

# Labs Undertakes Oil Shale Program

We've all seen the long lines of exasperated motorists waiting to get gasoline at the filling station. New Mexico hasn't experienced the problem, but millions of Americans have and, whether real or contrived, a shortage of gasoline seems to be a fact of life.

This shortage is the basic reason behind a Labs decision this month to undertake an effort in the energy potent field of oil shale. Oil shale is a type of rock possessed of a singular characteristic: when heated, it gives off oil — an oil that can be conventionally refined to produce the conventional liquid fuels — including gasoline, diesel and jet fuel — now in short supply.

Immense deposits of oil shale are found in Colorado, Utah and Wyoming. For perspective, consider these figures: present domestic oil reserves (exclusive of shale) are estimated at 100 to 340 billion barrels. Oil from shale in these three states is estimated at 600 to 1800 billion barrels. The lower figure (600) includes only those rich deposits yielding 25 or more gallons of oil per ton of shale; these deposits are located chiefly in Colorado. The higher figure (1800) includes all deposits yielding 10 or more gallons of oil per ton. In 1974, this country's total oil requirement is 6.2 billion barrels. Clearly, oil from shale can keep many cars on the road for many years.

At Sandia, a new department has been set up to work on this project. It is Energy Technology Department 1140 under Hap Stoller. Its charter declares that it "... will be responsible for the program management and coordination of Sandia activities in the development of *in situ* fossil fuel processing technology. The initial focus of this program will be on oil shale deposits."

Discussing the charter with Hap, he states: "The key words are '*in situ*.' Oil shale can be mined by conventional methods, either strip or underground mining, and processed above ground, but this approach has its problems such as expense, safety and a large water requirement. Further, you end up with mountains of spent shale that the Colorado natives aren't likely to be happy about."

*In situ* processing of oil shale has the potential to reduce these problems and satisfy environmentalists at the same time. Several *in situ* experiments have already been conducted, both by the Bureau of Mines and a number of private companies. One concept is to drill a deep hole in the shale and insert conventional explosives. The detonation fragments — "rubbilizes" — a large shale volume. With natural gas or propane, a fire is started at the top of the rubble. As oxygen is supplied by pumping in air, the carbon in the shale burns — charcoal like — and the heat converts the solid organic material, called kerogen, to oil. The oil drips down to the bottom of the shale rubble and is pumped out. The burned out shale is left underground, so little debris is produced and few mining expenses occur.

Hap points out that the oil shale program combines a number of proposals which were earlier submitted as part of the Labs energy program. It is felt that this consolidation can help answer the two critical questions which so far have hampered the development of *in situ* oil shale processing: how can the shale be broken up so that it can be made to burn, and how can the fire be controlled so that it frees the oil but doesn't burn it up?

To answer these difficult technical questions, a number of teams have been formed throughout the laboratory to get the  
(Continued on Page Four)



TWENTY FOUR TONS of high grade oil shale were shipped to Sandia from Colorado for use in laboratory processing experiments. Dave Northrop (5843), Wendell Weart (1111) and Hap Stoller (5840) discuss possible locations of a full scale *in situ* oil shale field experiment.

## LAB NEWS

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APRIL 12, 1974

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

### George Samara Receives ACS Prize

George Samara, manager of Physics of Solids Research Department 5130, received a singular honor last week. He is the recipient of the American Chemical Society's 1974 Ipatieff Prize which includes a \$3000 honorarium. The prize is awarded every three years in recognition of outstanding work in the fields of catalysis or high pressure.

George was cited as a leader in the use of high pressure to obtain information about the electrical and magnetic properties of solids. In his research at Sandia, George has investigated a variety of physical phenomena including ferroelectric transitions and pressure-induced transitions in insulators and semiconductors to achieve metal-like electrical conduction. He is the author or

coauthor of more than 60 scientific publications.

The award was made during the national meeting of ACS last week in Los Angeles. During the meeting, George delivered a lecture — "The Hydrogen Bond in Ferroelectricity and the Role of High Pressure Research."

George earned a BS in chemical engineering from the University of Oklahoma in 1958 and a PhD from the University of Illinois in 1962. He joined Sandia after graduation.

He is a member of the American Association for the Advancement of Science, the American Physical Society, and the ad hoc committee on high pressure technology of the National Academy of Sciences.

# Afterthoughts

Those 39 candidates--Among other things, Watergate is supposed to have created a revulsion within the citizenry toward politics. But at least 39 people in Albuquerque are not at all so affected--each wants to be our new mayor. Not to mention those hundred and something who hanker to be district councilors. I can see one great advantage to declaring oneself for office--at least you know whom to vote for.

\* \* \*

Dept. of Equal Rights--At a conference of the American Heart Association, a medical researcher reports that women are now catching up to men in the incidence of sudden, unexpected death from heart attack, and he states that the step-up seems to be attributable chiefly to the burgeoning use of cigarettes among females. Maybe it's discriminatory--but that's one manifestation of equal rights we can do without.

\* \* \*

And it's windy too-- April is the cruellest month, breeding  
Lilacs out of the dead land, mixing  
Memory and desire, stirring  
Dull roots with spring rain.  
T. S. Elliot, *The Waste Land* \*js



Frieda Salazar (9631) and Fred Gutierrez (9424).

## Supervisory Appointments

On April 1, Frieda Salazar and Fred Gutierrez began their duties as division supervisors; Frieda heads Design Information Processing Division 9631 and Fred supervises Test Data Programming Division 9424.

Frieda has been at the Labs since 1948 and has held various executive secretary positions. Since August 1970, she has supervised an engineering services section. Frieda's husband works at KAFB. They have a 12-year-old daughter and two grown sons. The Salazars live at 420 Graceland Dr. SE.

In 1967, following graduation from UNM with a BS and MS in math, Fred joined Sandia as a technical staff member. His work at the Labs has been in the computer programming field. Fred's spare time is taken up with gardening and photography. He and his wife, Christina, live at 5620 Guadalupe Trail NW.

## Events Calendar

- April 13 — NM Mt. Club, Cochiti Dam hike, 5-8 miles, Gulf Mart, 8 a.m.
- April 13 — Luis Rivera Dance Company, Popejoy Hall, 8:15 p.m., 277-3121.
- April 13 — Moving Pictures, Ltd.: "Symphonic Pastorale," 10 a.m. and 12 noon, Guild Theater.
- April 14 — Annual Easter Egg Roll & Bash, La Luz Trail, sunrise.
- April 14 — "The Three Bears," Rodey Theater, 1 and 3 p.m.
- April 16 — Audubon Wildlife Film: "Scandinavian Saga," travel film, 7:30 p.m., Popejoy Hall.
- April 17-19 — Old Town Studio opens with "The Odd Couple" by Neil Simon, 8 p.m., tickets 242-4602.
- April 18-19 — Albuquerque Symphony Orchestra with chorus and soloists, 8:15 p.m., Popejoy Hall.
- April 19-21 — Albuquerque Builders Home &

- Outdoor Living Show, 265-6421, Tingley Coliseum.
- April 20 — NM Mt. Club, Penasco Springs, 6 miles, springs and a cave, Gulf Mart, 8:30 a.m.
- April 21 — Faculty Recital: Karl Hinterbichler, Wayne Sharp, 8:15 p.m., Keller Hall, UNM.
- April 21 — UNM Orchestra, 8:15 p.m., Fine Arts Center.
- April 22-26 — Spinners and Weavers Workshop, 9:30 a.m. Floriculture Building, State Fairgrounds, Shirley Herbert, 242-7809.
- April 23 — UNM chorus and orchestra, "Bach's Passion According to St. John," 8:15 p.m., Popejoy Hall.
- April 25 — Rodey Theater, UNM, "Zapatera" opens, through May 4, 8:15 p.m., 247-4402.

