

Lots of Cavities

Underwater Travel —Area Three Style



RUNNING full blast with a six-inch diameter stream of water traveling at 450 fps, the water tunnel facility sprays water across the mesa in Area III.

Here at Sandia, in the high desert country of New Mexico, are some of the most advanced and useful hydrodynamic research and development facilities in the country.

In Area III, Systems Environmental Testing Department 9330 is finding out what happens when a high-speed projectile strikes and travels through water.

The program, being conducted for Exploratory Systems Development 1200, is studying the phenomenon called cavitation — the formation of gas and vapor-filled voids around a projectile as it impacts and travels through the water. This pocket remains in varying forms with the missile as it travels at high speeds fully submerged.

Project leader for the test program is Al Stephenson (9335).

For the past two years, Al and the men of Area III have conducted hundreds of tests in three hydrodynamic facilities — the water jet, the water tunnel and the water impact facility.

Results of the tests have enabled engineers to design a full-scale projectile launched from an aircraft which enters the water at high speed and continues in a stable (as opposed to erratic) trajectory maintaining high speed throughout its underwater travel.

“Understanding the cavitation process was the key to the design of the prototype,” Al says. “And we’re still learning more about cavitation and hoping to further improve the performance of this as well as other projectiles.”

“When a projectile strikes the water surface, some of its kinetic energy is transferred to the surrounding water pushing it aside. Air rushes in creating the original cavity. The pressure inside the walls of the air-filled splash becomes less than that exerted by the water it is entering — this causes the walls to contract and the cavity is sealed off. This closure is a function of the entry angle and velocity of the projectile, its geometry and weight, and the pressure of the atmosphere above the water.

“Velocity, weight, shape and pressure are important factors in determining the later behavior of the cavity. Since the trajectories

(Continued on Page Three)

Sandia Labs Helps At Trade Fair for Minority Business

Sandia Labs was one of forty concerns and agencies that participated last month in a trade fair for minority businessmen from throughout New Mexico. Aim of the fair was to provide the businessmen with information on what is involved in becoming a supplier to the firms.

Jay Hughes, head of Procurement Systems Division 4331, was a member of the fair committee and set up Sandia's display booth. He reports that senior buyers Waylon Ferguson, Henry Moeding, Fred Bentz, and Ralph Davies (all Sandia Purchasing) counseled about 35 prospective minority suppliers. “Getting to be a supplier to Sandia or to any other large firm is a somewhat complicated process. The whole point of the fair was to urge these businessmen to bid on possible work from us and not to be overwhelmed by the procedural requirements. I think we succeeded in conveying that message,” states Jay.

Participation in the fair is part of the Labs' continuing activity in the affirmative action program.



LAB NEWS

VOL. 25, NO. 3

FEBRUARY 9, 1973

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

Final 1972 ECP Campaign Results

Total cash and pledges for 1973 amounted to \$377,268. This is an increase of some \$20,000 over the previous year. The figure does not include the Labs gift of \$34,125 to UCF.

Percentage of Sandians participating in the plan rose by 1.2 percent to 85.3 percent. The percentage pledging a Fair Share (one hour's pay per month or more) rose by 1.6 percent to 51.9 percent. The average gift per contributor this year is \$73.

Twenty departments qualified for UCF Silver Awards. To qualify, 75 percent or more of the employees within the department must give Fair Share. Seven departments can also boast of having 100 percent participation, and three of these, 3110, 3160 and 3240 — deserve special recognition for being 100 percent Fair Share or better. Ken Sutton (3250) was ECP Committee Chairman in 1972; '73 Chairman is Bill Snyder (5320).

GUY COBURN (1300) glides effortlessly across finish line, winner in his class in the first Albuquerque Avalanche Cross-Country Ski Race held on Sandia Crest. Other Sandians placing in the 4½-mile event were Dick Kavet (1554), Dave Saylor (1724), John Shunny (3162), Pete Wakeland (9200), and Bill Ulrich (1523). Sam Beard (5628) and George Barr (1721) were race officials.



Afterthoughts

Who Says Doctors Aren't Funny?--From the medical column in Union Carbide's Nuclear Division News: "Q. Is a Carbide employee subject to dismissal if he contracts a venereal disease? A. No, he is not subject to dismissal unless he is caught catching the infection while at work."

The Times That Try Men's Souls--The 300 or so members of the Sandia Bicycle Association are viewing with consternation the relentless progress of that seven foot fence going up around the Base. Seems that the opening in the old fence at the NE corner of the Base, which cyclists used to avoid traffic, will not be incorporated in the new fence. This give the cyclist the opportunity to compete with traffic at Wyoming, Eubank or Gibson, and that's like playing Russian roulette with a single-shot gun. Newly elected SBA president Billy Thorne (5162) is mulling over the problem.

About That Solitary Drinking--Couple of issues ago we discussed the Labs' alcoholism program and included a quiz that one hospital uses "...in helping a patient decide whether he's an alcoholic." One "yes" answer to any of the 20 questions "...is a definite warning," according to the framers of the quiz. One reader, however, takes strong exception. To the question "Do you drink alone?" he writes "Yes! Bull! What if you live alone?" He's got a point.

The Human Comedy--"Were it not for the presence of the unwashed and the half-educated, the formless, queer and incomplete, the unreasonable and absurd, the infinite shapes of the delightful human tadpole, the horizon would not wear so wide a grin."
Frank Moore Colby (1865-1925) *js

Sandia Co-Sponsors Metallurgical Conference

An international conference on "Metallurgical Effects at High Strain Rates," held Monday through Thursday this week at the Hilton Inn and attended by 120 people, was co-sponsored by Sandia Laboratories and the Metallurgical Society. Dick Rohde (5531) was conference chairman. The program included speakers from England, New Zealand, Sweden, Canada, and Brazil, as well as from this country.

Sandians presenting papers included: L.E. Pope and A.L. Stevens (both 5133), "Wave Propagation Measurements in Beryllium Single Crystals," and "Wave Propagation and Spallation in Textured Beryllium"; R.A. Graham (5132), "Shear Strength of Impact Loaded X-Cut Quartz as Indicated by Electrical Response Measurements"; W. Herrmann (5160), "Numerical Analysis Methods for High Strain Rates"; and O.E. Jones (5100), "Shock Wave Mechanics." Dick Graham also chaired a session on Phase Transformations.

A volume of the conference proceedings will be compiled and edited by J.R. Holland (5335), B.M. Butcher (5133), C.H. Karnes (5165) and R.W. Rohde (5531). It will be published by Plenum Publishing Company.

LAB NEWS
PAGE TWO
FEBRUARY 9, 1973



Recreation Notes

FUN & GAMES

Sandia Labs Bowling Association

Winners of the recent Third Annual Mixed Singles and Doubles Tournament held at Fiesta Lanes are:

Class A Singles:

Tony Repetti (1415) 620 Scratch Series
Ruth Brooks (3132) 670 Handicap Series

Class B Singles:

Lucille Browning (wife of Stu, 1611) 541 Scratch Series
Pat Ximenes (7631) 648 Handicap Series

Class A Doubles:

Harold Peterson (AEC/SAO) and Robert Sinclair (AEC/ALO) 1305 Handicap Series
Bob James (5428) and Hugh Taylor (7544) 1170 Scratch Series.

Class B Doubles:

Marilyn and Ken Pilkington (9124) 1218 Handicap Series
Cliff Shaw (7144) and Dick Shaw (7113) 1158 Scratch Series

The next tournament is the Singles and 3-Man Team to be held at Holiday Bowl on Feb. 10-11.

Sympathy

To Lillian Bowers (4152) on the death of her mother-in-law in Florida.

To Virginia DeWitt (1001) on the death of her father in Bevier, Mo., Jan. 25.

To Anthony Veneruso (1213) on the death of his father in New York, Jan. 8.

Variable Annuity Unit Value

| | |
|--------------------|-------|
| February | 1.894 |
| January | 1.873 |
| Average 1972 | 1.738 |

LAB NEWS

Published every other Friday

SANDIA LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO
LIVERMORE, CALIFORNIA
TONOPAH, NEVADA

Editorial offices in Albuquerque, N.M.
Area 505 264-1053
ZIP 87115

In Livermore Area 415 455-2111

john shunny is editor
&
don graham ass't. editor

bruce hawkinson writes
as does norma taylor while
bill taskar takes/makes pictures
&

in livermore lorena schneider does all



AEC Research Labs Affirmative Action Conference was held last week in Albuquerque. Bob Garcia (3230) was conference host. He is shown at left with President Sparks, who welcomed the more than a hundred conferees. Later, AEC Chairman-Designate Dixy Lee Ray addressed the group. She is shown in the picture above with President Sparks.

