Cock-a-poo, males, \$45; Sears zig-zag sewing machine w/cams & sewing table, \$125. Graham, 293-7302.
- 4 TIRES, L78-15, \$10 ea.; 1 BR78-13 steel belted radial, \$30. Martin, 869-2049.
- GE full size turntable, \$35; GE AM/FM stereo w/turntable & speakers, turntable nonfunctional but probably repairable, best offer. Brunacini, 344-7456.
- HANDMADE AFGHANS, 1 striped 85"x50" w/fringe; 1 shell stitch, orange, brown & beige, 61"x46". Palmer, 268-3025.

- SEWING MACHINE, Sears Kenmore, 30 different stitches, buttonholer & cabinet/worktable, best offer over \$100. Shortencarier, 292-3575.
- 1944 COLLINS autotune transmitter w/manual; antique radios, phonographs, ham equipment, furniture. Sander, 8205 Morrow Rd. NE, 299-5761.
- CAMPER SHELL, SWB, \$200; Yamaha guitar w/case, \$75; Sears exercycle, \$40. Perkins, 869-6220.
- STORM DOOR, alum., 32"x80", sliding window, \$30; chain link gate, 45" high x 48" wide, w/hdwe., \$15 omo. Hughes, 299-6674.
- SEARS 30" electric range, white, 2 ovens, \$103. Field, 345-1470.
- COLEMAN 2-burner gasoline stove, \$15; Danish modern couch & chair, \$50. Marder, 268-9643.
- WATER SKIS, 2 pr., \$15/pr.; convertible top motor, \$35; Delco AM car radio, \$25; storm/screen door, \$10. Falacy, 293-2517.
- KING SIZE WATERBED, custom made, deluxe baffled mattress, air pillow liner, bookcase headboard, 6-dwr. pedestal, \$425. Hickerson, 892-6699.
- TWO wooden etageres w/glass shelves, \$200 ea. Hartwig, 298-5048.
- BUNK BEDS, light oak, \$100; twin mattress & box springs, \$25 for both. Cooper, 881-4503.
- LAWNMOWER, Craftsman electric, 18" twin blade, w/bag, \$125; lg. seed & fertilizer spreader, \$15. Buss, 298-1589.
- CORNET, Conn. mute, case, \$70. Waite, 867-5953.

### TRANSPORTATION

- PENTON MC-5 400, tool bag, 2 tanks, \$550; Warn winch, 8000 lb., electric, never used, \$400. Boruff, 298-4365.
- 79 SUZUKI RM-125 dirt bike, set up for fun or competition, adult ridden, never raced, \$550 or best offer. Chinenti, 294-5644.
- CORONADO high performance sail boat w/trailer, \$2400; Silvertone acoustic guitar, \$35. Eaton, 299-7271.
- 75 CORVETTE conv., 2 tops, low mileage, \$8700. Perryman, 281-3020.

- 77 KAWASAKI, windshield, luggage rack, saddlebags, crash bars, \$800. Salmi, 294-3022.
- GIRLS' BICYCLES, two 3-spd., \$15 ea. Williams, 299-8986.
- '80 YAMAHA Encore 100cc, low mileage. Durand, 821-3064 after 5.
- 73 MERCURY Marquis Brougham, AC, full power, cruise control, \$1900. Hall, 299-0009.
- 76 AUDI, 100LS, 4-dr., 4-spd., PS, PB, AC, AM-FM cassette, \$2500. Goodwin, 294-6702.
- 77 HONDA Goldwing, fully dressed w/AM/FM stereo, in-dash CB, intercom, custom seat, 25,000 miles. Mills, 255-4887.
- 76 DATSUN, std., 2-dr., 62K miles, \$2000. Tripp, 266-4626.
- 79 HONDA CX 500 custom motorcycle, low mileage, 50 mpg, \$1500. Gunckel, 254-4325.
- 79 Z-28 CAMARO, new tires, \$6000 or B/O. Lucero, 836-5375.
- 78 CELICA ST, AT, AC, AM-FM, low mileage, spoke wheels, \$4500. Lutheran, 293-8364.
- 74 HONDA XL175 dirt or street, 65 mph, 60 mpg or better, luggage rack, \$375. Bloomquist, 821-3018.
- '69 VW BUG, \$2000 firm. Morris, 299-1415 after 5.
- REBUILD '72 Suzuki TS-125 dirt bike, \$400. Cordova, 881-2209.
- KENT 27" 10-spd. bike, blue, extra accessories, \$80. Brewer, 831-6897 after 5.
- 72 VW Super Beetle, AM-FM, one owner, radials, sheepskin front seat covers, 76K miles, \$2400. Davis, 294-7478.
- 77 CHEVY Vega stn. wgn., \$1250. Perkins, 869-6220.
- '69 OLDS 88 sedan, 100+K miles. McDowell, 281-3027.
- 77 BRONCO (small body), V8, power, air, auto., low miles, \$4195 or offer. Stronach, 294-5271.
- '80 CAN AM 125 MX6 sand W strokers, \$650. Andersen, 897-1555.
- 76 HONDA 4-cyl. 400cc motorcycle, \$495. Marder, 268-9643.
- '81 ESCORT GL wagon, AC, AM/FM cassette, cruise control, PS, PB, luggage rack, etc., 19K miles. Lozano, 296-0915.
- 71 VOLKSWAGEN bug, seats reupholstered, engine rebuilt, clutch replaced, \$1950. Garner, 298-2562.