## LAB NEWS

Published every other Friday

### SANDIA LABORATORIES

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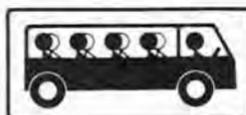
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&  
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Bruce Hawkinson writes  
as does Norma Taylor while  
Bill Laskar takes/makes pictures  
&

in Livermore Lorena Schneider does all



## Bus Notes

A new "charter route" similar to the one now serving the Southeast Heights begins Monday in the Near South Valley and West Mesa areas. Operated by Albuquerque Limousine Service, it will use two 15-passenger vans. If you're interested, call 4-RIDE and ask for an info sheet.

### Variable Annuity Unit Value

April .....	1.513
March .....	1.516
Average 1973 .....	1.752

## Sandia Colloquia

APRIL 17

Joint Sandia Research/Technology Colloquium  
Don B. Shuster - 4700  
Subject: "Energy"  
Bldg. 815, 10:15 a.m. (outside Area)

APRIL 19

Joint Sandia-UNM Colloquium  
Dr. Hatten S. Yoder, Jr.  
Carnegie Institution of Washington (D.C.)  
Subject: "Primordial and Primary Magmas"  
University of New Mexico, Geology Bldg. (Northrop Hall), Room, 122, 3:00-4:00 p.m.

APRIL 24

Dr. Ivan P. Kaminow  
Bell Telephone Laboratories  
Subject: "Fiber-Optic Communication and Optical Wave Guide Device Research"  
Bldg. 815, 10:15 a.m. (outside Area)

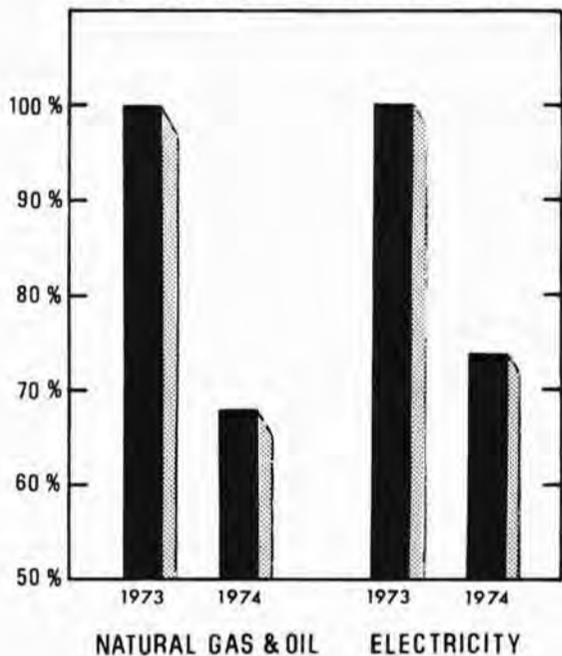
APRIL 29

Materials Science Seminar  
Dr. Dieter Gruen  
Argonne National Laboratory  
Subject: "Chemical Effects of Thermonuclear Plasma Interactions with Solids"  
Bldg. 806, Room 201, 10:00 a.m. (inside Area)



Liz Bodie (8266)

THE LIVERMORE ENERGY PICTURE  
1st QUARTER CONSUMPTION



Speakers

- Ron Musket and Walt Bauer (both 8334), "Surface Analysis by Proton-Induced X-rays (PIX)," National Symposium of American Vacuum Society, New York City, Oct. 9-12.
- Larry Watkins (8342), "Information Loss in Fiber Optic Bundles After Intense Gamma Radiation," Fisk University, Department of Physics Seminar, Nashville, Tenn., Oct. 25.
- Bill Ashurst (8364), "Determination of Thermal Conductivity Coefficient Via Non-Equilibrium Molecular Dynamics," 13th International Conference on Thermal Conductivity, Lake Ozark, Mo., Nov. 5-7.
- Clark Lemmon and Hugh Coleman (both 8111), "The Prediction of Turbulent Heat Transfer and Pressure on a Swept Leading Edge Near Its Intersection with a Vehicle," Sixth Fluid and Plasma Dynamics Conference sponsored by the American Institute of Aeronautics and Astronautics, Palm Springs, Calif.
- Roger Baroody (8160), "Overview of Sandia," and film, "Rocket Sled Testing," Sequoia Masonic Lodge No. 349, F.&A.M., Oakland, Calif., March 5.

# LIVERMORE NEWS



JACK WILSON (left) of metrology lab in Livermore (8413) and Clarence Sandy of the corresponding lab in Albuquerque (9433) discuss new temperature and humidity standard. Jack chaired ANSI subcommittee responsible for standard.

Temperature & Humidity Subject of New Standard

Today's technology assumes the interchangeability or mating of precise parts that may have been made by different manufacturers, and it's essential, obviously, that dimensions be correct. And recent developments in microminiaturized electronic packages have imposed exacting dimensional requirements relating to the length and location of components. These are problems of measurement and, to help meet the problems, a new temperature and humidity standard has been adopted for dimensional measurement laboratories. Approved by the American National Standards Institute, the standard has been published by the sponsoring agency, the American Society of Mechanical Engineers.

Jack Wilson, supervisor of Standards and Calibration Section 8413-1 is chairman of the ANSI subcommittee responsible for the standard. It provides industry with practical requirements and methods by which the international standard temperature of 20 degrees Celsius (68 degrees Fahrenheit) can be achieved. Temperature control is necessary to avoid variations from measurement to

measurement because of thermal expansion in the material being measured. Guidelines for humidity control at a level below 45 percent are also contained in the new standard.

Sandia/Livermore's metrology laboratory meets the requirements now found in the new standard, as do most other standards labs within the AEC complex. "We early saw the need for our labs to meet the standard," says Jack, "and now have a standard that reflects the consensus of American industry."

Although the new standard applies primarily to metrology laboratories, it also affects manufacturing processes. If parts are inspected under various temperatures or humidities, measurements taken must be appropriately adjusted. "It's not economical," says Jack, "to hold a machine shop at 20 degrees Celsius and less than 45 percent humidity. But by using this new standard, the manufacturer can meet dimensional requirements through a process of adjustment. Principles and testing procedures to make these necessary adjustments are a part of the standard."

## Take Note

Chet Tarne (8184) has been named president and Marty Abrams (8111) educational vice president of the local Tri-City Toastmasters. The group develops the ability of its members to speak effectively and listen analytically. Chet has held various offices in the organization for about four and a half years including a previous term as president, while Marty was last year's administrative vice president. Membership is open to men and women, and meetings are held Monday evenings from 7:30 to 9:30 at State Savings and Loan Association in Livermore. If you are interested in joining or

would like additional information, contact Chet on ext. 2887.

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Pat Leary (8441) and her bridge partner Jan Stansby of Oakland have won the women's pairs title in the national championships held in Vancouver, British Columbia. The two compiled over 1300 match points to win, and the title is one step toward representing the United States internationally. Pat, a Life Master, last year ranked 65th on the bridge world's "McKenny List" for winning the most master points, placing her in the top 10 women players in the

country. She and her husband, Jim (LLL), were third best nationally in 1973.

