



NEW THERMAL BATTERY invented by Ron Carlsten, left, and Don Nissen (both 1913) was patented recently by the AEC. The device uses an electrolyte which does not melt during the output phase.

New Thermal Battery Patented

A patent was awarded recently to the AEC for a thermal battery invented by Don Nissen and Ron Carlsten of Exploratory Power Supplies Division 1913.

The new design uses standard thermal battery pellet technology — pellets of electrolyte, anode and cathode are stacked within a container — but the difference is in the material used for the electrolyte. In the prototype device, silver iodide was the electrolyte. It differs from conventional materials in that it remains solid during the output phase.

In most thermal batteries, the electrolyte melts and becomes a liquid during output, when the temperature of the battery ranges from 500 to 600°C. The new battery operates

at lower temperatures — from 150 to 300°C. Because the electrolyte remains solid, less malformation from extreme environmental factors is experienced. In addition, it is a simpler chemical and electrochemical system with less interaction between components. Silver is used for the anode, rubidium triiodide for the cathode. Output is comparable to other thermal batteries.

Nissen has been at Sandia six years involved in power supplies development. He earned a PhD in physical chemistry from Oregon State University in 1964.

Carlsten has been at the Laboratories six and a half years. He holds an AAS degree from DeVry Tech and is scheduled to graduate from UNM with a BS in EE in May.

LAB NEWS

VOL. 25, NO. 6

MARCH 23, 1973

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

Hot Air Blast Makes Better PCB's

A machine that levels solder on printed circuit boards (PCBs) with a blast of heated air instead of with hot liquid has been developed by T.A. Allen and Bob Sylvester of Composites Process Development Division 7123.

The new machine leaves a thicker layer of solder on the boards, produces boards faster and without repeated thermal shocks, removes excess solder from through-holes efficiently, and does not emit objectionable fumes.

PCBs are typically covered with flux and dipped in solder or hot liquid to provide a fused protective coating for the thin copper circuit paths and to provide a metallic layer to which components, such as transistors, can subsequently be soldered.

However, this process leaves an uneven layer of solder on the board, and excess solder may plug the through-holes, which connect the two sides of a board.

Heretofore, the solder has been leveled — and the excess removed — by inserting the PCB into a machine which sprays the board with a hot solution of polyglycol. Repeated sprayings are necessary to produce a uniform coating and clear the holes.

The sprayings — at least 12 are required — take time and subject the PCB to repeated thermal shocks. In addition, the spray does not always remove excess solder from the holes and does not leave a layer of solder thick enough (at least .0003-inch) to meet military specifications for PCBs.

Further, liquid solder levelers do not permit one-step implementation of the relatively new etched pattern-fused solder technique. A separate solder pot is required to complete this process, which is being increasingly used because of its lower cost.

The new hot gas leveler solves these problems, producing completed PCBs of any type with a single pass between a pair of air knives (slots) positioned above the solder pot. The slots are about .20-inch wide, 7 inches

(Continued on Page Four)



BOB SYLVESTER AND T.A. ALLEN (both 7123) examine printed circuit board emerging from machine they've developed that levels solder on PCB with blast of hot air.

Afterthoughts

There's a Spanish song with the poignant line "Adios muchachos, companeros de mi vida..." that seems appropriate to this day when so many Sandians are leaving. The line translates, roughly, to "so long, my lifelong friends," and if you'll look for a moment at our group picture (centerfold) of persons retiring, you'll see many whom you've known, if not for a lifetime, certainly for many years. And add to these the several hundred who are leaving but are not pictured.

Most people don't get emotionally worked up about their place of employment because, however benign, the company remains an impersonal thing, not really loveable. But one gratification, for me at least, in my many years at the Labs has been the people associations. I concluded some time ago that Sandians as a group are great. They possess a personal and intellectual élan that's turned Sandia into a first rate laboratory and helped in the city's development.

Are you leaving? Goodbye. It's been a pleasure to have worked with you.

* * *

Graciousness, Alive & Well--Bill Garcia recounts an incident that illustrates what I've tried to say above. Counseling sixty-plus Florencio who is retiring and who has a little language problem, Bill presented him with the wallet engraved with his name which the Labs gives to retirees. Florencio examined it with grave pleasure, then stated, in Spanish, "I wish that I could give Sandia a present in return to show my appreciation." That kind of graciousness is a rare commodity.

* * *

A Thought For The Day--"I am by no means sure that I've ever thought, and I'm not certain that I wish to; looking about me I see thinkers, and it does not appear that they are any wiser or better or happier than I." A. Edward Newton *js

Take Note

Pete Petersen (9124) calls with a report that Sandia motorists will find gratifying. A non-employee recently made a point of telling Pete how courteous Sandia drivers are. In the evening she enters Eubank from Copper, which could be tough because of the solid stream of traffic, but the Sandians always let her in. In her words, the drivers are "universally courteous."

LAB NEWS

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&
don graham ass't. editor

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

in livermore lorena schneider does all

Events Calendar

- March 23-26** — Civic Light Opera, "Man of La Mancha," 8:15 p.m., Popejoy Hall.
- March 25** — N.M. Mt. Club, Painted Cave near Cochiti, Gulf Mart, 8 a.m.
- March 25** — Sandia Bike Ass'n., meet at Tramway and Montgomery NE at 10 a.m. for bike tour to Alameda.
- March 27-29** — Albuquerque Little Theatre, "My Daughter, Your Son," 8 p.m.
- March 28** — Decormier (formerly Bellefonte) Folk Singers, 8:15 p.m., Popejoy Hall.
- March 29** — Great Plays on Film: "The Caretaker" 7:30 p.m., Popejoy Hall.
- March 30** — Films: Museum Without Walls Series, "The Cubist Epoch" and "Germany — Dada," 7:30 p.m., Popejoy Hall.
- March 30** — Concert, "The Carpenters," 8 p.m., UNM Arena.
- March 31** — N.M. Mt. Club, Pottery Mound, (near Los Lunas), W. Central K-Mart, 8:30 a.m.
- April 1** — April Fools Century, 100-mile bike ride to be completed in 12 hours, to Belen and back, entry details at Pedal 'N Spoke bike shop.
- April 1** — Albuquerque Symphony Orchestra Series for Young People, 3 p.m., Popejoy Hall.
- Through April 8** — Art Museum, Fine Arts Center, UNM, collection of 19th and 20th Century photographs.
- Through April 15** — Art Museum, Fine Arts Center, UNM, Eliot Porter show — color and black and white photographs.
- Through May 27** — Museum of Albuquerque, Photography of the New Mexico Territory.