After Death,

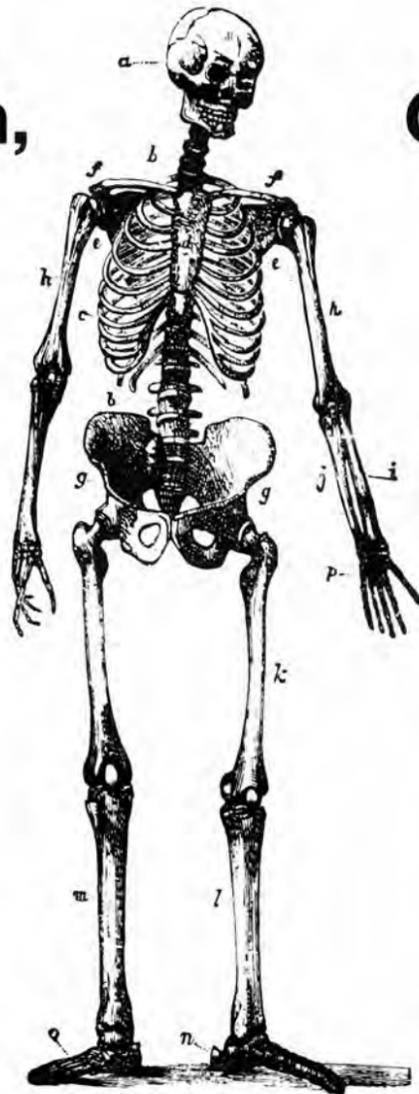
Emotionally, all of us are convinced of our own immortality — the “I’ve been alive for as long as I can remember” syndrome. Intellectually, however, we’re aware that, while life spans are increasing, death is inevitable. And most of us would derive some satisfaction from the knowledge that we could be useful after death (as well as before).

Hence the appeal by the University of New Mexico’s School of Medicine — donate your body now so that after death you can help further medical education and research.

Macabre though it may sound, medical schools need bodies — bodies are textbooks of anatomy for the people who will serve the nation’s health needs during their professional careers. And today there are not enough bodies to meet the need.

Some facts may help you decide. No expenses to family or estate are incurred in donation (unless special arrangements are desired). On the other hand, no payment per se is made for a body. The University does assume expenses directly related to embalming by a funeral home and transportation of a body from any point within the state.

The University refuses few donations. Diseases, for example, do not generally



Give Life

destroy the usefulness of a body; in fact, a disease may make a body especially valuable for research. And the donation of specific organs, such as kidneys or eyes, to an appropriate organization does not preclude donating the remainder of the body to the University.

If you wish, a conventional funeral or memorial service may precede the donation. The mortician involved would confer with the University to arrange for embalming and shipment. These expenses will be paid by the University, but expenses connected with the actual funeral or memorial service would be paid by family or estate. When the medical school has no further use for the body, the University arranges for its final disposition by cremation or burial at no expense to family or estate (unless transportation or other special arrangements are desired).

Any interested Sandian (or any adult New Mexican residing within 100 miles of Albuquerque) may donate his body to the UNM medical school. Forms are available in the LAB NEWS office. One copy goes to the University, the others to those people — physician, clergyman, next-of-kin — who would likely be the first to know of the death. •bh

Continued from Page One

Underwater Travel — Area III Style

and stability of water-entry projectiles are influenced by the behavior of the cavities around them, a knowledge of cavity shape as a function of time is required for optimum missile design and for the possible control of the cavity behavior.

“The original air-filled cavity becomes vapor-filled as the projectile continues to penetrate the water. Actually,” Al says, “a number of vapor cavities are formed rapidly and are ripped away during further penetration.”

High speed film exposed during tests in the hydrodynamic facilities shows these violent cavity changes and provides some of the needed data. Pressure transducers and strain gages complete the instrumentation.

The water impact facility is a vertical tank

14 ft. in diameter and 22 ft. deep. Ten camera ports and underwater illumination are provided. Various size air guns can be mounted atop the tank to fire the projectiles into a submerged target made of layers of lead foil, ensolite and plywood. Projectile velocities up to 900 fps can be attained, and it is possible both to spin the projectile about its longitudinal axis and to simulate angular entry.

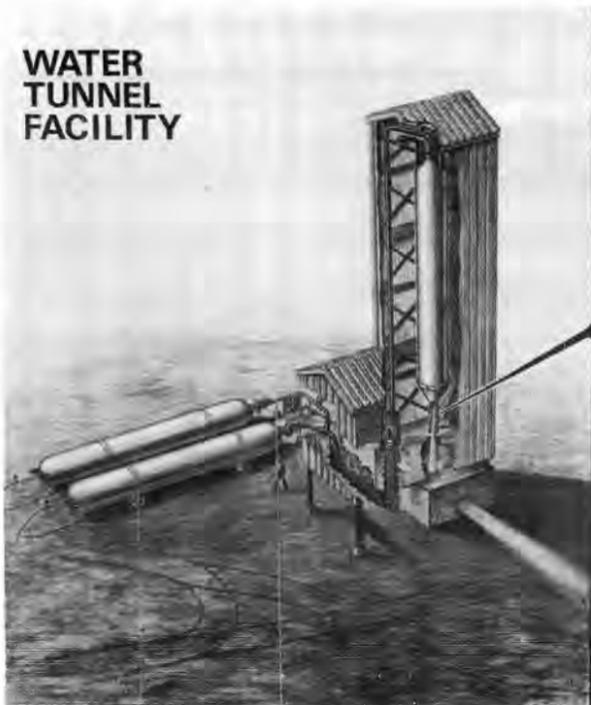
The water jet facility, a prototype design, has been one basis for design of the larger water tunnel. It still is used for testing and it can create a water stream traveling at 450 fps for 400 milliseconds. The test section is 5.8 inches in diameter and models are 3/8-inch in diameter.

The larger water tunnel consists of three

625 cubic feet tanks, two for compressed air and the third for water. The compressed air drives the water from its tank through the nozzle section and into the six-inch diameter test section. Maximum flow rate is 650 fps. The tank contains 4500 gallons of water, enough for about 3000 linear feet of testing, or at 600 fps about five seconds of testing time is available.

Dave Schafer is supervisor of Division 9335. Others in the group operating the water facilities are Milt Stomp, Bob Middlesworth and Dewey Bolton at the water impact facility and Wilson Payne and Terry Demaree at the water tunnel facility. Photometric support is provided by Division 9312 and facility design by Division 9334. •dg

WATER TUNNEL FACILITY



WATER TUNNEL FACILITY — Largest and highest velocity water tunnel of its type creates six-inch diameter water streams with velocities up to 650 fps (450 mph). The instrumented models are mounted on a string in the test section.



WATER IMPACT FACILITY



WATER IMPACT FACILITY — A filtration system assures clear water in this 14 by 22-foot tank. Atmospheric pressure and density above the water can be controlled. Air guns mounted on the lid propel models into the water at velocities up to 900 fps (600 mph). Ten high-speed cameras look through portholes to record water entry events. Inside, 56 1000-watt lamps provide illumination.

Larry Watkins Awarded Master's Degree Under OYOC



Larry Watkins has returned to the Laboratories after receiving a Master of Science degree under Sandia's One-Year - on - Campus (OYOC) Plan, a part of the Graduate Education Program. Under the OYOC Plan, bachelor-level, technical people study full time while in residence for one academic year at an approved university.

Larry, who works in Instrumentation Development Division 8342, was awarded his MS degree in electrical engineering from Stanford University. He received his BS degree in physics from Fisk University in Nashville, Tenn., and joined Sandia/Livermore in August 1971.

Speakers

Tony Thompson (8313), Technical Seminars: "Ductility Losses Due to Hydrogen: Experiments and Mechanisms," North American Rockwell Science Center, Thousand Oaks, Calif., Oct. 12; "Current Research on Hydrogen Embrittlement at SLL," E.I. DuPont, Savannah River Laboratory, Aiken, S.C., Oct. 18; "The Dependence of Polycrystal Work Hardening on Grain Size," Massachusetts Institute of Technology, Department of Metallurgy and Materials, Cambridge, Mass., Oct. 19.

Tony Thompson (8313), "Hydrogen Effects in Metals," AIME, Southern California Section meeting, Los Angeles, Oct. 12; Technical Seminar, Vanderbilt University, Department of Metallurgy, Nashville, Tenn., Oct. 17.

Ron Musket (8313), "Atomic Composition I: Techniques Based on Nuclear Charge," part of a special course on Surface Analysis, National Symposium of the American Vacuum Society, Chicago, Ill., Oct. 1972.

Vocational Educators Visit Livermore Labs

Members of the California Industrial Education Association from Alameda and Contra Costa Counties recently visited Sandia Laboratories Livermore. Purpose was to acquaint the vocational educators with some of the latest equipment and technology used at the Laboratories with a view to the educator's roles in student counseling, course planning and instruction.