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Roger Everett of Aerodynamics Division 8364 has been reappointed to the Membership Committee of the American Institute of Aeronautics and Astronautics for 1974. Last year, Roger worked with a subcommittee that updated the Institute's membership requirements. He has also been serving on the AIAA Technical Committee on the Application of Aerospace Technology to Society (AATS).

# Oil Shale Program

program off to a quick start. In 4753, Jim Dossey is investigating novel and, hopefully, inexpensive techniques for creating voids in and breaking up the shale. Concurrently, Virgil Dugan (4734) is directing the economic analyses of oil shale retorting to insure that the Sandia approaches are cost competitive. In 5800, Dave Northrop (5843) directs efforts aimed at the chemistry of the process: the reactions must be understood to optimize the conversion of kerogen to oil and further knowledge must be gained of the extent to which the shale must be rubblelized for effective burning. Division 1115 under Jay Benson is already gaining experience in how to instrument for and measure the critical factors associated with *in situ* processes — the degree of rubblelizing, temperature and location of the burn and reaction fronts, flow rates of oil and other products. The needed instrumentation must be novel and ingenious to operate in the severe underground environment of an oil shale retort.

These unknowns are one more reason for Sandia's entry into this program. The technology of *in situ* oil shale exploitation is in its infancy; thus, Sandia has an opportunity to make substantial technical contributions in the field. In addition, much of what is learned here will be applicable to other fossil fuel conversion and recovery technologies.

Immediate plans call for a parallel effort by the new department, one in the laboratory, the other in the field, where Wendell Weart (1111) is currently organizing the effort. Work is beginning in systems analysis, materials studies, explosives development, reaction chemistry, instrumentation development, ore bed preparation techniques, and *in situ* process development. A search is underway for an appropriate field site. People throughout the Labs are already working on the program. Not all the required people are in his new department, and Stoller comments, "I expect to be knocking on a lot of doors around here. We'll need help and cooperation to make this project go." •js



USING LAB APPARATUS, Charlie Arnold (5811) and Dick Curlee (5843) simulate oil shale *in-situ* processing. The asbestos-covered glass tube contains oil shale rubble which has been ignited at top. As the rubble burns down, oil collects at bottom of tube.



JACK HALLIDAY, retired Sandian now teaching at the Albuquerque Skill Center, heads the electronics training program. In the past 3-1/2 years the Center has trained some 2200 students, placed almost 80 percent on jobs.

## Our Town

### 'Bought My First Car' — Thanks to Albuquerque Skill Center

Remember your first car? Possessing it was and is a rite of passage for young Americans. The car gave you status — you had arrived.

Jack Halliday, retired Sandian teaching at the Albuquerque Skill Center, has a desk drawer full of cards and letters from former students now working throughout the country.

Phrases such as "I bought my first car," "you gave me a new start," "my life has changed," and "thank you, thank you all at the Skill Center" occur many times in the letters.

In the three and a half years that the Skill Center has been in operation, some 2200 students have been trained in one of 14 occupational skills. Almost 80 percent have been placed on jobs. Before, they were unemployed or, rather, unemployable.

The Albuquerque Skill Center is operated by T-VI with federal funds provided by the Department of Health, Education and Welfare and the Department of Labor. Students enter the program only through referrals from other agencies. They must be unemployed and meet one of several other criteria — female head of household, member of a minority group, or welfare recipient. Most of the students are young high school dropouts, although people up to age 65 are trained in Skill Center programs.

Students are paid \$50 per week while attending classes. Usual training period lasts from six to eight weeks. From five general course "clusters" the students specialize in one of 14 job skills. The clusters are clerical,

mechanical, electronic, health clerical, and retail/wholesale trades.

The training staff includes 36 instructors and aides. Most instruction is one-to-one, and students progress at their own rates. About 205 students are training each week.

"We've had good luck with our electronic people," Jack says, "placing almost 90 percent after training and, of those, 80 percent of our 1600 graduates are still on the job. We have excellent cooperation with local electronic fabrication firms who welcome our people because they're well trained and motivated."

Jack has just launched an experimental program to train blind electronic fabricators, and he reports that it is progressing very well. Three students are well into the program, training for specific jobs at local firms, and should be on their own soon.

After 22 years at Sandia, Jack admits that he misses the place. "But this is the most exciting job I ever had," he says. "A teacher gets involved. The student's success is my success. Tremendous satisfaction in that. The beauty of the Skill Center is that the people we train have been burdens to the taxpayers. But after training and a few years on a job, the worker repays the cost of the program in taxes." •dg

ENERGY SAVINGS	
COMPARED WITH LAST YEAR'S USAGE	
REPORTING PERIOD SEPT. '73 - FEB. '74	
ELECTRICITY	1973 46,900 MWH 1974 40,700 MWH 13.2%
STEAM PLANT FUEL (EQUIV. OIL)	1973 120,000 BBL'S 1974 107,100 BBL'S 11.2%
VEHICLE MILES	1973 1,765,000 MI. 1974 1,656,000 MI. 17%



# feed *back*

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



CHANGE OF COMMAND — George Thorne (4232) discusses Sandia's FEEDBACK program with new administrator, Phyllis Wilson (3161).

*Q. (from SLL) In light of the energy crisis, why isn't hallway lighting reduced either by rewiring or simply removing half the fluorescent tubes?*

*In my office area our procedure of turning off lights at the circuit breaker box at the end of the workday has been abandoned because the janitorial staff and security guards turn the lights on again and leave them on. Can some procedure be established to eliminate unneeded lighting during non-work hours?*

A. The energy crisis is receiving considerable attention. The many steps that have been taken are paying off in important ways. Currently, savings are approaching 20% of previous consumption of electrical energy.

We appreciate your interest in supporting conservation of energy. The hall lighting you mention has been discussed for some time. Recently approval was given to reduce the hall lighting in Bldg. 912 by 66%. Currently, all lights except a minimum for security are being turned off each night. In many cases employees are assisting in this process. Janitors turn on lights as needed, turn them off as they finish an area.

—C.H. DeSelm - 8200

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*Q. "O" Street traffic heading west from Gate 10 has a stop sign at Wyoming. This causes traffic going west on "O" to back up at least two blocks while waiting for clearance to cross Wyoming. Since "O" Street carries more traffic, why can't some other traffic control be initiated to eliminate this backup?*

A. Any traffic control device or measure on KAFB outside of Sandia's tech areas must first be approved by the KAFB Traffic Control Board and actually implemented at their direction. The Board is aware of the existing traffic congestion at the intersection of Wyoming and "O" Streets. An appointed Traffic Control Panel evaluated the situation and at a meeting of the Board on December 18, 1973 the panel recommended that a traffic control light be installed at the intersection in accordance with presently established priorities. The Board is implementing the necessary action to have the light installed. Actual installation of the light will not be made for several months.