### REAL ESTATE

- WINROCK AREA, 1750 sq. ft., 3-bdr., 1½ bath, den, fp, assume 9½%, 412 PITI, 65K, terms negotiable, REC/wrap. Gabaldon, 255-7971.
- FIVE ACRES, mountain home, Arkansas, heavily wooded; near Norfolk. Bull Shoals Lakes. Eiffert, 281-3053.
- NE, 4-bdr., 2½ baths, lg. master suite & den w/tp, 3-car garage, 2378+ sq. ft., some solar, assumable FHA 8½%. French, 821-6144.
- 1 ACRE LOT in Pueblo West, Colo., 4 miles to Pueblo Reservoir, \$9000, part down, 12% note on balance. Hughes, 299-6674.

### WANTED

- REMINGTON or Ruger bolt action .30-06 with scope, good condition; barbell/weight set, weightlifting bench. Olson, 898-8909.
- TWIN size bunk bed in good condition. Young, 842-0348.
- WANT TO RENT—strip chart recorder, single channel, long-term monitoring. Yingst, 884-3812.
- FIBERGLASS CAMPER SHELL for SWB Ford pickup. Perkins, 869-6220.
- DRAWING BOARD, 30x36 or slightly larger, up to 36x48. Hughes, 299-6674.
- RIDE from Abq. to Flagstaff, daughter's dog going home, will pay for gasoline & incidentals, before July 12. Stevens, 299-6086.
- RIDERS/DRIVERS: leaving July 1 east, Amarillo, Oklahoma, St. Louis, Indianapolis, Columbus, Cleveland, Buffalo, Rochester, Syracuse. Kish, 298-7090.

### WORK WANTED

- HOUSE SITTING & animal care, college student, references, NE/NW areas. Christine Lambert, 344-9012.
- COLLEGE student needs yard & misc. work, painting experience. Steve Northrop, 884-4718.

**Coronado Club Activities**

# Rio Grande Mexican Food Buffet Tonight

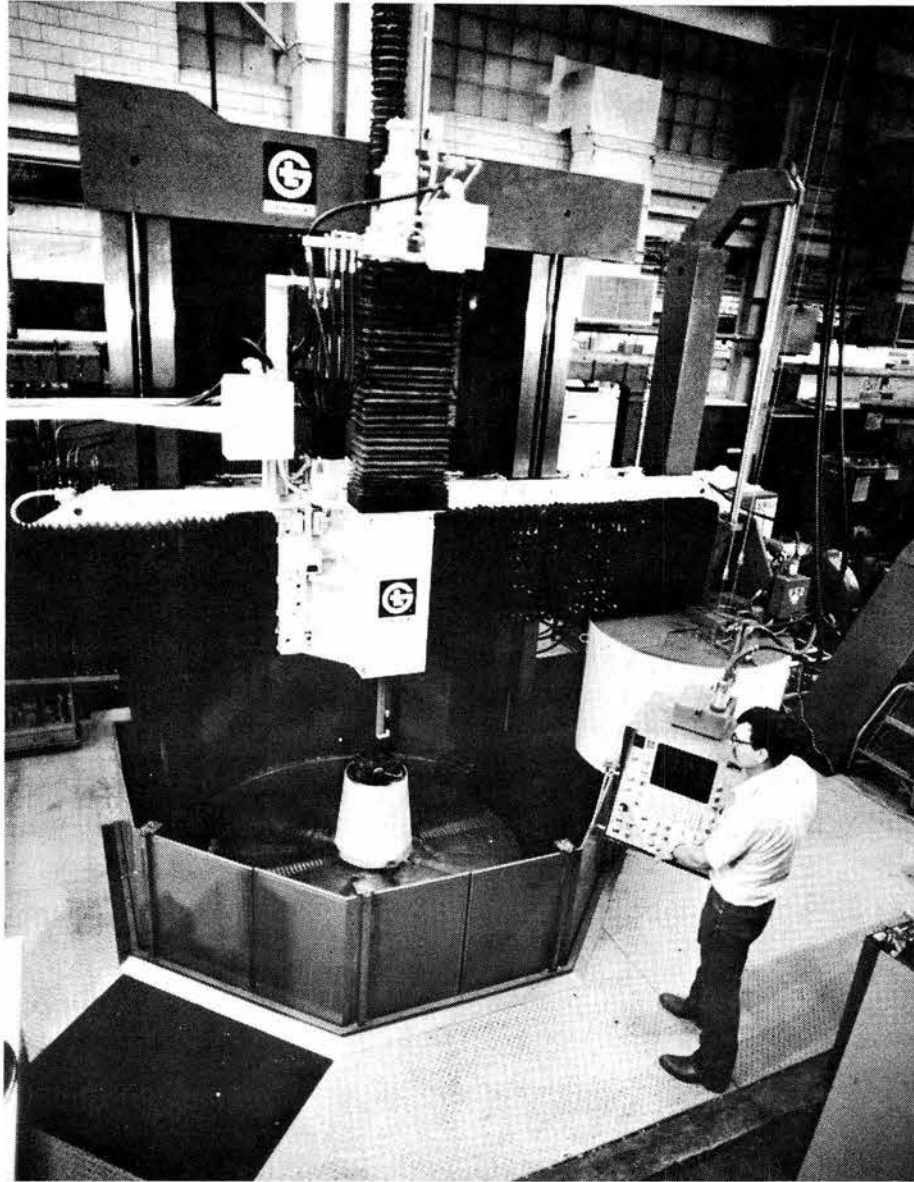
**TONIGHT** at Happy Hour the Country Showmen hold the bandstand from 8 until midnight while Chef Bill Potts spreads a Rio Grande-style Mexican food buffet from 5:30 until 9. Special prices are in effect all evening.