Among the Sandia people who talked to the visitors were (from top in photos) electronic fabrication supervisor Rus Richards (8421-3), data processing supervisor Don Benton (8411), model shops supervisor John Bryson (8421), Jim Boehmke of the joining laboratory (8422), and machine shop supervisor Jay Jost (8421-1).

Scriv Scrivner (8400) was sponsor, while Jerry Maloney (8432) and Bill Jamieson (8235) served as coordinators for the visit and tour. Special arrangements were made by Benefits Division 8236.

Sympathy

To Bobbie Balanda (8232) on the death of her mother-in-law in Webb City, Mo., Jan. 10.

To Grace Campbell (8264) on the death of her mother in Sonora, Jan. 12.

To Bob Facer (8136) on the death of his mother in Pocatello, Idaho, Jan. 2.

To Jack Wirth (8340) on the death of his sister in Benton Harbor, Mich., Dec. 24.

To Bill Gordon (8177) on the death of his father in Phoenix, Ariz., Dec. 27.

LIVERMORE NEWS

VOL. 25, NO. 3

LIVERMORE LABORATORIES

FEBRUARY 9, 1973

Educators Visit Labs



"hundreds of parts go into loading a printed circuit board"



"results of destructive tests or experiments are recorded on tape"



"by tape command, the machine can change 16 tools"



"automatically sequences the different weld parameters"



"variable pitch threads can be made only on a tape controlled lathe"

Rancho el Valle — Original Livermore, Pleasanton Site

This is the fifth and final article by Herbert Hagemann, an eighth-generation Californian, on the early history of the Livermore/Amador Valley.

During the Mexican administration of Alta California, four large land grants were made in Valle de San Jose, known today as the Livermore/Amador Valley. Rancho San Ramon went to Jose Amador (LAB NEWS, July 21, 1972), Rancho Las Pocitas to Robert Livermore and his partner Noriega (LAB NEWS, Oct. 27, 1972), Rancho Santa Rita to Jose Pacheco, and Rancho el Valle de San Jose to four Bernals, two brothers and two sisters — Agostin, Juan Pablo, Dolores Bernal y Sunol, and Pilar Bernal y Pico. The Bernal grant consisted of some 64,000 acres, encompassing what is now half of Livermore on the east, including Pleasanton, and stretching south and west over Sunol Valley and its surrounding hills.

Immediately after the secularization of Mission San Jose in 1834, the Bernals had applied for the grant in Monterey. Formal title to Rancho el Valle was given in 1840.

Greatest asset of the Rancho was its vast cattle herds. However, meat was not a saleable item; rather, the wealth was in the hides, tallow, and bones which were hauled to the coast in carts and there loaded on ships destined for various parts of the world. By 1850 the herds were estimated to contain 25,000 head.

Antonio Maria Pico and his wife Pilar sold their quarter interest in Rancho el Valle to Antonio Sunol in 1842 for 150 head of cattle. In 1848, Sunol sold the same interest to his brother-in-law Juan Pablo Bernal for \$4000, making the price at the time about 25 cents an acre. Juan Pablo's one-half interest covered some 32,000 acres including the present site of Pleasanton and the west half of Livermore. South Livermore Avenue follows the old boundary line which extended across the entire Valley.

The original owners did not live on the land but resided in San Jose, the center of Spanish California culture. The two Bernal brothers and Sunol, however, built separate establishments as headquarters for their cattle ranching activities. Agostin's is still visible on Foothill Road west of Pleasanton, Sunol erected two adobes at Sunol near Arroyo de la Laguna, and Juan Pablo's establishment was on Santa Rita Road where Amador High School is located. Not until the late 1840's did the owners become concerned about the influx of American settlers on their land and the threat to their cattle herds and the stability of land titles.

Agostin was the first to take action, in 1848, by constructing a two-story adobe which is still standing near Castlewood Country Club. At that time, Amador was residing at San Ramon (today's Dublin), Livermore was living at Rancho Las Pocitas and Pacheco had erected an adobe for his major domo, Francisco Solano Alviso, to the north on Foothill road. Sunol, in 1850, sent his son Jose to live in one of the adobes on Arroyo de la Laguna. On returning late one afternoon, Jose found squatters had taken possession of his house. When he ordered them to leave, the intruders killed him and fled. Jose's place was



Local pioneers, Juan Pablo (left) and Agostin Bernal.

later taken by his younger brother Narciso. Juan Pablo Bernal, having acquired a new son-in-law — John Kottinger — in 1850, gave the newlyweds 4500 acres of land south of Arroyo del Valle, including a large part of present-day Pleasanton, and here Kottinger erected a two-story adobe fronting today's Main Street. In 1852, Juan Pablo constructed his home in the "wilderness" on Santa Rita Road.

Times were turbulent and with the discovery of gold in the Sierra, Americans and foreigners came in droves to California. The Bernals and Kottinger took advantage of the situation by driving cattle to the gold fields where they sold them, taking gold in payment. The return journey was always hazardous because of bandits who were eager to relieve the travelers of their gold-filled saddle bags.

It is reported that the Bernals were able to keep more of their original holdings than any of the other Spanish pioneer families in central California. Today some portions of the Rancho are still in the hands of Bernal descendants.

Retiring



Dick Watkins (8323)

Take Note

Jack Dini of Metallurgy Division I 8312 served as chairman for two of the five sessions of the American Electroplaters Society Fourth Symposium on Plating in the Electronics Industry held in Indianapolis, Ind., Jan. 31 and Feb. 1. He chaired the sessions on electroplating and gold electroplating.

Authors

Dan Hartley (8354) and Ronald Hill (5642), "A Highly Efficient Light Trapping Cell for Raman Scattering Experiments," JOURNAL OF APPLIED PHYSICS, Nov. 1972.

Sheridan Johnston (8354), "Stability of Rotating Stratified Fluids," AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS JOURNAL, Oct. 1972.

Randall German (8313), "The Direct Observation of Open Porosity Networks," METALLOGRAPHY, Vol. 5, p. 462-5.

Walt Bauer and Dan Morse (both 8334), "Helium Implantation and Re-Emission from Niobium at Elevated Temperatures," JOURNAL OF NUCLEAR MATERIALS, Vol. 44, p. 337.

Congratulations

Mr. and Mrs. Mike Malinowski (8334), a son, David Michael, Jan. 4.

Mr. and Mrs. Wayne Will (8414), a daughter, Julie Christine, Jan. 17.



CHAD AWARD — Ralph Cozine (8410), center, and Bill McGuire (8431), left, chairmen of the 1971 and 1972 LEAP Committees respectively, accept a Charter Member Plaque on behalf of Livermore employees from Bob Trefry, executive director of Bay Area Combined Health Agencies Drive. The award recognizes LEAP support of CHAD's inaugural effort last year. CHAD encompasses 12 national health agencies.

Authors

R.L. Long (1433), "Monte Carlo Simulation of D-Region Sampling," Vol. 77, No. 31, JOURNAL OF GEOPHYSICAL RESEARCH.

R.D. Moyer (7452), "Terminal Invariant Parameter Determinations from Complex Signal Ratio Measurements," Vol. IM-21, No. 4, IEEE Transactions on INSTRUMENTATION AND MEASUREMENT.

R.R. Bartkowski and B. Morosin (both 5132), "Linear-Chain Behavior of the Spin- $\frac{1}{2}$ Copper Salt α -bis (N-Methylsalicylaldiminato)-Copper(II)," Vol. 6, No. 11, PHYSICAL REVIEW B.

W. Beezhold and E.P. EerNisse (both 5112), "Ion Implantation Into Insulators: Charge-Removal Studies Using Ion-Induced Characteristic X-Rays," Vol. 21, No. 12, APPLIED PHYSICS LETTERS.

R.S. Blewer (1413) and J.K. Maurin (5522), "Dimensional Expansion and Surface Microstructure in Helium-Implanted Erbium and Erbium-Hydride Films," Vol. 44, No. 3, JOURNAL OF NUCLEAR MATERIALS.

J.W. Berglund (5162), "Transient Interaction of A Flexible Ring-Reinforced Shell and A Fluid Medium," Vol. 10, No. 11, AIAA JOURNAL.

A. Narath (50), "Relaxation of Local Moment Nuclei in Metals," Vol. 6, No. 11, PHYSICAL REVIEW B.

R.L. Park (5331), "Surface Structure: An Emerging Spectroscopy," Vol. 25, No. 8, PHYSICS TODAY.

W.S. Saric (5641), "Surge Waves in Stranded Springs," Vol. 94, No. 3, JOURNAL OF ENGINEERING FOR INDUSTRY; "Nonlinear Motion of an Asymmetric Body with Variable Roll Rate," Vol. 10, No. 8, AIAA JOURNAL; "Nonlinear Waves in a Kelvin-Helmholtz Flow," Vol. 55, part 2, JOURNAL OF FLUID MECHANICS.