Sympathy

- To Pat Proulx (9473) on the death of his mother-in-law in Las Vegas, Feb. 19.
- To Lyle Hake (9471) and Lewis Hake (1324) on the death of their mother in El Cajon, Calif., March 10.
- To Conrad Roeschke (7453) on the death of his mother in Cedar Crest, March 3.



ENGLISH TRIALS — a kind of trail bike riding where the terrain is almost impassable, speed and endurance don't count, balance is everything (put your foot down, lose a point). Wayne Ebaugh (9216) demonstrates on Jerry Brooks' (7145) bike. Call either for more information.



Swisher



Sharp

LIVERMORE NEWS

VOL. 25, NO. 6

LIVERMORE LABORATORIES

MARCH 23, 1973

Jim Swisher and Don Sharp Awarded Tantalum Reclamation Process Patent

Jim Swisher of Metallurgy Division II 8313 and Don Sharp of Hybrid Microcircuit Division 1436 are co-inventors of a new process for reclaiming oxygen-free tantalum powder from reject capacitors. A patent for the invention has been assigned to Bell Telephone Laboratories and Western Electric Company in the names of Messrs. Swisher, Sharp, W.M. Baldwin (WE-Winston-Salem, N.C.) and E.O. Fuchs (BTL-Murray Hill, N.J.). The development work was done while Jim was at BTL-Murray Hill and Don was at the Western Electric Research Center in Princeton, N.J.

The most critical step in the process is the removal of oxygen from sintered and anodized tantalum powder by treatment in a bath of liquid calcium. Laboratory experiments were followed by full-scale operations conducted by Western Electric engineers at the Winston-Salem plant, where the capacitors are manufactured. Reclaimed

powders can be made into high quality capacitors at a cost that is not considered prohibitive.

This is Jim's second patent. He has been awarded a patent for the development of a bronze-iron magnetic alloy of high strength, and he has two others pending. One is for development of a copper-zirconium oxide alloy for high electrical conductivity and high strength applications; the other involves polymer coating of fine powders for magnetic recording applications.

Don has seven patents; his two most recent were awarded since coming to Sandia a year and a half ago. One involved an anodizable cermet film component and its manufacture, the other a manufacturing method for a non-reflecting metal photomask for precision photolithography. He, too, has several patents pending.

Congratulations

Mr. and Mrs. Fred Perez (8433), a daughter, Mary Elizabeth, Jan. 29.

Underground Link or The SLL-LLL Connection

Power to the Laboratories — sounds like the rallying call of a radical group. But it's really just a new line at Livermore, in fact a 13.8 kv power line now completed between LLL and Sandia. And, like some of the radicals who have left the scene and gone underground, our new feeder line has done just that, too.

More reliable electric power was needed because of expanded use of computer systems and the additional equipment under continuous operation during the past few years.

Dick Wilhite (8251), project engineer for the new power service, says that early winter traditionally brings many small outages and fluctuations as rains wash the dust off insulators. "These interruptions are a nuisance because all the starters for the supply fans and other air conditioning equipment in each building must be restarted by hand.

"But where outages really cause problems," he continues, "is in the computer center. They can cause loss of computer information, and even after the power is restored there remain other problems."

Underground lines are more reliable, but when they do fail Dick observes that more time is required to identify and correct the problem. An alternate feeder line has also been installed for use in the event of trouble with the regular line.

Now, with power billed from one point (LLL), there will be a cost savings because of the larger quantity discount.

Take Note

Don Wesenberg (8352) won first place trophy in the Fourth Annual Juan Doyen Memorial Chess Tournament completed recently at Sandia/Livermore after some six months of noontime play. Ray Ng (also 8352) took the second place trophy and Dick Brown (8137) was presented the third place chess set. Some 20 employees participated in the tournament which was played on a round robin basis. Al Reichmuth (8431) served as tournament coordinator.

* * * *

Jerry Jones (8164) has been elected president of ACCORD (A Coordinating Committee to Overcome Racial Division). The committee was formed in Livermore in 1968 to promote racial understanding and serves as a forum for activities relating to minority housing, community programs and tutoring. It also sponsors communication forums for other local groups interested in problems of the poor and minorities. Jerry is former chairman of the ACCORD education committee.

Sympathy

To Tim Marino (8421), on the death of his mother-in-law in Livermore, March 7.

To Ken Finders (8254) on the death of his father-in-law in Oelwein, Iowa, Feb. 1.

To Art Hull (8343) on the death of his brother near Auburn, Calif., Feb. 4.

Authors

Randall German (8313) and G.R. St. Pierre (Ohio State University), "The High Temperature Thermodynamic Properties of Ni-Ti Alloys," METALLURGICAL TRANSACTIONS, Vol. 3, p. 2819-23.

Al West (8313), "Scattering of Diatomic and Polyatomic Molecules from the (100) Crystal Face of Platinum," JOURNAL OF CHEMICAL PHYSICS, Dec. 1972.

Ray Mar (8314), "High-Temperature Thermal Analysis of High Boron Alloys Using Automatic Optical Pyrometry," THERMOCHIMICA ACTA, Vol. 4, p. 367-76.