**TOMORROW** is the party of the year as the Club and patio are turned into a South Seas setting for the annual Luau. Spinning Wheel plays for dancing, a 10-member dance troupe called Polynesian Phantasies entertains, and a fantastic oriental buffet is spread. About 300 reservations had been made as LAB NEWS went to press.

**NEXT FRIDAY**, July 2, the long weekend starts with a Single Mingle during Happy Hour, and 12-Gauge booked to play early and stay late. The music starts at 5 and continues until midnight. The buffet is fried chicken and fish.

**THE FOURTH OF JULY** is always a big day in the Club's pool and patio area. The celebration starts with the twin pools opening at 11 a.m. The snack bar will have a two-hot-dog special with chips and beans for \$1.75 (\$2 with chili), a beer truck will dispense 35-cent mugs of foamy, horse-shoes and other fun and games are planned in the patio area for kids of all ages, and the Municipal Band plans a concert from 1 to 3 p.m. It should be a great day for families. Members show membership cards for free admittance; adult guests pay \$2, kids \$1.

**A BAR PROMOTION** by the Miller's beer people is set at the Club on Thursday, July 8. Glasses of their draft brew will sell for 25 cents until 8 p.m., and they'll hold drawings for prizes every half hour starting at 5.



**NEW MACHINE** in Sandia's Process Fabrication Labs is this numerically controlled 72-inch vertical boring mill operated by Keith Mote of Heavy Machining Section 7483-1 in Bldg. 840. The \$720,000 large machine tool replaces a 30-year-old piece of equipment, and offers wide flexibility in computer-programmed operations including outside and inside contouring, threading, turning, facing, and boring on parts up to 84 inches in diameter, 96 inches tall. It can maintain constant surface cutting speeds and loadings for improved accuracies and surface finishes. The boring mill was assembled by Machine Repair Section 7485-1 and certified by Mechanical Calibration Section 7485.

**TRAVEL DIRECTOR** Frank Biggs announces a couple of new trips—two trips on the Cumbres-Toltec scenic railway on Sept. 26 or Oct. 2. Cost is \$42 for adults, \$30 for children 11 and under. This includes charter bus with treats and refreshments and the train ride. Another new trip is Canyon de Chelly by charter bus Oct. 30-31 for \$82. This includes treats and refreshments on the bus, lodging and all admissions. Deposit \$25 now, balance due by Sept. 30.

In the meantime, there's the Silverton-Durango train ride package July 10-11 for \$88. Check with the Club office about available space. Or if you want to raft

down the Chama River, a group goes July 10-11. You camp overnight and meals are furnished. Cost is \$100.

The Gallup Indian Ceremonial on Aug. 14 is another one-day charter bus destination. Take in all the events for \$32 adults, \$27 for kids 11 and under.

Fly or bus to Las Vegas Sept. 12-15 and stay at the Maxim Hotel, tour Hoover Dam. Pay \$130 for bus, \$185 for plane.

The Mexican Pacific coast cruise aboard the MTS Daphne has space available. The cruise is set Oct. 23-30 and prices start at \$789, which includes air fare to Los Angeles, transfers, port taxes and the works.

Go to Mazatlan Nov. 1-8 or Nov. 8-15 for \$359. The package includes airfare, seven nights at the Playa Mazatlan, transfers, hotel taxes, and bell tips plus a special two-hour cocktail party.

See Frank in the lobby tonight between 5 and 7 to talk travel.

### Congratulations

Paul Klimas (9725) and Carlota Romero (UNM/NMERI), married in Albuquerque June 12.



"Blazes—those deep steam people are giving us competition again."



"Frustrated by defeat in earlier skirmishes with such barbaric invaders as *le hot dog* and *le weekend*, French protectors of the language have declared full-scale war on the incursions of *le software* and *le hardware* into French discourse on computer technology. Such illegal aliens need not be admitted, say the Gallic defenders of verbal purity, when native equivalents like *le logiciel* (for software), *le materiel* (for hardware), and *la banque de données* (for data bank) exist in the new list of French computer words created by 40 members of the Academie Française and published by the French Ministry of Industry."

—New York Times