M.L. Merritt (9150), "Preliminary Report Cannikin Ground Motion & Water Pressures," BMI-171-147, The Cannikin D+2 Months Biology and Medicine Report; "Reaction of Shallow Onshore Waters to Ground Shock," Dec. 1972 issue, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA.

E.P. EerNisse (5112), "Small Signal Negative Conductance in BARITT Devices," Vol. 20, No. 8, APPLIED PHYSICS LETTERS.

C.E. Barnes (5112), "Neutron Damage in SiC Light-Emitting Diodes," Vol. 20, No. 2, APPLIED PHYSICS LETTERS; "Neutron Damage in GaP Light-Emitting Diodes," Vol. 20, No. 3, APPLIED PHYSICS LETTERS.

C.B. Watkins and F.G. Blotner (5643), "Three-Dimensional Effects on Electron Density in a Blunt Body Laminar Boundary Layer," Vol. 10, No. 10, AIAA JOURNAL.

J.G. Fossum (1932), "Systematic Computer-Aided Multidimensional Modeling of Integrated Bipolar Devices," Vol. 16, January 1973, SOLID-STATE ELECTRONICS.

S.T. Picraux (5111) and F.L. Vook (5110), "Ionization, Thermal, and Flux Dependences of Implantation Disorder in Silicon," Vol. 11, 179 (1971), RADIATION EFFECTS.

D.K. Brice (5111), "Depth Distribution of Energy Deposition by 4-40 MeV Fe⁺ Incident on Fe," Vol. 11, 51 (1971), RADIATION EFFECTS; "Spatial Distribution of Ions Incident on a Solid Target as a Function of Instantaneous Energy," Vol. 11, 227 (1971), RADIATION EFFECTS.



ERNIE SANCHEZ (7542) sits with some very attentive boys and girls in the Duranes Head Start Center. Ernie is a member of Economic Opportunity Board that recommends funding for Center.

Labs Man Helps Community

Ernie Sanchez is lead man in the rapid service print shop (7542) at Sandia, but he fills another role in the outside world. Ernie is one of 36 people serving on something which bears the grand but not particularly informative title of Economic Opportunity Board. Now any outfit supposedly run by a committee of 36 people has some staggering built-in problems, and Ernie was apprehensive about joining EOB last summer when he was invited to do so by Governor King. But you don't get personal invitations from the governor every day, so Ernie joined the Board and undertook to find out what it does.

In the half year or so since joining EOB, he has found that the Board is deeply involved in many activities affecting the poor people of Bernalillo County:

—Neighborhood Service Centers: the eight Centers are places that a poor person can turn to for help with specific problems, e.g., what to do about a contaminated water supply, or for guidance on the best way to deal with the exigencies of modern life.

—Community Advisors: people who assist residents in poverty areas in the formation of neighborhood associations whose aim is the upgrading of their homes and neighborhoods.

—Head Start Centers: six of these Centers give pre-school youngsters from poverty areas care and education which enable them to better cope with primary school.

—Health Start: a program to provide medical, dental, and psychological help to poor children.

Function of EOB is to consider the problems of poverty and to recommend programs, such as those listed above, for funding by the federal government. For Ernie the EOB job consists chiefly of leg-work — visiting the Centers to gain first hand knowledge of their operation. "Inevitably, there's a fair amount of bureaucracy when you start spending federal funds," Ernie notes. "And now federal funding has become uncertain. But I've seen what the money does — it helps people who are poor help themselves." •js

Retiring



Ray Bishop (7154)



W.O. McCord (7511)



James Hollon (4513)



Andrew Fry (7145)



Jess Parker (7111)



Hester Stiver (6021)



Ellis Turner (7411)



Gene Baker (4611)



Albq Citizens vs Albq Air

(Part Two)

Statistics can lead or mislead. Those which follow hopefully will lead Sandians to an understanding of their role in our town's unrelenting smog drama.

The 1970 census reveals how Bernalillo County residents get to work:

| Means | Number | Percentage |
|---------------------|--------|------------|
| Drive private car | 90,000 | 80% |
| Ride in private car | 9,700 | 9% |
| Bus | 2,700 | 2% |
| Walk | 5,200 | 5% |
| Cycles, bikes, etc. | 3,300 | 3% |
| Work at home | 2,200 | 1% |

Because work locations are scattered throughout the county, neighbors generally do not work near each other, and the lone ranger figure — probably under 75% — is thus hardly surprising. We at Sandia work with 6000 or so fellow employees, and we all have a neighbor or two who works at Sandia. But Sandians as a group do their bit for pollution too: 80% of us drive to work in solitary majesty everyday. Some married couples working here have an arrangement in which each drives a car, which has to be the height something.

One concludes that Sandians can afford the 12 to 30 cents per mile it costs to operate an automobile these days (see box). What's bad about the practice is what's shown in this table. (From the 1970 Annual Atmospheric Emissions Inventory for Albuquerque/Bernalillo County.)

| Source | Emissions (tons/year) | Percentage |
|-----------------------|-----------------------|------------|
| Transportation | 301,173 | 72.3% |
| Unpaved Roads | 98,143 | 23.5% |
| Stationary Heating | 7,268 | 1.7% |
| Industrial Operations | 5,394 | 1.3% |
| Refuse Disposal | 3,857 | 1.0% |
| Miscellaneous | 994 | 0.2% |
| Totals | 416,829 | 100.0% |

Transportation sources are the chief villain. And the automobile is the worst offender of the group:

| Source | Emissions (tons/year) | Percentage |
|--------------------------------|-----------------------|------------|
| Gasoline Combustion | 272,989 | 72.3% |
| Prop Aircraft Combustion | 9,787 | 2.7% |
| Diesel Engine Combustion | 7,040 | 2.0% |
| Fuel Evaporation from Vehicles | 6,178 | 1.8% |
| Fuel Handling Evaporation | 1,853 | 0.5% |
| Jet Engine Combustion | 1,612 | 0.4% |
| Fanjet Engine Combustion | 1,223 | 0.3% |
| Particulates from Rubber Tires | 491 | 0.1% |
| Totals | 301,173 | 72.3% |

The automobile thus accounts for more than 90% of the emissions from all transportation sources. And it's the auto that creates the problem with unpaved roads. But let's look at

the junk we inherit from all that gasoline combustion:

| | | |
|--------------------|---------|-----------|
| Carbon Monoxide | 249,837 | tons/year |
| Hydrocarbons | 17,652 | |
| Nitrogen Oxides | 3,802 | |
| Particulate Matter | 815 | |
| Sulfur Oxides | 611 | |
| Other | 272 | |
| Totals | 272,989 | tons/year |

Half of these agents are invisible, and that representing highest concentration is not only invisible but odorless — yet CO is one of the deadliest gases. What you can't see can do you in. Nationally, cars supply only 20% of our energy but cause 60% of our total pollution and 90% of our urban pollution. As the publication AMERICAN ENGINEER puts it, "It would be hard to imagine anything on such a large scale that seems quite as badly engineered as the American automobile."

* * *

Of incidental note is the unhappy circumstance that New Mexico cars pollute significantly more than, say, cars on the east coast. They're older — 6.5 years vs the national average of 4.3 years — and pollution control devices on the newer models are

Changing Times for November '72 says this (below) is what it costs to run a medium price (\$3640) car for five years. Depreciation, insurance, and other normal operating expenses are reflected in the figures.

| City | Total Cost per Mile | | |
|---------------|---------------------|------------|------------|
| | 5000/yr. | 10,000/yr. | 15,000/yr. |
| Dallas | 29.54¢ | 16.63¢ | 12.33¢ |
| Oklahoma City | 28.70 | 16.32 | 12.19 |
| Denver | 27.66 | 15.76 | 11.80 |

generally set for sea level operation. At our altitude these devices, unless properly adjusted, are less effective. Manufacturers don't even bother to install high-altitude jets, a simple measure, in the carburetors of cars destined for this area, and the use of these jets can reduce fuel consumption by 20%.

Tune-ups are important. Properly tuned (plugs, points, and, for newer cars, emission control devices), the car performs better, saves money at the gas pump, and pollution is minimized.

Even when properly tuned, though, the older car will pollute more than a recent model. And we've got lots of old cars.

Next: What happens when you breathe polluted air; the federal Clean Air Act; a look at what other cities, Albuquerque, and Sandians can do towards carefree breathing. • bh

Letter to the Editor

From: Grover W. Hughes - 9474
Subject: Article in Jan. 26 issue, "Albq (sic) Citizens vs Albq Air"

I would like the privilege of your attention to a few comments on the subject article. The thrust of the article was clearly intended to encourage car pools, certainly a worthwhile goal, but I wish to point out that the author failed to follow his own logic, of "putting the blame where blame is due," as he says. It is surely evident that the real problem is too many people, rather than too many cars, per se. The author quotes Pogo as saying, "We have met the enemy and he is us;" note the *us* as the enemy. Pogo did not mention vehicles. There are indeed too many of *us*.