LIVERMORE RETIREES — top row (l to r): Bill Funk (8230), Jim Wimborough (8161), T.K. O'Kelley (8263), Carl Bachmann (8168), John Miller (8264), Paul Koetting (8432); center row: Jerry Ward (8412), Ed Healey (8183), John Gumm (8178), Hugh Odell (8231), Leo Adams (8235); front row: Axel Peterson (8257), Steve Corder (8264), Eddie Berry (8261), Bud Pearson (8257), Joan Maffey (8261). Retirees not pictured: John Balaban (8168), Dora Bowers (8256), Kathy Callow (8421), Bill Carter (8432), Jack Curran (8161), Jim Curtin (8335), Russ Hutchison (8182), Herb Johnston (8342), Mike Lettrich (8264), Ken Loughlin (8421), Orval Wallen (8314), Herman Wink (8257).

Continued from Page One

Better Way to Build PCB's

long, and slightly offset so that they do not blow directly into each other.

Hot air flowing from the knives at about 50 psi levels the solder, clears the holes, yet leaves a layer of solder thick enough to meet military specifications for PCBs.

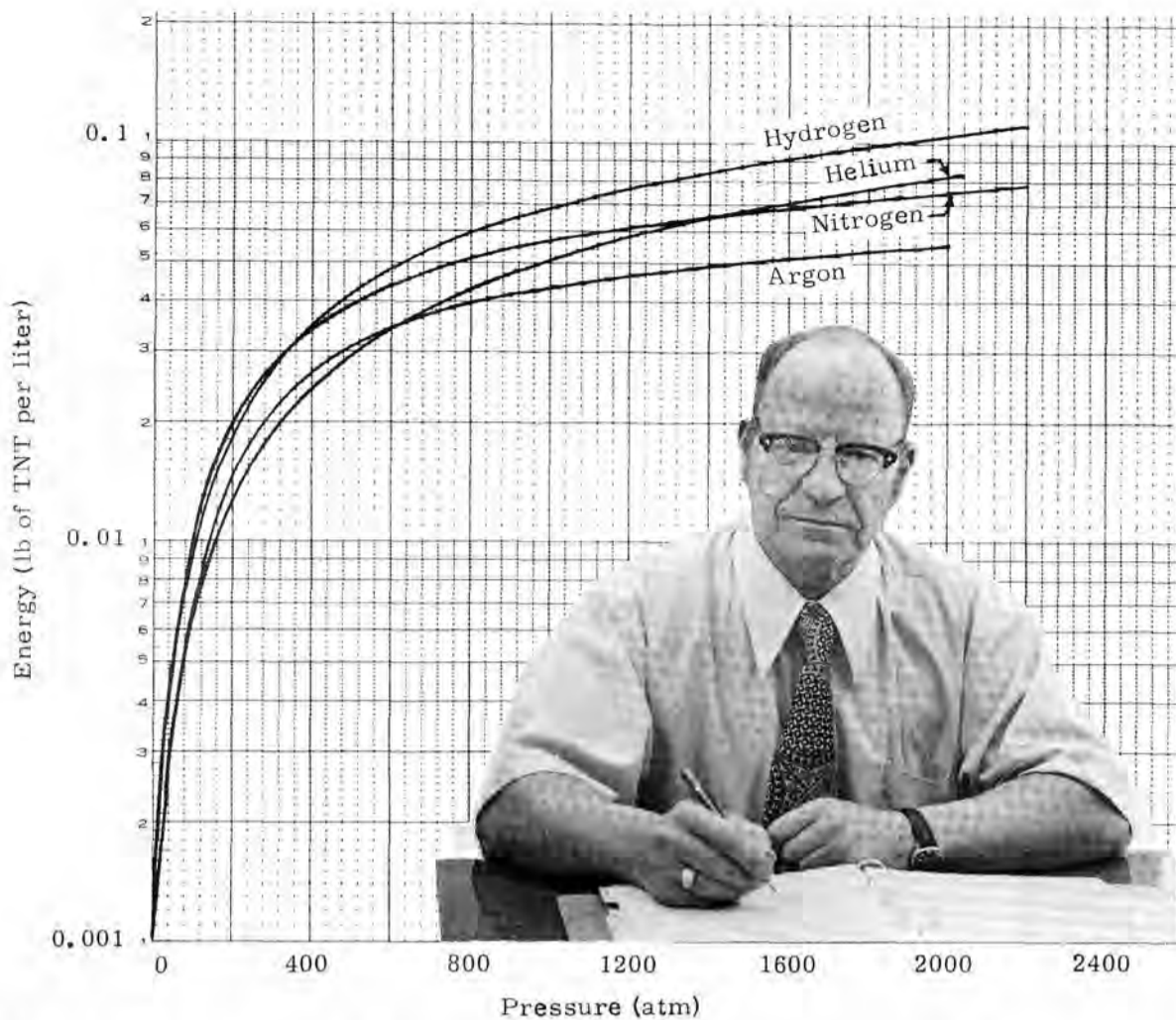
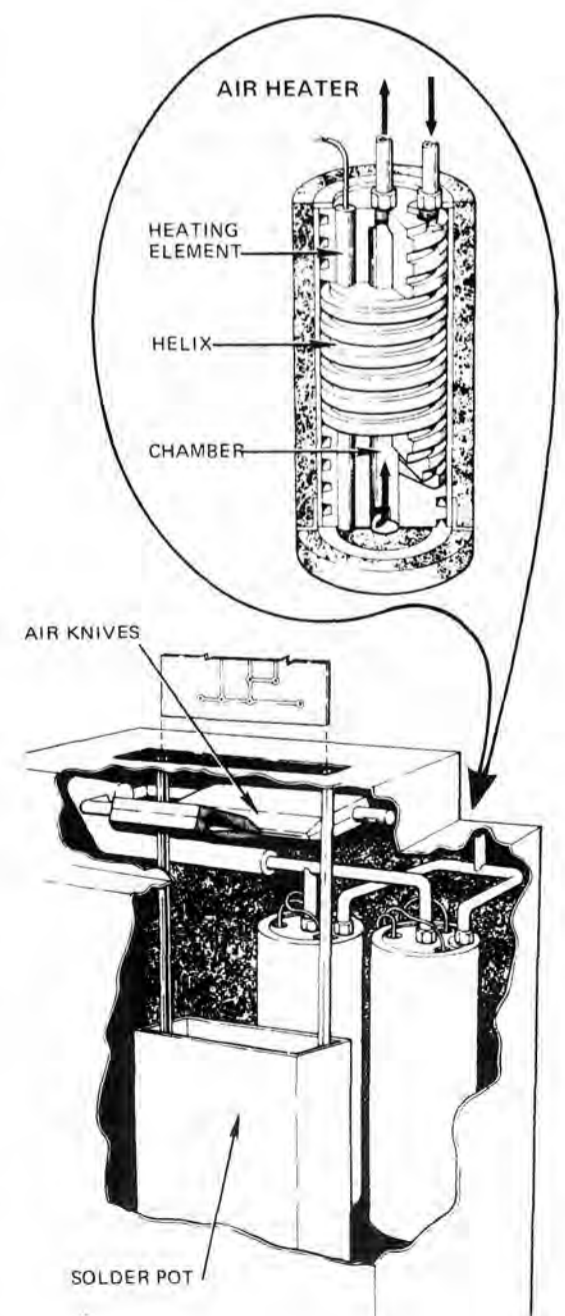
Although ordinary compressed air is used in the machine, it does not cause oxidation, apparently because the blast of air drives a fine wave of flux across the solder in advance of the air as the board is withdrawn from the pot.