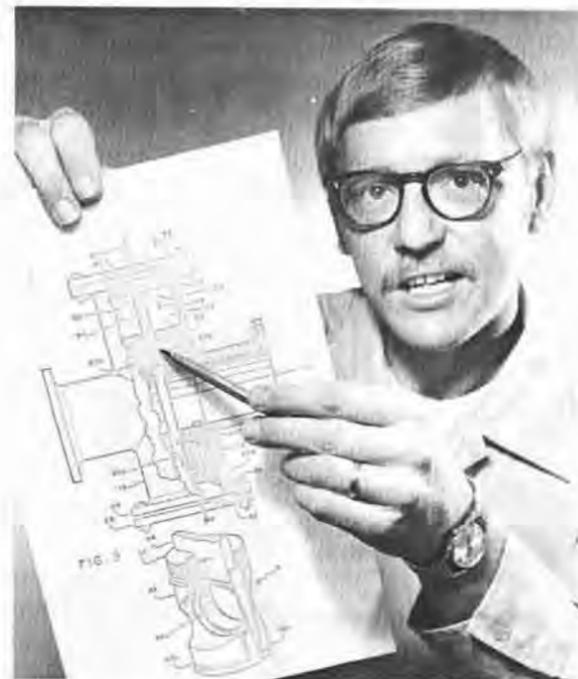
—L.J. Heilman - 9500

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*Q. It would be convenient to have lunch periods for the different organizations listed in the phone book.*

A. In order to assign lunch periods in approximately three equal segments, Vice-Presidents have worked out plans which work best for their organizations. Some organizations have assigned lunch periods by organization, some by individuals. For example, the Medical and Personnel Organizations are staffed 8-1/2 hours a day, by staggering the lunch period to individual employees, while some of the Technical and Shop Organizations have assigned lunch periods by Division or Department.

—D.S. Tarbox - formerly 4200



RICH ASHBAUGH (1713) explains operation of the guillotine blade in his closure device recently patented. The device is used extensively in underground testing at Nevada Test Site.

## Device Invented By Rich Ashbaugh Awarded Patent

A device invented by Rich Ashbaugh (1713), which has been used extensively in underground experiments at Nevada Test Site, has been awarded a patent.

The device closes off the "line-of-sight" pipe extending from the site of the nuclear explosion to the various experiment chambers. Made in sizes to close openings ranging from 2 to 10 inches, the system uses atmospheric pressure to effect closure in time periods from 20 to 40 milliseconds.

A vacuum exists in the line-of-sight pipe. An explosive squib, incorporated into the closure system, is fired by timer and causes a pin to release a "guillotine" blade. Atmospheric pressure impels the blade into the vacuum of the pipe to close the opening.

O-ring seals prevent gas and debris from entering the experiment chamber.

Rich joined Sandia in 1960 after earning an Associate Engineering degree from Penn State. He has worked in tool and gage design, field testing and underground instrumentation organizations.

## ASQC Offers Study Class

Anyone interested in earning certification as a Quality Engineer from the American Society for Quality Control is urged to contact Tom Harrison (2334), Albuquerque chapter education chairman.

To qualify for certification, the applicant must pass a six-hour exam. Tom and other ASQC members will be conducting study sessions to prepare for the exam in coming weeks. Bill Robertson (1641), who earned his certification in December, reports that the proposed course of study is excellent preparation for the exam.

Call Tom on ext. 1159 or Bill, ext. 2704, for additional information.

## Sympathy

To Joe Ferguson (9718) on the death of his brother in Arlington, Texas, March 24.

To Mary Woods (3321) on the death of her sister in Florida, March 23.

# FUN & GAMES



*Pretty Expensive Fish* — If you fish, take note of these changes resulting from '73 legislation:

Trout Stamps — \$1 or \$3, depending on type of license, required for fishing in designated trout waters. Stamps are not required for those who fish in nontrout waters or on Indian reservations.

A Junior-Senior license is now available for New Mexico residents 12 or 13 years, or 65 years of age and older. The license and the trout stamp, if required, cost \$1 each.

The one-day license, previously issued only during June, July, and August, is now available year-around to residents and non-residents. The trout daily bag and possession limit is set at eight trout. License vendor fees have been added to the price of each license and stamp: 25¢ on those costing \$5.50 or less and 50¢ on those costing more than \$5.50.

Read the Fishing Information pamphlet, available from any Game and Fish Department office or license vendor, for a complete rundown.

## Fishing License Fee Schedule Effective April 1, 1974

Resident Licenses	License	Stamp	License Stamp and Commission
General Hunting and Fishing	\$12.00	\$3.00	\$15.75
Fishing	5.50	3.00	9.00
Junior-Senior Fishing	1.00	1.00	2.50
Five-Day Fishing	5.25	1.00	6.75
One-Day Fishing	2.00	1.00	3.50
Duplicate	1.00	1.00	2.50

*Judo Class* — Last class was so popular that John Gowan, he of the black belt, would like to start another. Class would start next Friday the 19th at 5 in the gym. Ten bucks to sign up and \$1/month fee. Call Les Baumann (9550) on 299-9493 or see him at the gym after work if you are interested.

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*Sandia Bicycle Ass'n.* — The reason we still don't have that stop light at 7th and F is (take a deep breath) the military can't get the aluminum poles. Anyone buddy-buddy with H. Kaiser?

June issue of *Bicycle World* carries interview with Dr. Kenneth Cooper, author of *Aerobics*. Asked about aerobics vs running vs bike riding, Cooper points out the additional variables in bicycling, continues: "I can say basically this: if you're going to get the points you need (for basic fitness) by cycling, it's a rough rule of thumb that you have to cycle 30 miles a week. If you walk, you have to walk 15; if you're running, you have to run 6 miles a week; and if you swim, you have to swim 1-1/2 miles a week. These are roughly the equivalents to get a minimum of 30 points." That 30-point per week figure represents the amount of exercise considered by Dr. Cooper as necessary to maintain some minimal level of physical fitness.

In case you hadn't noticed, The Rope is now and then put up across the street at the elementary school before 8 o'clock. Be careful: it's wiped out several SBA'ers. For the umpteenth time, our Base friends have been informed and we are assured that the problem will be taken care of.

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*Sandia Chess & Go Club* — "Go," not to

be confused with go-go, is another of those cerebral games and Bill Minser (7145), he of the Chess Club, states that they're broadening their base and will now admit, if not openly embrace, go players at their Monday meetings. If you want to go or, for that matter, if you want to chess, next meeting is this Monday, the 15th, at 7:30 in the Coronado Club.

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*Sandia Runners Ass'n.* — Who says we ain't got class? For SRA'er Pete Richards (5132) is entering the Boston Marathon, the *ne plus ultra* of the runner's world. Race day is April 15. We'll report on Pete and the Boston next issue.

*Running After Forty* is the title of a booklet published by *Runner's World* that falls in the category of inspirational literature. Consider this item. A university physiologist recently conducted tests on long-term joggers, 32 men averaging 47 years of age, who had run for several years but only moderately — about 11 miles a week. Still, results were significant:

- maximum oxygen uptake 20-35% higher than untrained men
- resting heart rates 15-25% lower than sedentary men of comparable age
- body fat 10-15% below typical levels.

Running can be an incredible drag. But its benefits are a little incredible too.

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*Bowlers* — A Scotch Doubles tournament, sponsored by Sandia Labs Bowling Association, will be held at Fiesta Lanes on April 20 and 21. This is a fun tournament for employees and their spouses; skill isn't necessary. For more information see Mary Ward (9614) or Helen Davison (4700).