It has been rather interesting to me to notice that, of the many people who complain most loudly about overcrowding, pollution, degradation of the environment, etc., most of them have three or more children. Surely a person who brings three or more offspring into the world should think again before he aims criticism at others for polluting the environment. I have no knowledge of the number of additional contributions made to the world's population by your article writer; but if he is in the "three or more" category, then I deny him the right to make any thoughtful suggestions regarding pollution to me.

It is true that we must have emission control, but not only on automotive engines.

My last comment is really a paraphrase of the author's suggestions for reducing use of automobiles — here's how we might use the same three methods to reduce population:

1. Legislation — restrict large families on the grounds that they are community health hazards;

2. Catastrophe — a particularly unfavorable combination of biological conditions that caused some joker who already has six kids to have quintuplets would likely outrage the survivor (if, indeed he survived!) into taking drastic steps; or

3. Economic pressures — charging a large tax per child born would (a) provide funds to subsidize and expand programs of public information on the problems of overpopulation and (b) restrict large families to the very necessary — or the very affluent and very foolish.

To continue the paraphrase: We can postpone, if not avoid, these measures to the extent that we as individuals voluntarily curb our production of offspring — to the extent, in other words, that we accept responsibility for the consequences of our actions. What's your role in limiting our too-large population? For starters, how about discussing this situation with your children, and encouraging them to limit their own families in the crowded years ahead?

Speakers

W.H. Sullivan (1933), "Measurement of Propagation Delay Time Junction Transistors," IEEE International Electron Devices Meeting, Dec. 4-6, Washington, D.C.

A.G. Beattie (9352), "Two Acoustic Emission Experiments," Materials Dept. Seminar, Dec. 5, UCLA, Los Angeles.

D.O. Smallwood (9332), "A Transient Vibration Test Technique Using Least Favorable Responses," Smallwood and A.F. Witte (9332), "The Use of Shaker Optimized Periodic Transients in Matching Field Shock Spectra," 43rd Shock and Vibration Symposium, Dec. 5-7.

A. Swain (1644), "Human Factors in Safety," Federal Safety Council, Nov. 13, KAFB-West Officers Club.

H.C. Monteith (9344), "Contributions of Eastern Religions," Heights Optimists, Nov. 8, and "ESP Research in Russia, England, and America," Evening Optimists, Nov. 30.

A. Goodman (5323), "Some Things That the Future May Bring," Sandia Sertoma Club, Nov. 13.

R.A. Bice (3000), "Sandia in the Seventies," Junior League of Albuquerque, Nov. 15.

T.B. Sherwin (3160), "Public Relations," Univ. of Albuquerque PR Class for City Firemen, Nov. 15.

K.R. Dickerson (7111), "Metal Working as a Career," Rio Grande High School Career Day, Nov. 15.

A.J. Arenholz (5428), "A Career in Data Processing," Rio Grande High School Career Day, Nov. 15.

H. Frauenglass (3152), "Bosque del Rio Grande — A Special Kind of Nature Preserve," C of C — Rio Grande Parks Task Force, Nov. 15; UNM Architecture Class, Nov. 20; Staff, City Parks and City Planning Depts., Nov. 21; and Environmental Lab, State Environmental Improvement Agency, Nov. 21.

R.W. Russell (9343), "Lost, But Not Forgotten," Los Altos Kiwanis, Nov. 17.

A.E. Kaping (4332), "Supplier Evaluation and Surveys," Rio Grande Kiwanis, Nov. 20.

V. Nelson (5538), "Metal Welding at Sandia," Eldorado High School Metalworking Class, Nov. 20.

N.C. Anderholm (5214), "Lasers and Quasars," NE Heights Lions, Nov. 22.

H.H. Patterson (9230), "Mexico and the Sea of Cortez," Heights Optimists, Nov. 22.

H.D. Sivinski (1740), "Planetary Quarantine for Space Exploration," Albuquerque Citizens Radio Assn., Dec. 5, and Eldorado HS science class, Dec. 12.

F. Dausses (3132), "Machine Tool Technology and Apprenticeship," Eldorado HS metalworking class, Dec. 11.

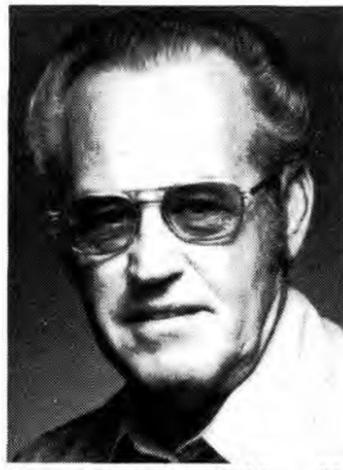
H. Frauenglass (3152), "Bosque del Rio Grande — A Special Kind of Nature Preserve," Senator-elect Domenici and his staff, Dec. 12, and Federal Executive Board, Dec. 12, Albuquerque.

G.W. Hughes (9474), "General Astronomy," Eldorado HS science class, Dec. 19.