The board is directed into the pot by a pair of guideways, located nine inches apart. The guideways and air knives could be adjusted to handle boards of sizes different from the 9 x 12-inch boards standard at Sandia.

A continuous flow of hot air — adjustable from about 375°F to more than 600°F — is provided by a pair of unique heaters made from two 5 x 15-inch steel billets. Three 2½-kilowatt electrical heating elements are embedded in each of the heavily insulated billets.

The new machine should be less expensive to produce than the liquid leveler since it does not contain a high temperature pump and should cost less to install because it requires no special venting. Operating costs should be reduced by the fact that the new machine uses air instead of liquid, thus needs no periodic recharging.

SOLDER LEVELER



LES LAMKIN (7100), retiring today, is prime mover behind Sandia's new pressure safety program. The graph is part of the Pressure Safety Practices Manual which is, in turn, an integral part of the program.

How To Know What You Need To Know About Pressure Safety

An R & D lab like Sandia includes among its apparatuses a vast collection of pressure and vacuum vessels and systems, each one a potential source of some degree of mayhem. The potential is being reduced significantly through a new pressure safety program, headed by Les Lamkin (7100).

The program is designed to: 1) increase awareness of the hazards associated with pressure systems; 2) guide the people engaged in operation of pressure systems and supervision of pressure work; and 3) provide a core of knowledgeable people who can monitor all phases of pressure work.

The program includes continued orientation and training lectures for all Sandians involved with pressure systems. It also includes a cadre of a hundred or so Pressure Advisors who implement and monitor the pressure safety program for a specified area of activity. All are available for consultation or actual installation work.

A recently completed portion of the program is SLA-73-0065, also known as "Pressure Safety Practices Manual." It's a good reference — well-indexed, essentially self-contained (seldom simply refers the user to another source), definitive. It's much more than a listing of Thou Shalts and Thou Shalt Nots — the rules are there all right, in capital letters, but the rationale underlying the rules is there too. It's less a "Do this because we say so" and more a "Do this because here's what could happen if you don't" situation. The manual discusses the hazards involved with pressure work; provides definitions which eliminate ambiguous terms; clarifies design requirements; shows some of the basic calculations on which the requirements and rules are based; tells how and when to make out a Pressure Safety Analysis Report (PSAR); and then lists, by type of container, the applicable safe practices to be followed.

Rather an impressive document, all in all.

In addition to completing the manual, the pressure safety committee is establishing a certified stock of pressure equipment to reduce the possibility of random modifications to a system. Proper adaptors for pressure regulators are now available. And a pressure lab is being set up. The lab will be able to proof test most pressure vessels and systems; inspect them to assure continued integrity; and test, certify, and calibrate pressure fittings, tubing, relief devices, and regulators.

Any safety program depends, in the long run, on people, not on equipment or labs or manuals. Sandia's pressure safety people, the committee itself and the pressure advisors scattered throughout user organizations, recognize and accept the challenge of keeping pressure where it belongs. • bh

Secretarial Workshop Scheduled April 28

Ann Michele (4500), president of the Albuquerque chapter of the National Secretaries Association, announces the group's annual workshop, to be held on Saturday, April 28, from 8 a.m. to 3 p.m. at the Airport Marina Hotel. Theme of the workshop is Progress Through Performance.

Keynote speaker is Dr. Allien Russon, Professor of Management and Business Education at the University of Utah. Among those in a panel discussion on human relations is Herb Pitts (100).

Registration for the workshop closes April 21. Additional openings may become available, but this will not be known until late next week.



Albq Citizens vs Albq Air

(Part Four)

Readers of the first three segments of this series all know that Albuquerque air's arch enemy is the automobile owner. They have learned The Real Truth About Thermal Inversions. They can hold a Sunday School class or a cocktail party spellbound with a "These are the times that try men's lungs" oration. They write anti-pollution letters, signed Concerned Citizen, to both underground and aboveground newspapers.

All of which isn't hard to believe — we're surrounded by zealots of one kind/denomination/flavor or another all the time, everywhere.

But some of those concerned citizens are different: they're not simply evidencing their ecological education or posing as professionals on pollutants. They're actually doing something positive. They're riding

bikes to work; they're walking to the drugstore for their prescriptions; they're taking a bus to the shopping center; or maybe they're commuting by car pool. Some have discovered they don't need that second car; some have learned how much pure fun a bike (or cycle) can be — at least when the weather cooperates.

All share a very real concern — a concern for Albuquerque's air. And a willingness to make a few sacrifices, suffer a few inconveniences, be a bit less independent for the sake of less-polluted air.

The rest of us — the lone rangers — could, with some logic, line up to shake their hands and say "Thanks — thanks for leaving your car at home so that I can breathe a little better, and a little longer."