Paul Silverman, consultant

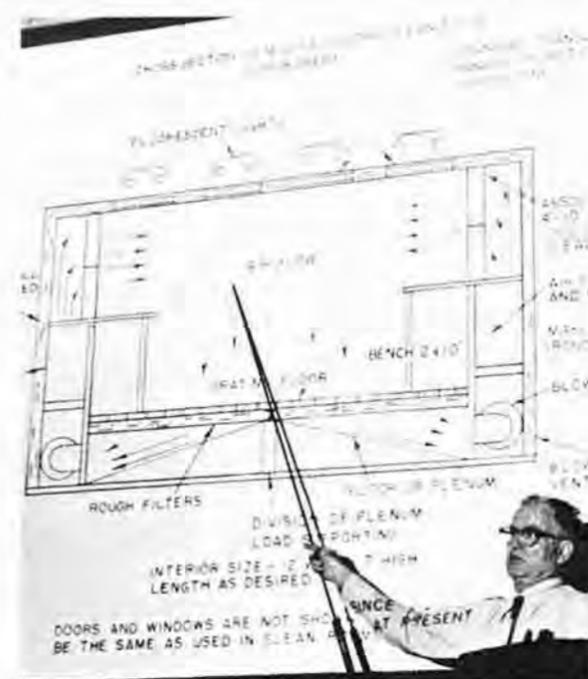
## Microbiologist Joins Sandia As Consultant

Paul Silverman, vice president of research and graduate affairs at UNM, has joined Sandia's Biosystems Research Department 5250 as a consultant. He will work several days a month on various life science programs now underway or planned by the department.

Silverman, a national authority on microbiology, brings a wide general knowledge of bacteriology, virology, genetics, tissue culture, parasitology, radiobiology, entomology and biochemistry to the activities of 5250.

Before joining UNM to head the biology department, Silverman was professor and chairman of zoology at the University of Illinois. He was named to his present position at UNM in March. His specialty is malaria research, pursued since the early 50's, and his UNM research team has recorded significant progress in developing a vaccine against the disease.

Silverman earned his master's degree at Northwestern University and his Phd from the School of Tropical Medicine, University of Liverpool, in 1955. In 1968 he was awarded an honorary doctorate from the same school.



WILLIS WHITFIELD (here discussing his invention of the laminar flow clean room) and Dan Garst (both 5252) recently conducted a three-session course on Fine Particle Physics and Contamination Control for Quality Assurance people of Departments 9510 and 9520.

# Be A Metre Reader

The root problem with our conventional measuring system is that it isn't: it's not a system. It's a slipshod collection of measuring units which have purely arbitrary relationships among themselves. Yes, they can be mastered, with enough motivation and practice. But, for that matter, so can ancient Greek.

Still another problem with our current set of measurements: our trade with the rest of the world is hampered unless we wish to trade only with nations such as Sierra Leone, Gambia, Nauru, and a few even lesser knowns. Other major nations have a much less cumbersome system; they are not going to adopt ours.

That less cumbersome system is, of course, the metric; specifically, it is the form of metric known as the SI (for *Systeme International d'Unités*). It is indeed a system.

## One Base Unit

For one thing, SI uses one and only one base unit for each physical quantity. Instead of measuring length in terms of inches, feet, yards, furlongs, and miles, we will use only the metre (and its cousins, the millimetre, kilometre, etc.). Instead of measuring area in square yards or square miles or acres, we will use square metres, square kilometre, or hectares (100 m x 100 m).

Instead of measuring liquid volume by pints, quarts, gallons, firkins, and barrels, we will use litres. Dry volume will be measured in cubic metres.

Mass measurements will no longer rely on the ounce, pound, and ton, but on the kilogram and the tonne (a thousand kilograms). Eventually only the scholars and old timers will be able to define the old terms.

Temperatures: Many scientists will use the kelvin scale on which zero kelvin is absolute zero, or minus 273.15°C. The rest of us will use a form of kelvin called degree Celsius (formerly centigrade). A degree Celsius equals a kelvin, but 0°C is the freezing point of water (32°F) and 100°C is its boiling point (212°F). Note that it's "200 kelvin," not "200 degrees kelvin."

And time. No change here, though most technical calculations will be on the basis of the second, a base unit in SI. For other purposes we will use minutes, hours, days, etc., as appropriate.

The other three base units are the ampere, the measure of electric current; the candela (pronounced "can-Dee-la"), the measure of light intensity; and the mole, a measurement of the amount of substance in a system, primarily a unit of molecular physics.

## Coherency

The real beauty of SI is not only that each unit is a decimal multiple of its base unit — metre, kilogram, second, ampere, kelvin, candela, or mole — but that each unit may be multiplied by another and the product is a meaningful unit in itself. In other words, it is a coherent system: unit area results when unit length is multiplied by unit length, unit velocity when unit length is divided by unit time. Not so in the existing set of measurements: For example, determining the acreage of your 47 ft. x 127 ft. lot demands a division of the first product by 43,560.

SI Base and Supplementary Units		
<b>Base Units</b>		
Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Thermodynamic Temperature	Kelvin	K
Electric Current	ampere	A
Luminous Intensity	candela	cd
Amount of Substance	mole	mol
<b>Supplementary Units</b>		
Plane Angle	radian	rad
Solid Angle	steradian	sr

Obviously, for technical studies, the seven base units aren't enough. To indicate force, SI uses the newton (1 kilogram multiplied by 1 metre divided by second squared); energy is measured in joules (a newton times a metre), though we will still use the electron volt where applicable. These plus many others make up the "derived units" — each is derived from one or more of the base units and therefore retains its coherency in use.

Two supplementary units complete the SI system: the radian to define plane angles and the steradian to define solid angles.

## Why 10?

SI is not a perfect system. For example, there is nothing inherently right about having each unit related to its cousin by powers of 10. Why not 12, which divides into quarters more easily? Or some other number? But 10 has been accepted by all the countries whose lead we're following. And, because of our monetary system, we're accustomed to it.

No base, derived, or supplemental unit is given for weight. That's because weight varies depending on the pull of gravity, which in turn depends on location. Mass is "a property of matter to which it owes its inertia," an absolute, not affected by gravity. However, except in technical studies, most of us will continue to speak of "weighing" 60 or 90 kilograms or whatever.

There are a couple of metric units which we will come to know and love even though their use for things technical is frowned upon by SI. One is the centimetre, the other is the litre. Litre is simply another name for cubic decimetre, and is therefore unnecessary in purely scientific use. Most of us will use it widely outside the laboratory though.

## Think 1000

Generally, SI favors units and multiples and sub-multiples of 1000, not 10 and 100. So, in technical work, millimetres, metres, and kilometres will take precedence over centimetres and decimetres. The guide here is that three digits are easy enough to recognize immediately: .53 m or 530 mm are therefore preferable to 53 cm or 5.3 dm, though in non-technical use of any of these is okay, and centimetre will prove to be a most useful unit.

Another system of metrics uses the centimetre, the gram, and the second as base units and is therefore known as the cgs system. But the cgs system is not coherent; SI is the only coherent system in use.



Me? Metricate? Never!

Some random examples to help get a feel for the new system —

A small hamburger weighs about 50 g; you likely weighed about 4 kg at birth.

A jigger of whiskey contains about 45 cc, a cup of coffee over 50 cc. Your gas tank may hold about 90 l.

Your average guppie is about 12 mm. The new legal speed limit is 89 km per hour.

Antarctica may get down to -90°C, Montana -60°C. Death Galley reaches 52°C.

A postcard is 100 cm<sup>2</sup>, a 16-inch TV screen is a little over 900 cm<sup>2</sup>, and a chessboard is 1000 cm<sup>2</sup>.