Dean Davis — 4142

15

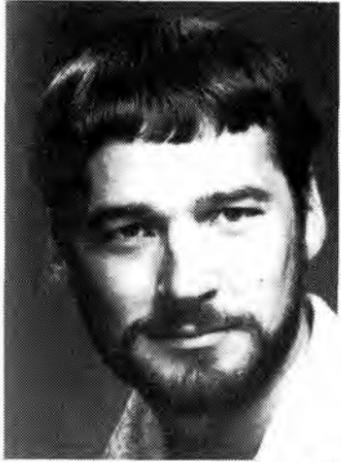


Monroe Blaylock — 4614

25

MILEPOSTS

LAB NEWS February 1973



Louis Feltz — 5623

10



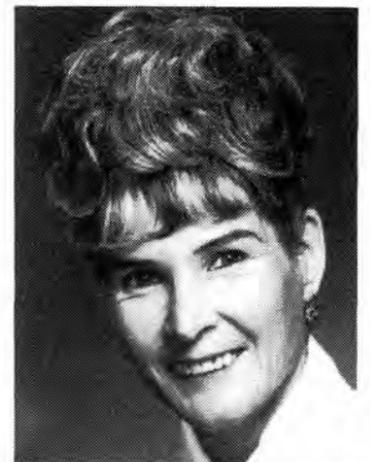
Warren Merritt — 1814

25



Charles Garcia — 4514

25



Gene Gray — 4613

10



Dorris Tendall — 9150

20



Kenneth Hykes — 4541

15



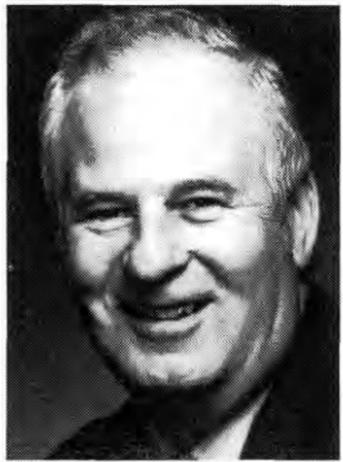
Clifford Magnuson — 1511

20



Walter Barbier — 1323

20



Robert Roberts — 1824

20



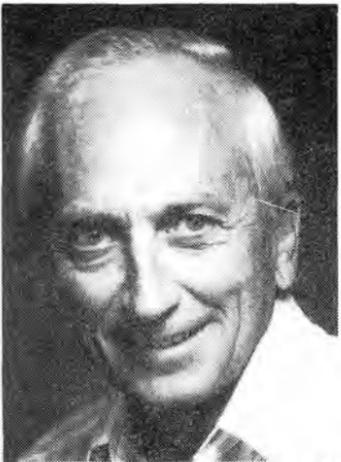
Clarence Young — 5627

10



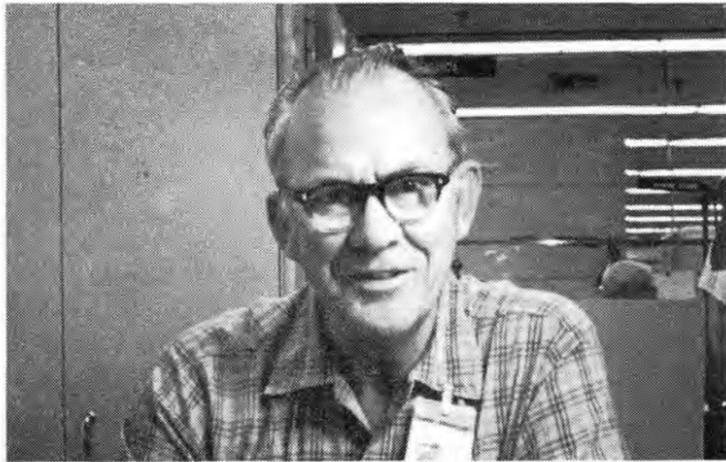
Lewis Fjelseth — 1551

20



Herbert Webster — 7451

20



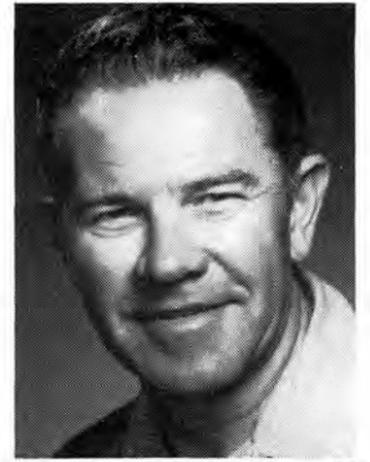
Charles Boston — 7131

10



Frutoso Gurule — 4512

10



Hank Tendall — 7614

25



John Lyle - 9311 10



Dulin Westfall - 9223 20



Vern Easley - 4553 15



Thomas McMahon - 4518 15



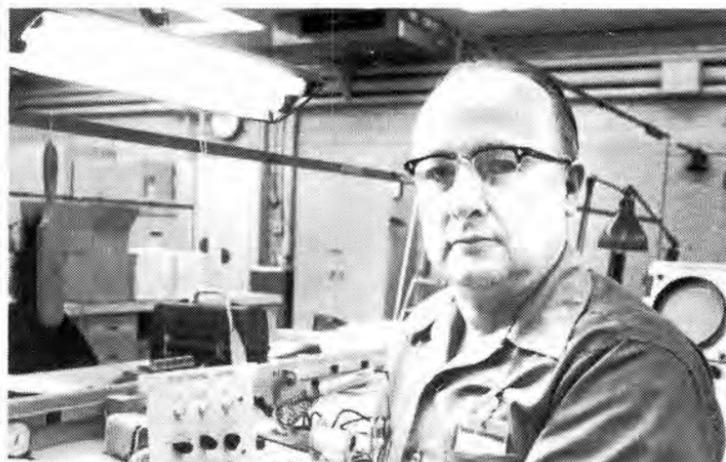
John Weydert - 9224 20



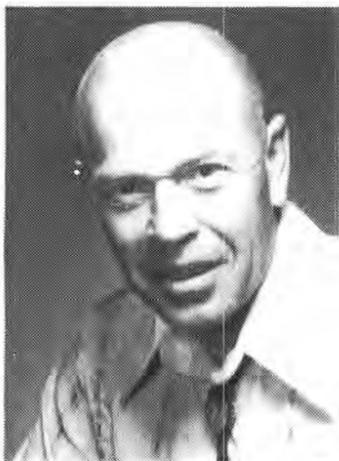
Richard Rudolph - 9228 20



Leonard Smoll - 1644 25



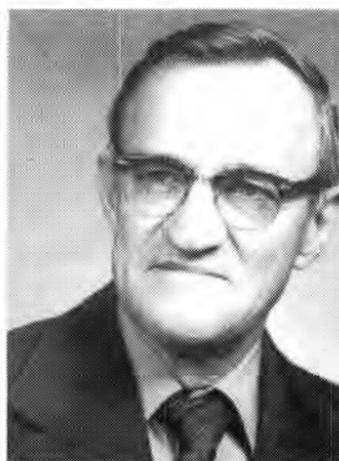
Stanley Owens - 7131 15



Lewis Larsen - 1912 20



Mary James - 4151 15



Hugh Odell - 8231 25



Gerald Gay - 5525 15



Robert Thomas - 7652 25



Alan Stephenson - 9335 10



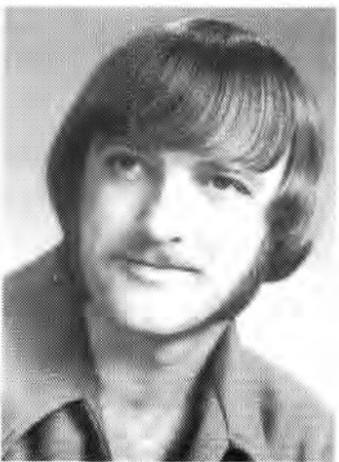
John Colp - 5627 15



Lois Easton - 4361 10



Endalecio Gurule - 4614 10



Al Yung - 8411 10



Harry Olson - 1435 20

Credit Union Reporter



Credit Union Annual Meeting

By Bill Prekker, Chairman
Education Committee

Annual Meeting

Probably the largest annual stockholders meeting in New Mexico was held Jan. 25, 1973, when approximately 800 members of the Sandia Labs Federal Credit Union gathered at the Coronado Club for the 25th Annual Meeting.

Donald Wagner of Livermore was elected a new member of the Board of Directors; re-elected to the board were W.W. Olheiser, Bill Bristol (CU Manager), and Ralph Hampy; Vincent Arroyo and Charles Lumpkin were elected members of the Credit Committee.

Included in President Bill Prekker's report was the announcement that interest rates on loans for second mortgages, mobile homes, boats, travel trailers, and most campers have been reduced. The table below shows the changes.

Door prizes, portable color TV sets, went to Melvin Johnson (9334) and Art Trujillo (5645).

Board of Directors Officers

Elected officers are: president, Earl Simonson; vice-president, Clarence Sandy; secretary, Joe Miller; and Bill Bristol, treasurer. Other board members: W.W. Olheiser, Joe Maldonado, Bill Prekker, Alan Pope, Donald Wagner, Ralph Hampy, and Karl Waibel.

Committee chairmen appointed: Supervisory Committee, R.C. Butler; Executive Committee, Bill Bristol; Operations Committee, Ralph Hampy; Education Committee, Bill Prekker; Building Committee, Joe Maldonado; and Data Processing Committee, R.L. Turner.

Interest Rate Changes (Now in effect)

| | Annual Percentage Rate | |
|---------------------------|------------------------|---------|
| | Previous | Current |
| Second Mortgages | 9.6 | 8.4 |
| Mobile Homes | 9.6 | 8.4 |
| Boats | | |
| Current year & 1-year old | 9.6 | 8.4 |
| 2-4 years old | 10.8 | 9.6 |
| Over 4 years old | 10.8 | 10.8 |
| Campers | | |
| Current year & 1-year old | 9.6 | 8.4 |
| 2-4 years old | 9.6 | 9.6 |
| Over 4 years old | 9.6 | 10.8 |
| Travel Trailers | | |
| Current year & 1-year old | 9.6 | 8.4 |
| 2-4 years old | 10.8 | 9.6 |
| Over 4 years old | 10.8 | 10.8 |

Existing loans which qualify will automatically be reduced to the new rates effective Feb. 1 so that you need not apply for the lower rate. There will be no increase in the interest rate for existing loans on campers over four years old.

Second Mortgage Loans

Are you using your credit to the best advantage? Many members may not be aware

that the Credit Union makes second mortgage loans. If you have considerable equity in residential property and are considering a fairly large expenditure, why not drop in and discuss a second mortgage loan.

CU Bulletin Board

As part of its normal audit procedure, the Supervisory Committee recently mailed statements to members with account numbers from 3000 to 3999, 5000 to 5999, and 10,000 to 10,999. If your account number is in any of these series and you have not received your statement, please notify R.C. Butler (4364), Committee Chairman.



FRED SALAS (4514) was roused out of a warm bed at 3:30 a.m. one day last week for what turned out to be a snow job at the Labs. Storm dropped four-five inches of the white stuff, caused traffic stack-ups, was followed by little people heaving snowballs.

Take Note

A circular from UNM describes a non-credit course which starts March 22 and which may be of interest to many Sandians. Called "Recreation Vehicle Know How," the 12-hour 6-week course will discuss "... maintenance, operation, driving techniques, woman's role in camping (sic), safety procedures ... and equipment." Travel trailers, campers and motor homes are the subjects. Cost is \$18, and we have one circular in the LAB NEWS office if you're interested, or you can call Bill Naylor at 277-2931 for details.

* * * * *

Phil Owens (7616) attended the Annual Winter Meeting of the National Society of Professional Engineers at Salt Lake City on Jan. 10-13. He delivered a report to the National Board of Directors in his role as chairman of the N.S.P.E. Pension Improvement Committee.

* * * * *

Randy Maydew (5620) has been appointed to the American Institute of Aeronautics and Astronautics (AIAA) Missile Systems Technical Committee. By organizing national meetings in conjunction with ARPA, ABMDA, SAMSO, and other agencies, the Committee provides a forum in which government and industry representatives discuss the development and operation of tactical and strategic missile systems.