Far better though to emulate than to appreciate. • bh



"I AM Don Quixote, the Man of La Mancha . . . That's not really true. I'm really Gene Ives, a man of Exploratory Systems Division 1226, but that's hard to sing. I'm playing the lead in Albuquerque Civic Light Opera's Man of La Mancha at Popejoy tonight through March 26. Come, enjoy."

A Terminal Case

"Sitting There in the Kitchen . . .

. . . I got my PhD. It certainly wasn't a luxury kitchen — it was in barracks housing at the University — but it had one feature seldom found even in the all-electric ones: a terminal with access to the University's computer system."

Dave Caskey (5424) didn't spend all his educational leave-of-absence in the kitchen. He did spend September 1969 through June 1972 at the University of Texas at Austin, the final two years of which were under Sandia's Doctoral Study Program. And he did do much of the work on his dissertation in the Caskey kitchen.

His dissertation deals with computer recognition of hand-printed characters. It's an area calling for frequent computer access. Most graduates in computer science (or, like Dave, in an inter-disciplinary program sponsored by the various engineering schools and the computer people) would have resigned themselves to foregoing family life for hours of sitting around the Computer Center taking turns at a terminal talking to a time-sharing CDC 6600 and 6400.

Not Dave. In December 1971 he located a rebuilt CRT (cathode ray tube) input/output device and bought it. "And then I had the problem of convincing an incredulous delivery man that a terminal doesn't really mind living in a \$35 a month student apartment. He finally believed me enough to help me install it there in the kitchen next to the washing machine — which, it turned out, garbled my input at least once per wash load."

The terminal talked to the computer by way of an acoustic coupler on the telephone. So it was either forego phone calls for four or five hours a day or get another phone put in. "The phone installer was a bit more blasé than the delivery man," says Dave, "at least until he realized he was installing a separate phone right next to the existing one. He had to run a new line off the pole outside — no one had even conceived of any student

needing two separate phone lines."

With all the comforts of home — including wife Beth and daughter Laura — around him, Dave finished his dissertation in June rather than the anticipated September. Since he didn't have to wait his turn to use a terminal, he was able to get a great deal done.

Usually he spent days rewriting yesterday's output (picked up from the printer at the Computer Center) into today's input. He'd man his terminal after 10 p.m. when the Center closed down and the computer wasn't so busy. And no one was using the washing machine. • bh



A RE-CREATION of dissertation days when Dave Caskey communicated by phone line with a University of Texas computer from his kitchen in student housing. He bought this rebuilt terminal while on educational leave.

Retiring



Retirees (As of March 31)

Almon Alberts (7611), Helen Allen (7542), Earle Anderson (9323), Loran Anderson (1523), Berniece Andrews (4154), Augustine Apodaca (4512), Prospero Armijo (7144), Alice Arrington (7542), Sol Azouz (7131).

Kurt Baars (4151), Gabriel Baca (4623), Vernon Baker (9312), William Baldwin (7145), Warren Ballard (1432), Walter Barbier (1323), Frank Batchelor (7511), Bernice Beeson (3302), Burton Bell (9352).

Violet Bernard (3521), M.F. Bernhard (5621), Harold Bigley (3520), James Birchfield (6021), Marie Blythe (3111), Herbert Bowen (9322), Joseph Brooks (9353), Arthur Brown (7145), Arvin Brown (7422).

Roy Buckner (5165), Howard Burgess (7511), Raymond Butler (1642), Aubrey Butts (4511), Ralph Calvert (1715), Charles Campbell (4000), Lewis Carl (7144), Arthur Cary (9473), John Cavanaugh (4154).

George Chaffee (7151), Lloyd Chapman (4518), Alfredo Chavez (4515), Herman Chaves (7145), David Chavez (4611), Eduardo Chavez (4622), Fidel Chavez (7123), Joe Chavira (4623), John Church (7145), Harry Clay (4514).

Elinor Coberly (3232), Hubert Cole (7432), Leroy Cole (9311), John Colwell (9224), Dale Cone (3513), Sarah Copeland (1612), Chester Corbin (7121), Leslie Cox (7121), Wynne Cox (3148), Earl Craven (4543), Robert Crompton (3520).

Henry Dancy (4338), Edward Darnell (7111), Frank Dausses (3132), Chenault Davison (4338), Donald De Herder (4337), James Deakin (9473), Samuel Dehaan (7631), Marshall Denish (4553), Lee Denton (7415), Livinus Desmet (4513), Lyle Diamond (1526).

Robert Dill (7150), Robert Dineen (1336), Dennis Doherty (7122), Eugene Drake (4543), Carl Drew (5533), George Duda (7633), Edith Duffy (7412), Dora Dyer (6021).

Doomas Easton (4513), Chester Eaves (3520), Rex Eaves (3520), Harry Evans (3513), Roy Ewing (7655), Frances Fawver (5300), Frank Feery (7414), George Felzman (4361), Alfred Fields (1430).

Donald Fifield (9441), Leon Filvin (7614), Donna Foor (3231), Kenneth Fortman (9334), Donald Fossum (3132), Hilman Frock (3520), Joe Fulmer (4513), John Fuqua (9132).

John Garcia (7131), Luis Garcia (4513), Oracio Garcia (4515), Olivia Geffe (4600), Harry Gelwicks (4514), Helen Gelwicks (3521), Ronald George (4513), Raymond Glass (9132), Leonard Glover (4513).

Raymond Goddard (7131), Nazario Gonzales (4622), Mary Goolsby (7542), Noble Gruenoch (7411), John Gustafson (7511), Evelyn Hackley (1612), Rose Hainlen (4152), Lee Hancock (3500), Robert Hamilton (9310), Martin Hansen (7134), Roy Hansen (7122).

John Harner (9353), George Hawley (7414), Everett Hayes (1811), James Hay (7144), Edward Heath (9312), Robert Heck (7512), Omar Heins (4542), Felix Hendren (7121), Leigh Hendricks (5424), Robert Hendricks (7415).