SI will be alien at first, but its structure is simple and day-to-day usage will bring a ready comprehension of the system. • bh

Multiplication Factor	Prefix	Symbol
10 <sup>12</sup>	tera (tera)	T
10 <sup>9</sup>	giga (giga)	G
10 <sup>6</sup>	mega (mega)	M
10 <sup>3</sup>	kilo (kilo)	k
10 <sup>2</sup>	hecto* (hekto)	h
10 <sup>1</sup>	deka* (deka)	da
10 <sup>-1</sup>	deci* (desi)	d
10 <sup>-2</sup>	centi* (senti)	c
10 <sup>-3</sup>	milli (mili)	m
10 <sup>-6</sup>	micro (mikro)	μ
10 <sup>-9</sup>	nano (nano)	n
10 <sup>-12</sup>	pico (peko)	p
10 <sup>-15</sup>	femto (femto)	f
10 <sup>-18</sup>	atto (atto)	a

\*To be avoided in technical studies.

# Take Note

If Disneyland in California or Disney World in Florida is on your 1974 vacation schedule, be sure to stop by Employment and Employee Services Division 4251 (Bldg. 832 Lobby) to pick up a card entitling you and your family to various discounts (depending on the cost of the ticket package you select) at these attractions. No phone calls, please.

\*\*\*\*\*

Helen Payne (2111) reports that Gov. Bruce King has proclaimed the week of April 21 as Secretaries Week. Helen is chairman of the International Secretarial Workshop which is being held this year on Saturday, April 27, from eight to four at the 4-Seasons motel. Registration deadline for the Workshop is April 19; it costs \$7.50. Call Helen on ext. 2915 for registration forms and information.

\*\*\*\*\*

Expect to be contacted by parents of Coronado Aquatic Club members (or by members themselves) as these kids are signing up sponsors for their April 21 Swim-a-Thon. Each sponsor agrees to pay a nickel (or a penny or a dime or whatever) a length. Each sponsored kid will thus be swimming to raise, they hope, \$4000. Seventy-five percent of the proceeds go toward a permanent pool cover for their practice pool at the Coronado Club (the present cover is a temporary one); the remainder goes to the National Swimming Hall of Fame, the Swim-a-Thon's sponsor. If you'd like to be a sponsor but aren't contacted next week, call Bob Prew (2134) at 4-5403 by Friday. He'll send a young swimmer to sign you up.

\*\*\*\*\*

Frank Biggs (5223) dropped by the LAB NEWS office last week with a recipe for something called a "Beta Aloosters Delight":

"Start with a generous measure of speech improvement, add plenty of effective listening, sprinkle in a little debating and a dash of parliamentary procedure, knead thoroughly with pleasant fellowship and let it rise to a thoroughly enjoyable experience every Wednesday right after work at the Coronado Club."

The Beta Aloosters is a Toastmaster Club, one of the oldest in the city, and it is seeking new members. If you are interested call Frank on ext. 7367 or Bob Guerin (4152) on 2546.

\*\*\*\*\*

Cliff Taylor (3613) is helping organize a Youth Softball Association in Albuquerque with the goal of providing organized leagues and sponsors for youngsters 9 to 15 who want to play softball. He invites parents to the organizational meeting Tuesday, April 16, at 7:30 p.m. at the Sandia High School Science Hall.



SANDIANS PARTICIPATING in the upcoming sports car races at Ft. Sumner April 27-28 include, from left, Ralph Goekler (2312), Art Sena (3622), Dick Kromer (2344), Bill Abel (2334), Bill Denison (9521), Jim Campbell (5714), Bud Gauwerke (2344) and Dave Nokes (2344), inside car. Jim is regional director of the American Sports Car Association, Bud is co-chairman of the races, and Dave placed eighth in the national runoffs last year with this modified Datsun 510 B sedan. The others will be driving in the races.



A NUMBER OF SANDIANS participated in the recent Career Fair at Eldorado High School giving the students the word on professions. Clockwise, from top, are Rip Anderson (5813) describing the weird things encountered in oceanology, Larry Tichenor (3622) demonstrating Sandia's flash blindness goggles, Jim Karo (9632) discussing technical photography, and Joe Maez and Ernie Sandoval (both 3644) discussing machinist apprentice programs. The balloons? Well, we haven't quite figured them out.



# VIPS VISIT SANDIA

AEC Commissioner William Anders held a press conference in Bldg. 800 last week.



Maj. Gen. Ernest Graves, AGMME (left), Assistant Secretary of the Army Norman Augustine and President Sparks examine hardware.



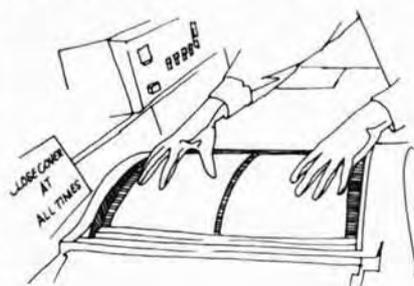
Don Shuster (4700), left, discusses oil well drilling tool with Congressman Harold Runnels (center) and Max Newsom (5724).

**CONSERVE**

SANDIA'S ENERGY AND RESOURCE CONSERVATION

## CONSERVE PAPER!

On the Xerox 7000, you can reduce and copy four pages onto one sheet of paper.



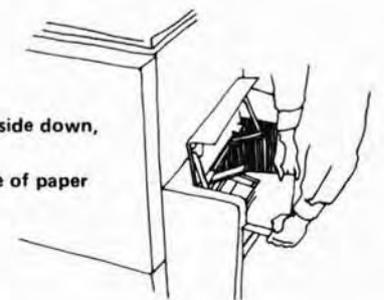
1. select reduction and number of copies
2. center pages

3. close cover
4. push START PRINT button
5. remove copies from hopper



6. turn copies over

7. insert copies in paper bin, print side down, do not change orientation
8. repeat procedure for second side of paper



The Xerox 7000s are located in 802 (rm 250), 836 (rm 225), 807 (breezeway), and 892 (rm 110 & rm 228). Reductions possible are 85%, 77%, 65%, and 61.5%.

Thanks to Shawkeet Hindi (3147).  
If you have an energy or resource saving idea, please drop a note to: CONSERVE, 3155.

# MILEPOSTS

LAB NEWS APRIL 1974



Clarence Himes — 3623



Oscar Goodwin — 3148 20



Fran Roelle — 9441 10



Henry Moleculeski — 1522 25



Gerald Wilson — 5625 10



Martha Burress — 1002 10



John Zimmerman — 1537 20



Norm Ollman - 9631 25



Dale Massey — 9411 25



Les Harris — 9441 15



Kyle Williams — 3646 20



Hugh Gilbert — 9343 15



Sam Mancuso — 4121 20



Roger Eaton — 5643 10



Charles Leonard — 8151 10



Marie Iverson — 4212

# Local Section Will Host IEEE Region Six Meet

The Albuquerque Section of IEEE is hosting the 1974 IEEE Region Six Conference, April 24-26 at the Hilton Inn. Region Six comprises the western half of the U.S., including Hawaii. Conference topics are optoelectronics and laser technology; a laser short course will be conducted concurrently. All papers to be presented were invited and include specific details of the author's most current work.

Cecil Land (5113) will present a paper, co-authored by Will Smith (also 5113), entitled "Electrooptic Ceramic Materials and Devices." Otmar Stuetzer, manager of Exploratory Measurements Department 2440, will be the banquet speaker on the evening of April 25. He will explore some generally accepted untruths and half-truths in his address "Fairy Tales in Science and Technology."

Sandians responsible for conference arrangements are: Roger Chaffin (2125),



WILL SMITH (5113), foreground, checks out laser test set-up while Roger Chaffin (2125) kibitzes. Both are preparing for the IEEE Region Six Conference being held in Albuquerque, April 24-26.

president of IEEE Albuquerque Section; Will Smith, local arrangements chairman; Sam Varnado (4733), registration chairman; Don Schueler (5113), exhibits; Jerry Fossum (2113), finances; Ed Graham (2113), laser shortcourse chairman; and Dwight Hall (2114), publicity.