* * * * *

Sandians hold down half the 1973 officer positions in the American Ceramic Society, New Mexico Section. The new chairman is Gary McVey (5154); vice-chairman is Haskell Sheinberg, LASL; treasurer is Robert Eagan (5334); and secretary is Mike Tokar, LASL.

* * * * *

The Museum of Albuquerque on Yale Blvd. SE is going to be a popular stop for ballooning enthusiasts. The current exhibit, Hot Air Ballooning, provides close-up look of a balloon and its trappings, as well as barographs and flight photographs. The exhibit will be on display until Feb. 25.

* * * * *

Bikers — the State Highway Department and the State Planning Office have developed a tentative plan for a bikelane to parallel the new Highway 14 north of Tijeras Canyon. The plan needs community — and prospective biker — support at a Feb. 13 meeting at 7:30 p.m. at Bella Vista Restaurant on North 14 (see 10).

* * * * *

Tickets for the 1973 Golden Gloves Regional Tournament, scheduled Feb. 15-17 at the Civic Auditorium, may be purchased at VFW Post 401, 4510 Lomas Blvd. NE, according to Bill Foy (9312), junior vice commander of the post and Golden Gloves publicity chairman. Prices are 50 cents for students, \$1 general admission, \$1.50 reserved and \$2 ringside.

Deaths

Hubert Fox, a traffic analyst in Traffic Section 4363-2, died Jan. 18 after a short illness. He was 57.

He had worked at Sandia Laboratories since August 1963.

Survivors include his widow, two daughters and a grandchild.



Donald Wanner of Materials Analysis Division I 5521 died Jan. 31 after a short illness. He was 48.

He had worked at Sandia since September 1950.

Survivors include his widow, a daughter and two sons.



Ceramic Engineer or French Lawyer?

Bob Eagan in Musical Comedy Can Can

Bob Eagan, a ceramic engineer in Division 5334, is appearing in a colorful supporting role in Cole Porter's musical comedy Can Can. As French barrister Paul Barriere, Bob investigates illegal performances of a new "inflammatory dance" in Montmartre, notorious afterdark section of Paris.

Staged by Albuquerque's Music Theatre and featuring Charles Woodul and Katherine Counsell in its leading roles, Can Can will play six performances at the Kimo Theatre downtown.

Special rates for opening night, Friday, Feb. 16, are available to Sandia/Kirtland personnel. Tickets may be obtained at the Recreation Center across from the Base Gym, Bldg. 20-226, Kirtland East.



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.
A maximum of 125 ads will be accepted for each issue.

RULES

1. Limit 20 words.
2. One ad per issue per person.
3. Must be submitted in writing.
4. Use home telephone numbers.
5. For Sandia Laboratories and AEC employees only.
6. No commercial ad please.
7. Include name and organization.
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

ELECTROLUX floor polisher & scrubber, model B-8, heavy duty, 3 rotary brushes, waxes, polishes & shampoos, \$125. Perryman, 247-8485.

CEMETERY LOTS, Sandia Memory Gardens, Garden - Mercy, Estate - 206, Bloc - 4, Spaces - 4, No's. 1, 2, 3, 4, Wilson, 898-5042.

BATHROOM SINK, white, \$10; hinged glass shower door, \$10; alum. rollaway single cot, \$10; student clarinet, B-flat, case & music stand, \$60. Schuster, 255-5970.

TIRE CHAINS, lug-reinforced, fit 7.75-14 or 7.35-14 tires, \$10. Bircher, 268-0726.

STANDEL studio amp w/4 12" speakers, 140 watts, \$400; Oscar Schmidt auto harp w/case, \$25; fiddle w/case & 2 bows, \$50. Snyder, 264-7181.

GIRL'S dresser w/top shelves, French Pvc., white-gold, \$35; 2 small swivel chairs, \$8. Roberts, 255-9527.

'72 **APACHE MESA** solid state camper, blower heat, gas-AC/DC refrig., dbl. gas, 12V battery, other extras. Lerma, 268-0613.

MOTORCYCLE tire, 4:00-18 Universal Trails, \$6. Roth, 877-4997.

'72 **SEA KING** outboard motor, 5hp, \$125. Green, 298-8033.

INFANT SEAT; stroller; walker; mesh sided playpen. Jones, 298-6422.

REFRIG., Admiral dual-temp, 17 cu. ft., including 4 cu. ft. freezer, 175 lb. cap., \$90 delivered; portable room air conditioner, \$15, both \$95. Watt, 298-8289.

PARTNERSHIP in realty investors company, 27% growth last

year, sell at cost or best offer. Schulze, 898-2880.

TWIN BED mattress & box springs, Beauty Rest, two sets, \$35 ea. McIntire, 298-6145.

4 ANTIQUE CLOCKS, take all for \$250. Flowers, 281-3458.

PUPPIES free to good homes, Shepherd-cross, 6 wks. old. Frauenglass, 344-8344.

METAL SHELVES, 4' wide by 1' high up to 10' high. Chavez, 294-3604.

FILIGREE WOOD PANEL, 4x8' room divider, \$20. Johnson, 298-1011.

TRAVEL TRAILER, 14', 3-burner gas range w/oven, ice box, sleeps 4. Forsythe, 299-2785.

BRIGGS & STRATTON 4-cycle, horizontal shaft gasoline engine, \$10. Ricker, 296-2191.

SPEED QUEEN WASHER, as is, \$10. Peterson, 298-1235.

ROBERTS reel-to-reel tape recorder, model 1721, 4 mos. old, \$140. Jeys, 299-4197.

POMERANIAN, MALE, reg., papers, choc. color, \$75, 1 1/2 yrs. old; 4 Chev. pickup rims, 5-hole, 15" and 4 hubcaps, new '72, half price, \$75. Treharn, 869-2786 or 869-2583.

STEREO headphones, Nova 10 w/air cushion earcups, lt. wt. vinyl headband, 2 1/4" full range transducer in ea. side, response from 50 to 15,000 cps, 8-16 ohms impedance, 5' cord, \$7. Chavez, 256-1087.

GOLDEN RETRIEVER pups, AKC & OFA, whelped Dec. 28, \$125. Pryor, 344-2931.

OLD FASHIONED school desks, antique trunk. Nelson, 255-2364.

TIMPTE built utility box for 1-ton truck, 6x6x9'. Dyer, 299-5571 after 5:30.

DESK, all wood, dark finish, full size, top equals 37x60, Harstad, 298-6551 after 6.

3-PIECE SECTIONAL, turquoise, \$50; turquoise & white swag lamp, \$5. Chemistruck, 299-7563.

PICKUP SEAT, bench type, overall width approx. 55", \$10. Plummer, 296-0806.

WHEEL CHAIR, chrome plated, detachable footrests, full

reclining back, removable arms, \$250. Baczek, 255-3429.

DROP LEAF TABLE, -leaves & pad, mahogany finish. Philgreen, 256-1956.

BUNDY TRUMPET, \$45; Zenith 21" B&W TV, \$20; Sunray enlarger, \$20; Richard's Topical Children Encyclopedia set, \$20; marine toilet. Sasser, 298-1439.

BRITANNICA Great Books w/year books, cost \$550, sell for \$350; women's bike, Royce Union, \$15. Jones, 298-8492.

SADDLE, Western, tooled leather, 14" seat, \$75. Barth, 345-0172.

NEW QUEEN box springs, \$65; 42R overcoat, \$25; new 6.70x-15/7.75x15 tires, \$10; dinette set, \$15; CB radio & antenna, \$30. Lassiter, 298-2461.

CB RADIOS, 1 ea. Pace 6-channel solid state, 1 ea. Johnson Schannel tube type, built in power supply, \$110 for both. Matthews, 869-2370.

GARAGE SALE: "Cat-in-the-Hat" bedroom set; table; swag lamps; tables; chairs; pix; misc. Saturday, Feb. 10 only. 1721 Luthy Pl. NE. Hurley, 298-4440.

SHOP TOOLS: Wards Power-Kraft Mod 157D table saw, 2 1/2'x4' base; Fury 7 1/4 mod. F-7 Ram Tool Corp. saw; Sears 3/8" drill, Desmond table vise. Bayer, 296-8346.

SHOP MANUAL, 1962 Ford Galaxy, \$3; Motor's repair manuals, 1935-1950 & 1955-1963, \$3.50 ea. Schuch, 298-9924.

GE PORT. dishwasher, \$50; gas range, \$15; room air conditioners, 10,000 BTU, \$120; 5000 BTU, \$75. Brandon, 294-1285.

TRANSPORTATION

'61 **INTERNATIONAL SCOUT**, 4wd, Positraction, HD rear bumper, Dualmatic hubs, \$550. Gregory, 344-4419.