Neile Hensinger (4541), Charles Herrmann (7542), P.L. Higginbotham (1832), Frank Himebrook (1331), Genevieve Hines (7654), John Hobart (7113), Lorenzo Holcomb (4611), Ralph Holland (4518), Glenn Holmes (7512), Harold Howard (1313).

Val Hruska (1220), Millicent Hulgán (7633), Lloyd Hungate (3313), G.L. Hutchinson (4614), Calvin Jackson (3520),

Cecil Johnson (7651), Edward Johnson (5600), Noble Johnson (3163), Andrew Johnson (1590), Roger Johnson (7145).

James Jordan (1522), Johnson Jordan (7121), T.J. Jorgensen (4374), Charles Kaspar (4552), Woodrow Key (7431), Frank Kite (5627), Robert Knapp (1830), Les Lamkin (7100), John Lannon (9422), Phil Lapoint (9331).

John Larson (1611), Robert Lemm (4620), Harry Lindquist (4337), Arthur Lites (1612), Woodrow Littrell (3523), Lawrence Lodge (5513), Lew Longmire (1325).

Frank Long (7144), Pauline Loomis (3302), Fred Lovato (4514), Waldo Lucero (7145), Marshall Ludlam (3520), Leon Luke (4151), Winford Mabery (4541), Francis Macek (7411), Florence MacPherson (3144).

Louise Major (3113), Ernest Manning (7154), Tudor Marks (3155), Loretta Marmon (3302), Domingo Martinez (4611), Monico Martinez (4512), Antonio Mata (4518), Robert Matthews (7544), Salvatore Mattina (1813).

Robert McCallum (7452), Gene McClendon (4613), Ralph McClure (1822), James McCutcheon (1336), W.S. McElvaney (7113), Donald McFadden (9132), C.J. McGarr (4600), James McGovern (4310), Byrd McKay (7154), Evelyn McPhate (4152).

Gurdon Miller (3152), Dean Miller (4120), Frank Millikin (1551), Charles Mitchell (4511), John Miziker (1523), Eugene Monahan (4614), Paul Montano (4623), Julian Moody (7451), Gerald Morrisroe (7633), Glenn Morter (9223).

Leonard Motichko (7154), Lawrence Myers (9474), Bernard Myer (4154), Edward Newfield (1330), Robert Newman (3155), Ralph Niebel (7626), Harvey North (3513), Charles O'Keefe (3242).

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Kenneth Patterson (5414), Walt Paxton (4614), Howard Peacock (4613), Ann Pearce (3243), Clifford Pecha (4513), Jose Perea (4514), Peter Peshlakai (4611), Leroy Petersen (4553), Melvin Petersen (7511), William Peters (4512), Orbra Phelps (9481).

J.J. Platt (1525), Margaret Platt (3242), Ralph Plumlee (5334), Margery Poetzi (1935), Richard Porter (7453), Virginia Potter (3000), Margaret Potts (4613), Dorothy Pratt (7133), Rudolf Probst (7415).

Santos Quintana (4512), Elizabeth Rainey (7120), S.A. Ravenbyrne (9351), Martin Rechner (7651), William Reed (9124), Henry Roeder (7154), Conrad Roeschke (7453), Billie Rogers (4511).

Orville Rowin (7154), Camille Rudeau (7131), Alex Ruff (7414), Raymond Saiz (4614), Carlos Salazar (4614), Eulogio Sanchez (4623), Jose Sanchez (4614), Patrick Sanchez (3520).

Fred Sanders (7122), Elsie Sandy (7432), Paul Scates (1641), Walter Schmedt (7522), Rollin Schneider (7651), Walter Schoen (3300), Frank Schofield (4118), Ruth Schooley (7400), Frances Schroer (7633), Henry Schroer (7113), Mary Schwartz (6021), Spencer Schwarz (3511).

Willard Scranton (7616), Pauline Selph (7121), William Sharp (7122), John Shine (7144), William Shively (4512), Hardin Simmons (4513), Quirin Simon (7654), William Simpson (4337), Walter Sims (1522), Marston Skidmore (7652), Wilfred Slade (1525).

Ray Smelich (4611), Helen Smith (3232), Leonard Smoll (1644), Florence Smythe (7133), Burton Snow (9131), Vern Sowards (7145), Jennie Spann (7133), Betty Spieler (3151), Lloyd Spohr (7651).

Clarence Sproul (9133), Edmund Starr (4614), Edward Stepka (9217), John Stevenson (3520), Fred Stewart (7123), Leon Strauch (4331), Lee Stull (1326), Edward Swanson (6021), J.B. Sweatman (7113).

Charles Taft (9443), Hugh Tallman (4551), Robert Tarbell (9484), Henry Tendall (7614), Robert Thomas (7652), Joseph Tilley (4511), John Tolmie (1614), Alvarado Torres (7154), George Torres (7154).

Donald Tyson (4622), Fermin Vallejos (4514), B.E. Van Sickle (7113), W.G. Vander Laan (1336), Edward Vavro (5627), Frank Vest (9321), Samuel Waldorf (7121), Robert Walter (7623), Malcolm Ward (4518), W.A. Warren, Jr. (4374).

Raymond Wason (1441), Nelson Weidman (7133), Wayne Welkenback (7133), Martha Whitford (1000), Ralph Whitson (9343), Harold Wild (4338), David Wilkinson (4541), James Williams (9231).

David Winner (3524), Royal Winter (7451), Chester Wolowicz (7121), Edward Wood (7511), Earnest Yaeger (7453), Louis Yannoni (4622), Doris Young (7415), Helen Zimmermann (9425).



THAT'S Bill Laskar, LAB NEWS photographer, looking like a South American dictator, and the occasion is the group picture of retirees in this issue's centerfold. Cherry picker operator Dave Dailey (4511) is in the other bucket along with some character with a bull horn.

Authors

J.B. Moreno (5643), "A Study of Self Similar Implosions with Radiative Energy Transport," PhD dissertation: Case Western Reserve Univ., Cleveland, Ohio, June 1972.