# Speakers

- B.F. Estes and F.M. Morris (both 5221), "Reactor Kinetics: Pulse and Steady-State," TRIGA Owners Conference 3, Feb. 25-27, Albuquerque.
- J.M. Hueter (3131), "Evaluating Yourself," YWCA Job Clinic, Feb. 27, Albuquerque.
- R.W. Rohde (5832), "Coatings for Prevention of Stress Corrosion Cracking," Subwog 12A AVIS 936, Feb. 1974, SLA.
- H.R. Shelton (3132), "I'm OK, You're OK," Downtown Optimist Club, March 1.
- H.H. Patterson (1230), "Mexico and the Sea of Cortez," Duke City Civitan Club, March 5; SL Fed. Credit Union Board of Directors dinner, March 20; and Eldorado High school science survey class, March 25.
- O.L. Wright (4820), "The History of Sandia Base," Adult Fellowship Group, St. Paul's Methodist Church, March 5.
- B.W. Marshall (5717), "Solar Energy Research at Sandia," Air Quality Management class, UNM, March 6; and Duke City Civitan Club, March 19.
- T.F. Marker (6010), "The Invention Process," Los Altos Civitan Club, March 7.
- C.S. Johnson (9421), "A Nation in Quandry in a World of Crises," Los Altos Kiwanis Club, March 7.
- H.C. Monteith (9344), "Bridging the Gap Between the Humanities and Science," Albuquerque Academy science class, March 7; and "ESP Research in Russia, England and America," Manzano High school psychology class, March 26.
- D.M. Fenstermacher (2441), "Telescope Making," Eldorado High school science survey class, March 13.
- N.J. DeLollis (5813), "Metrication and International Standards," Eldorado High school science survey class, March 18 and 19.

## 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 AEO employees only
6. No commercial ads, please
7. Include name and organization
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

### MISCELLANEOUS

- 1-1/2 HP irrigation pump, electric, 110 or 220, \$90. Tobyas, 2253 Wilbur SW, 877-0354.
- MEDIUM SIZE DOGHOUSE, free; 14 watt/CH stereo amplifier, \$20. Jones, 298-6422.
- YOUNG RABBITS, \$2 ea. Schaefer, 281-3271.
- USED single garage door. Pino, 242-9553.
- GRANDFATHER CLOCK, solid walnut, 6'2" Westminster chimes, \$350; 21" color TV, \$150. Lutheran, 293-8364.
- CASSETTE, stereo, tape recorder & player, some tapes, \$50. Hodges, 298-9018.
- GERMAN-Shorthair pointer puppies, \$25 ea. Wright, 843-7147 or 299-5396.
- OVAL TABLE, 60x40, expands to 100", 6 chairs, buffet, 66x19, Founders, cost \$1140, sell for \$650. Laramore, 299-6941.
- SEARS 4-cycle Kenmore dishwasher, 1-1/2 yrs. old, \$125. Stichman, 293-6096.
- BIRCH kitchen cabinets, used, \$100. Lucero, 1020 Espejo NE, 299-7933.
- CAMERA, 35mm Olympus model 35RC, f2.8 lens, \$75. Church, 281-5215.
- NORGE auto. washer & gas dryer, \$110 pair. Dean, 296-3264 Sat. & Sun.
- GOLF CLUBS, left handed: 3, 5, 7, 9, irons, 1, 3 drivers, putter, bag, \$35. White, 296-3842.
- NAVAJO RUGS, \$25 - \$140, various sizes & designs. Luna, 298-7337 after 6.

- SEARS Easi-Load motorized movie editor for Super 8 film, \$12; Conn B flat trumpet, \$40. Hudson, 296-3484.
- ONE PAIR white, fully lined drapes, cleaned, 49W x 44L, \$7. Gatto, 298-8493 after 5.
- PIANO, Wurlitzer spinet, 88 keyboard, walnut, \$400. Snyder, 268-0679.
- 26" SCHWINN boy's bike; B&W TV, AM/FM radio phono console. Porter, 298-3623.
- GENUINE Pueblo saddle, \$195; horse included. Patterson, 243-2475.
- OLD silver & bluegreen turquoise squash blossom necklace w/matching bracelet, Navajo handcrafted. Sanchez, 344-6931.
- TUB ENCLOSURE: 2 sliding doors w/all hardware, ready to install, \$20. Cockelreas, 256-7570.
- 50-GAL. electric hot water heater, \$25; sliding metal doors for 6' opening w/track, \$17. Cockelreas, 256-7570.
- DISHWASHER, Waste King, built-in, 2-cycle, white; garbage disposal, both for \$60. Kaye, 293-0499.
- 16' FIBERGLASS canoe kit, \$89.50. Baxter, 1610 Bayeta Lane NW, 344-7601.
- WESTERN saddle, 15" seat, \$125. Clem, 296-5204.
- SHOP MANUAL, '66 Ford-Mercury, \$2.50. Roberts, 255-9527.
- CAMPER TIRES & WHEELS, 7000 miles, 12.00x16.5, 10 PR, Uniroyals, half price, \$150. Caudle, 298-9120.
- ITT port. AM/FM stereo radio, walnut case, 3 speakers, 2 detachable, AC power supply, \$65, cost \$200 new. Schkade, 293-7453.
- YOUNG RABBITS; spayed declawed 1-1/2-yr.-old cat, black & white. Hickman, 298-3804.
- 2 ANTIQUE wheels w/tubes for 17" w/6 holes; sailboat plans for 18' Seacat & 16' Kitty Cat catamarans, w/50 pieces pre-cut plywood parts, best offer. Harris, 255-6577.

- DELTA COMPUTER tachometer, zero to 8000 RPM, calibrated using 110V 60 cycle line, \$15. Stuart, 299-9190.
- DISHWASHER, convert. harvest gold, wood top; kitchen table; manual Royal typewriter; bedspreads; drapes; hair dryer; dishes; misc. items. Baker, 298-3341 after 5.
- SCREEN DOOR, alum., 36" wide, prehung, \$5. Joseph, 299-6989.
- CRAFTSMAN rotary mower, 20" cut, 9 cu. in., \$25. Handyman jack, model No. 30, \$12. Burnside, 256-7249.
- ENGLISH Springer spaniel, AKC reg., liver & white male. Barth, 345-0172.
- BOY'S SPORT COATS, sizes 12, 14, & 20 slim, clean. Jeffers, 299-7020.
- SPEAKERS, Marantz Imperial 7, 12" woofer, pair \$300; Gibson mandolin, A-50 w/case, \$325; lefthand golf clubs, bag, cart, \$80. Perryman, 294-7040.
- BRICK, patio, 711, new, \$20, you haul. 12117 Apache NE. Widdows, 298-7153.
- PIANO w/stool, \$300; five-piece bedroom suite, walnut twin bed, \$75. Padilla, 898-0379.
- '56 331 HEMI engine. Munden, 296-6724.