'70 **BUICK** Riviera 2-dr. spt. cpe., all power equip., low mileage, AM/FM radio, tape deck. Chapman, 299-3946.

'750 **HONDA** FOUR, '70 model, 6800 orig. owner miles. Grant, 294-5530 after 6:30.

'61 **VW BUG**, \$250. Devlin, 281-3112.

'62 **SCOUT** pickup, 4-wd, new tires, \$800. Peters, 266-0017, 8-5 or 898-1238 after 5.

'63 **FORD** 1/2-ton pickup, \$300. McCrory, 294-0497 after 5.

'58 **FORD** stn. wgn., orig. owner, 74,000 miles, V8, std. trans. Floyd, 299-2419.

'68 **TR 250 TRIUMPH**, wire wheels, convertible, needs clutch, \$1195. Beroldi, 268-7968 after 5.

'67 **DODGE** Coronet 440, tan, AC, AT, one owner. Fesler, 869-2060.

'69 **PONTIAC** Catalina, AT, PB, 400 cu. in. engine, one owner, \$1600. Parmley, 344-5072.

'70 **SIMCA** 4-dr. stn. wgn., 4-spd., radio, radial tires, 32 mpg, 22,000 miles, \$200 below book at \$995. Myers, 298-2677 after 5:30.

'69 **DODGE** Polara 4-dr., AT, AC, PS, 44,000 miles, orig. owner. Schamaun, 298-5192.

'65 **VW BUS**, new engine & upholstery, extra insulation inside walls, Elfner service record, snow tires, extra wheels, campsite paint. Atkins, 298-5762.

'71 **YAMAHA** 200, elec. start, low mileage. Botin, 255-3281 after 5.

'69 **PLYMOUTH** Sport Suburban stn. wgn., Michelin tires, complete service record, auto. speed control, power seat, \$1850. Ewing, 298-1404.

'68 **DODGE** pickup D-100, 225 CID, 6-cyl., 8', 3-spd., \$1250. Sieglitz, 898-5939.

'63 **CHEVROLET** stn. wgn., parts for sale. Aguilar, 898-0897 after 6.

'66 **CHEV.** Belair, 4-dr., AT, PS, PB, Stoeber, 296-3717.

3/4-TON PICKUP, old but good, removable stake sides, \$350. Roache, 268-4686.

'51 **FORD**, newly painted & upholstered, new clutch & radiator, \$350 or best offer. Puglisi, 268-0077.

WANTED

'14 **ALUMINUM** fishing boat. Skogmo, 898-6013.

MERCEDES BENZ COUPE, 1966 or older. Davies, 265-7283.

SCOUTMASTER for Troop 393, approx. 22 Scouts; meets at Hayes-Embudo School, committee organized & eager to support. Andes, 268-8951.

RIDE to UNM Computing Center from Area I on Mon., Wed., Fri., for 1:30 to 2:30 p.m. class. Thompson, 268-6026.

NEED old heavy duty all wheel drive vehicle, such as power wagon, military 2-ton, etc., need not have motor. Trentham, 255-7145.

PETRI 7S 35mm camera for parts, any condition. Mayer, 255-1565.

VW SQUAREBACK, 1966 or 1967, will pay average trade in or more if condition is good. Souder, 281-3121.

4 BACKPACKERS to join party walking down Paria Canyon, Utah to Lee's Ferry in April, 40 miles, 6 days. Stamm, 255-2640.

WESTINGHOUSE type roaster oven. Jacobs, 296-4522.

BOAT, tri-hull open bow, 16-18', 2-4 yrs. old, inboard/outboard preferred, water skis, ski belts, etc. Chandler, 296-3323.

TRADE one set maple bunk beds for one trundle bed. Frasier, 299-6933.

WANT TO RENT: 2-bdr. house w/garage, Heights location preferred. Laskar, 299-1024 after 5.

FOR RENT

NEW FURNISHED 1 & 2-bdr. apts., deluxe features, shag carpeting, dishwasher, laundry, \$145/mo., 217 Pennsylvania NE. 266-3955.

LOST AND FOUND

LOST — Rx safety glasses in black case, Cross chrome pen & pencil set; 2 Sandia brief cases, small drop-style gold earring, gold Cross pen, silver filigree circle earring attachment, 2 keys & nail clipper, amber pin w/gold oak leaf.

LOST AND FOUND, tel. 264-2757, Bldg. 832.

FOUND — Lens for glasses, white metal clip-on earring, gold button, copper button, head scarf. **LOST AND FOUND**, tel. 264-2757, Bldg. 832.

Bring the Crew!

CORONADO CLUB ACTIVITIES

HAPPY HOURS — Tonight, Veal Cutlet Buffet
Lou Springman and the Countrymen,
Barbara Clark in lounge. Feb. 16, Roast
Beef Buffet, Bob Banks Trio, Ed Shoaf
In Lounge. Feb. 23, Oriental Buffet,
Christopher on bandstand, Yolanda in Lounge.

KIDS KARNIVAL — Saturday, Feb. 17, 11 a.m.-3 p.m.
Fun, Games, Prizes, Cartoons, Clowns, Hot
Dogs, Lots of Goodies, Ten Tickets to
Midway, 35¢. The kids will love it.

SOUL SESSION — Saturday, Feb. 24, from
8:30 to 12:30, Scorpio on Bandstand
With Big Rock Sound. Happy Hour Bar
Prices. Free Admission for Members,
Guests \$1. Super Sandwiches Available.



Sanado Meets Feb. 13

Sanado Women will meet Tuesday, Feb. 13, for luncheon and a musical program. Frances Robertson and Pat Robison, high school choral directors and members of the Albuquerque Civic Light Opera, will present selections from popular Broadway musical comedies. Reservations should be made today with Mrs. George Horne.

Events Calendar

- Feb. 10 — Broadway Hit, "Story Theater," 8:15 p.m., Popejoy Hall.
- Feb. 10 — NM Ski Touring Club, exploratory trip, Gulf Mart, 7:30 a.m.
- Feb. 11 — Great Plays on Film — "Macbeth," 7:30 p.m., Popejoy Hall.
- Feb. 11 — NM Mt. Club, snowshoe hike on Sandia Crest, Western Skies, 8:30 a.m.
- Feb. 13, 20 — Friends of Art Lectures — "Today's Art Scene," coffee 7:45, lecture 8 p.m., UNM Museum.
- Feb. 14 — Albuquerque Arts Council Meeting, short color film and open meeting, 7:30 p.m., Convention Center.
- Feb. 14 — Albuquerque Symphony Orchestra, 8:15 p.m., Popejoy Hall.
- Feb. 14 — ASUNM Lecture Series, J.B. Rhine, parapsychologist, experiments in ESP, 8 p.m., Student Union Ballroom.
- Feb. 15 — ASUNM Lecture Series, Anais Nin, novelist, 8 p.m., Student Union Ballroom.
- Feb. 16 — UNM Chamber Orchestra, third concert, 8:15 p.m., Keller Hall.
- Feb. 17-18 — Albuquerque Children's Theater, "House at Pooh Corner," play; "Wedding Party," ballet, 1:30 and 3:30 p.m., Popejoy Hall.
- Feb. 17 — NM Mt. Club, Indian Petroglyphs near Moriarty, Western Skies, 8 a.m.
- Feb. 19 — Audubon Wildlife Film Series, "Sky Island: Arizona's Chiricahua Mountain Range," 7:30 p.m., Popejoy Hall.
- Feb. 20 — ASUNM Lecture Series, William

Friedken, Director ("The French Connection"), film clips to be shown with lecture, 8 p.m., Popejoy Hall.

Feb. 21 — Special meeting of Albuquerque Arts Council to discuss and define proposal for a Bicentennial Arts Center complex to be built in or near Albuquerque, 7:30 p.m., downstairs Convention Center.

Feb. 22-25 — Old Town Studio, "The Caine Mutiny Court Martial," 8 p.m., 242-4602.

Feb. 22 — Basketball: UNM vs Colorado State; Feb. 23 — UNM vs Wyoming, 7:30 p.m., Arena.

Feb. 25 — NM Ski Touring Club, 15-km cross country race at Chama, call 256-7085.

Coronado Club Announces Transportation Trip to Europe for June 5-26

A transportation only trip to Europe is scheduled by the Coronado Club June 5 — 26, according to Bud Wheeler (3251), club travel director. The group will land in London, June 6, be picked up in Paris June 26. The price is \$288. Two optional guided tours are available as part of the arrangement Bud says. For an additional \$807, you can spend 20 days in Scandinavia or for \$707, tour Europe. Call Bud on ext. 5656 for details.

In the meantime, only 20 seats remain on the Malaga, Spain, package scheduled May 17-25. If you are interested, you must sign up right away. A \$100 deposit is due at the Club office now.

PRACTICE SAFETY



IN SPORTS