J.W. Nunziato (5131) and H.J. Sutherland (5163), "An Acoustical Determination of Stress Relaxation Functions for Polymers," Vol. 44, p 184 (1973), JOURNAL OF APPLIED PHYSICS; Nunziato, K.W. Schuler (5161) and E.K. Walsh (Univ. of Fla.), "The Bulk Response of Viscoelastic Solids," Vol. 16, p 15 (1972), TRANSACTIONS OF THE SOCIETY OF RHEOLOGY.

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J.E. Schirber (5150), "Fermi Surface of Lead at Normal and High Pressure," Vol. 5, 4683 (1972), PHYSICAL REVIEW B; Schirber and B. Morosin (5132), "Linear Compressibilities and the Pressure Dependence of the Atomic Positional Parameter of As," Vol. 10, 249 (1972), SOLID STATE COMMUNICATIONS.

W.J. Camp (5151), "Estimation of Spectra from Moments-Application to the Hubbard Model," Vol. 5, 3730 (1972), PHYSICAL REVIEW B.

M.J. Landry and K.R. Hessel (both 1441), "Increased Contrast in Holographic Interferometry," Vol. 12, No. 2 (1973), APPLIED OPTICS.

P.J. Brannon (5214) and F.M. Bacon (1412), "An Improved Mount & Alignment Procedures for a Rapid Scan Fabry Perot Interferometer," Vol. 12, No. 1 (1973), JOURNAL OF APPLIED OPTICS.

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H.J. Rack (5335), "The Strength Differential in a Maraging Steel," Vol. 3, (1972) METALLURGICAL TRANSACTIONS.

E.R. Frye and R.M. Rayner (both 7123), "Observations of Failure Modes in Carbon Composite Materials," Vol. 6, p 286 (1972), JOURNAL OF COMPOSITE MATERIALS.

P.M. Richards (5152), "Spin Wave Theory and Static Correlations in a One-Dimensional Heisenberg Antiferromagnet," Vol. 27, 1800 (1971), PHYSICAL REVIEW LETTERS; "Temperature Dependence of the Ferromagnetic Resonance Linewidth," Vol. 7, p 453 (1973), PHYSICAL REVIEW B.

G.A. Samara (5130), "Dielectric & Ferroelectric Materials & Applications"; "High Pressure Sintering"; "Dynamic High Pressure Applications"; and "Ferromagnetic Materials," chapters in Report of the National Academy of Sciences REVIEW by Materials Advisory Board Committee on High Pressure Technology.

T.S. Prevender (5531), S.K. Sinha and J.F. Smith, "Lattice Dynamics of YZN," Vol. 6, No. 12, PHYSICAL REVIEW B.

W. Bauer (8331) and G.J. Thomas (5522), "Helium Release and Electron Microscopy of Helium Implanted Palladium," Vol. 42, p 96 (1972), JOURNAL OF NUCLEAR MATERIALS.

H.D. Fisher (1541), "Wave Propagation in A Hollow Conical Frustum," Vol. 39, No. 4, JOURNAL OF APPLIED MECHANICS.

J.R. Banister (9150), "Review of the book entitled "Nuclear Explosion Seismology," by Howard C. Rodean, Vol. 60, No. 5, AMERICAN SCIENTIST JOURNAL.

A.C. Switendick (5151), "Metal Hydrides-Structure and Band Structure," Vol. 5 p 459 (1971), INTERNATIONAL JOURNAL OF QUANTUM CHEMISTRY; "Electronic Energy Bands of Metal Hydrides - Palladium and Nickel Hydrides," Vol. 76, p 535 (1972), BERICHTE DER BUNSEN-GESELLSCHAFT FUR PIMSICALISCHE CHEMIE.

P.J. Chen (1721), "Acceleration Waves in Chemically Reacting Ideal Fluid Mixtures," Vol. 47, pp 171-187 (1972), ARCHIVE FOR RATIONAL MECHANICS & ANALYSIS; "On the Thermal Properties of Acceleration Waves in Isotropic Elastic Bodies," Vol. 106, pp 439-445 (1972), MECCANICA e FISICA MATEMATICA, Istituto Lombardo; "Some Comments on the Behavior of Acceleration Waves of Arbitrary Shape," Vol. 13, pp 948-950 (1972), JOURNAL OF MATHEMATICAL PHYSICS; "One Dimensional Shock Waves in Elastic Materials," Vol. 105, pp 907-916 (1971), MECCANICA e FISICA MATEMATICA; "One Dimensional Acceleration Waves in Inhomogeneous Elastic Non-Conductors,"



NEWS CONFERENCE, a first, was held on March 12 by President Sparks. Subject was the layoff and, after reading statement, Mr. Sparks fielded questions from newsmen.

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I.J. Hall (1643), "Tolerance Limits for the Distribution of the Product and Quotient of Normal Varieties," Vol. 29 (1973), BIOMETRICS.

G.J. Simmons (1721), "Combinatorial Properties of Plane Partitions," Vol. 6, pp 335-339 (1971), STUDIA SCIENTIARUM MATHEMATICARUM HUNGARICA; "An Extremal Problem in the Uniform Covering of Finite Sets," Vol. 13, No. 2 (1972), JOURNAL OF COMBINATORIAL THEORY; "Inequivalent Sets of 2ⁿ Two Level Orthogonal Functions," No. AD 744650, U.S. Department of Commerce, Technical Information Service.

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T.A. Duffey (1544), "Transient Response of a Plastically Anisotropic Cylinder in Plane Strain," Vol. 9, No. 1, INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES.

R.P. Clark (1913), "Heats of Fusion and Heat Capacities of Lithium Chloride Potassium Chloride Eutectic and Potassium Nitrate," Jan. 1973 issue, JOURNAL OF CHEMICAL AND ENGINEERING DATA.

I.J. Fritz (5132), "Anomalous Acoustic Behavior of KH₂PO₄ at High Pressure," Vol. 12, No. 1, SOLID STATE COMMUNICATIONS.

R.C. Knauer (5154), "Magnetic Susceptibility Measurements of the Spin-1/2 Linear-Chain a-bis (N-Methylsalicyladiminato)-Copper (a-CuNSal)," Vol. 7, No. 1, PHYSICAL REVIEW B.