### TRANSPORTATION

- HONDA Trail 90, '72, 3000 miles, adult driven. Greenwood, 298-5268.
- '69 INTERNATIONAL Travelall, 4-wd, AT, AC, PS, PB, radials, extra tank. Rea, 299-9315.
- '64 DODGE PU, 3-spd. Positraction, 6-cyl., w/camper shell, 51,000 miles, new paint. Peabody, 296-6239.
- 3-WHEEL BICYCLE, 3-spd. w/front hand brake and coaster brake, basket on back modified to ride small children, \$75. Hadley, 294-7634.
- '68 MERCEDES BENZ, 220 diesel. Reyelts, 296-5654 after 5.
- SCHWINN 3-spd. bike, 26" man's, thorn-resistant tubes,

- \$45. Laursen, 266-3190.
- GIRL'S 20" bicycles, two, high rise handle bars, banana seat, reflector pedals, one w/chrome fenders, \$40 ea. or both for \$70. Stuart, 265-7315.
- SCHWINN 21" boy's 10-spd. bicycle, Varsity model, new tires, \$70. Vogel, 256-0975.
- '71 YAMAHA DT1 250 MX, lots of extras. Botin, 294-4076.
- '70 DATSUN convert., model 1600, book value \$1575, best offer over \$1400 will take. O'Dowd, 299-1789.
- '64 FORD XL, 390 engine, 2-dr., \$200. Munden, 9533 Claremont NE, 296-6724.
- '69 PONTIAC Tempest, V8, 238 Cu. in., 2-dr. HT, air, PS, PB, etc., low mileage, \$1195 or best offer. Galbraith, 266-3001.
- '71 VW Super Beetle, std. trans., low mileage, below book, \$1795. Doro, 299-6505.
- YAMAHA 360 MX, 207-lb., \$845. Watterberg, 294-6759.
- '68 DODGE Charger, 383 engine, AC, PB, PS, 58,000 miles, \$700. Hendrix, 299-8872.
- 17' BOAT, Soonercraft trihull, open bow, 85hp Evinrude, Dilly trailer, \$2500; belt exerciser, \$45. Chandler, 296-3323.

### REAL ESTATE

- 2 LOTS w/business frontage & 2 rentals on back, \$3000 equity, 203 Isleta SW; '70 Chevelle windshield, \$35; mini-bike, \$50. Sanchez, 877-0326 after 5.
- 4-BDR., 2-1/2 baths, storage, extras, country but close, 2.16 acres, appraised \$66,500. Barker, 299-1483.
- RIVERFRONT PROPERTY, 200 ft. on San Juan 15 miles below Pagosa Springs, 1-1/2 acres, very accessible, \$4200. Robertson, 296-4613.

### FOR RENT

- 2-BDR. unfurnished apartment, water paid, \$125/mo. plus cleaning deposit, Penn. NE.

Heidrich, 268-1391 after 5.

### WANTED

- SMALL TRAILER HOUSE. Pino, 242-9553.
- FLUTE; cement mixer. Lutheran, 293-8364.
- WILL BUY 410 gauge double barrel side-by-side shotgun, cash. O'Bryant, 268-9049.
- BABY SITTING your home, NE Heights, during summer school vacation, 1 or 2 children, will fix lunch, references. Call Gail, 298-6527.
- SHOP MANUAL for Ambassador, 1969, 242 engine. Stuart, 299-9190.
- BORWARD ISABELLA TS for parts. Norwood, 262-0073.
- TRADE '71 Royal Irons for Wilson Staff, x-31's or 1200's, comparable condition. Johnson, 298-1011.
- THREE-passenger-seat for late model Ford van. Johnson, 298-4553.
- DOLLS that can be repaired and donated to a worthy cause. Nissen, 821-3685 after 3:30.
- CARTOP luggage carrier; carpet, 13'x15'; lg. mirror; twin beds; small hassocks. Chandler, 296-3323.
- HOUSING for faculty summer hire, 4 adults, 2-bdrs. for 6-weeks beginning period July 5-15. Touryan, 265-2284.

### LOST AND FOUND

- LOST — Ford car keys, lady's trifocals in gold case, man's black rim Polaroid sun glasses, man's yellow windbreaker, fur lined black glove, glasses in black leather case, small piece from copper & silver necklace. LOST AND FOUND, Bldg. 832, tel. 264-3441.
- FOUND — Rx bi-focals w/grey frames & black case. LOST & FOUND, Bldg. 832, tel. 264-3441.

<p>FRIDAY 12 HAPPY HOUR SEAFOOD BUFFET Adults ..... \$2.75 Under 12 ..... 1.75 BOB BANKS TRIO Lounge ..... Yolanda</p>	<p>SATURDAY 13 EASTER EGG ROLL (See Below) Free to Members SOUL SESSION 8:30 — 12:30 ERNIE &amp; THE SAINTS</p>
<p>19 HAPPY HOUR BBQ CHICKEN Adults ..... \$2.50 Under 12 ..... 1.50 FRANK CHEWIWIE On Stage ..... Denny</p>	<p>20 LAS VEGAS NIGHT (See Below) Members ..... \$1.00 Guests ..... 2.00  Dress Western</p>

**GAMBOL** — And frolic at Las Vegas Night on the 20th. Games of chance of all kinds begin at 7:30, dancing at 8. Dress Western, trade a dollar (\$2 for guests) for a bunch of gambling scrip, and have a great time.

**ONE EGGROLL** — Toddlers and tots (6 and under) should show up at the Club tomorrow morning at 9:30 or so for the annual Easter egg roll; competition is by age groups. A giant egg hunt climaxes the event. Prizes for winners in all categories. It's strictly BYOB (bring your own basket, or other egg toter).

**DICKENS** — Movie classic, *Great Expectations*, based on Charley's novel. It's a Pip! Voted one of the best movies of the year.\* Plus a Charlie Chaplin short and a Betty Boop cartoon. Free to members at 7:30 on the 17th. (\*1947)

**PROMENADE** — C-Club's second square dance is at 7:30 on the 24th. Expert or beginner, it's fun. Bob Berry's the caller. Call



ROLL YOUR OWN, or someone else's. Buffy Chavez (4812) and Robert Vargas (3647) practice before heading for Las Vegas (Night).

Jo Merillat at 242-4873 or Marge Lovato at 299-1375 for more info on this one.

**AUSTRIA** — Two weeks from tonight is the drawing for a free trip — you're eligible if you're signed up by then. (Final deadline is May 1.) Spend \$417 (double) in April, and spend August 14-22 in a picturesque Alpine village.

**MTWTh** — Happy Hour every Monday through Thursday from 4:30 to 6:30. Nice prices, free snacks.

**UNM Preregistration  
Deadline for Fall  
Classes Is April 22**

Pre-registration deadline for fall classes at UNM is 5 p.m. on Friday, April 26. Class schedules will be available by Friday the 19th in Education & Training Division 3131, Bldg. 632, Rm. 7. Dotty Mohart, ext. 5957, has further details.

**Spring Jamboree Set  
At A. Montoya School**

Tom Moody (2433) is promoting an April 20 and 21 spring jamboree for the PTA at A. Montoya school in Tijeras Canyon (near intersection with Rt. 14 south). Tom says there will be balloon rides, arts and crafts booths, a flea market, sweet shop, auction, and cake contest. And a raffle for 150 pounds of meat, species unidentified. The auction starts with a pickup truck. Shapes up as a pleasant afternoon and A. Montoya has many poor students, so try to stop by.

**Waste Disposal Talk April 16**

Bill Bishop of Reactor Safety and Waste Management Division 1721 will present a talk on "Waste Disposal" at UNM on April 16. Bill is participating in the Nuclear Energy portion of UNM's Spring Research Symposia, sponsored by the general faculty and its research policy committee.