S.M. Myers (5111) and A. Narath (50), "Anomaly in the NMR Shift of P and As in CeP and CeAs," Vol. 12, No. 1, SOLID STATE COMMUNICATIONS.

J.M. Peek (5234), "H₂ Dipole Strengths By Asymptotic Techniques," Vol. 5, No. 12, JOURNAL OF PHYSICS.

H.J. Stein (5112), "Divacancylike Optical Absorption in Si_{0.5}Ge_{0.5} Alloy," Vol. 22, No. 2, APPLIED PHYSICS LETTERS.

R.H. Ericksen (5314), "The Yield Point Phenomenon In A Be-Al Composite," Vol. 7, No. 1, SCRIPTA METALLURGICA.

H.D. Fisher (1541), "Bending Stress in an Impulsively Loaded Cylindrical Shell of Exponentially Varying Thickness," Dec. 1972 issue, AIAA JOURNAL.

H.C. Hardee, A.B. Donaldson and D.O. Lee (all 1543), "Predicting the Critical Boundary Temperature of Multidimensional Explosives," Vol. 19, No. 3, COMBUSTION AND FLAME.

T.D. Padrick (5215) and M.A. Gusinow (5125), "Energy and Threshold Characteristics of Chemical Lasers," Vol. 22, No. 4, APPLIED PHYSICS LETTERS.

J.A. Panitz (5331), "Preflashover Mass

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L.E. Pope (5133) and L.R. Edwards (5132), "The Pressure Dependence of the Austenite Start Temperature in Iron-Nickel Base Alloys," Vol. 21, No. 3, ACTA METALLURGICA.

G. Yonas (5242), K.R. Prestwich (5245), J.W. Poukey (5241) and J.R. Freeman (5241), "Electron Beam Focusing Using Current-Carrying Plasmas in High-n/g Diodes," Vol. 30, No. 5, PHYSICAL REVIEW LETTERS.

N.J. DeLollis and O. Montoya (both 5332), "Effect of Stress on Strength of Bonded Assemblies," p 417, PROCESSING FOR ADHESIVES BONDED STRUCTURES.

J.G. Curro (5511), "Calculation of Gruneisen Parameters of Polymers," Vol. 58, No. 1, THE JOURNAL OF CHEMICAL PHYSICS.

D.A. Nissen and R.W. Carlsten (both 1913), "Surface Tension of LiCl-KCl Eutectic Mixtures," Vol. 18, No. 1, JOURNAL OF CHEMICAL AND ENGINEERING DATA.

A.J. Toepfer and J.W. Poukey (both 5241), "Saturation of the Relativistic Beam-Plasma Instability for Arbitrary Density Ratios," Vol. 42A, No. 5, PHYSICS LETTERS A.

M.R. Scott (5222), "A Proposal for the Calculation of Characteristic Functions for Certain Differential and Integral Operators Via Initial-Value Procedures," Vol. 41 (1973) 1-13, JOURNAL OF MATHEMATICAL ANALYSIS & APPLICATION.

B.M. Bulmer (5628), "Effect of Low Heat-Shield Ablation Rates on Flight Test Turbulent Base Pressure," Vol. 10, No. 12, AIAA JOURNAL.

E.P. EerNisse and C.B. Norris (both 5112), "Electrical Effects of Clustered Defects in Heteroepitaxial Si Films," Vol. 16, No. 3, SOLID-STATE ELECTRONICS.

C.L. Julian (5130) and F.O. Lane, Jr. (5241), "Change of the Density-of-States Effective Mass of Holes in Germanium Induced by (111) and (100) One-Dimensional Strain and by (111) and (100) Uniaxial Stress," Vol. 7, No. 2, PHYSICAL REVIEW B.

A.J. Russo (5642) and K.J. Touryan (5640), "Experimental and Numerical Studies of Flush Electrostatic Probes in Hypersonic Ionized Flows: II. Theory," Vol. 10, No. 12, AIAA JOURNAL.

G.A. Samara (5130) and P.S. Peercy (5132), "Pressure and Temperature Dependence of the Static Dielectric Constants and Raman Spectra of TiO₂ (Rutile)," Vol. 7, No. 3, PHYSICAL REVIEW B.

G.J. Simmons (1720) and R.C. Entringer (UNM), "Sums of Valences in Bigraphs," Jan. 1973 issue, JOURNAL OF COMBINATORIAL THEORY; "Some Properties of Components of Bigraphs," Feb. 1973 issue, PERIODICA MATHEMATICA HUNGARICA.

H.D. Garbin (9111), "The Compressional Modulus of a Material Permeated by a Random Distribution of Circular Cracks," Vol. 30, No. 4, QUARTERLY OF APPLIED MATHEMATICS.

L.F. Shampine (1722), "Concentration-Dependent Diffusion," Vol. 30, No. 4, QUARTERLY OF APPLIED MATHEMATICS.

Speakers

D.W. Schaefer (5514), "Introduction of Photon Counting and Fluctuation Theory," Quantum Optics Lecture Series, Feb. 12-14, Univ. of Arizona, Tucson.

T.A. Allen (7123-1), "Complete Utilization of a Printed Circuit Facility," American Electroplaters Society and Society of Manufacturing Engineers, Feb. 14-15, Albuquerque.

T.R. Guess (5314), "Fracture Toughness of Graphite and Carbon-Carbon Composites," Ad Hoc Working Group on Brittle Fracture, Navy Advisory Council on Materials, Feb. 28-March 1, Asilomar Conf. Grounds, Pacific Grove, Calif.

J.C. Bushnell (9352), "A Survey of Nondestructive Flaw Detection Techniques"; L.M. Jercinovic (3510), "Medical and Surgical Possibilities of Controlled Miniature Explosions"; E.K. Beauchamp (5334), "Fracture in Surface Strengthened Glass and Glass Ceramics"; C.G. Murphy (9352), B.D. Hansche (9323) and O.J. Burchett (9352), "Prediction of Holographic Interferometry Experimental Results"; R.A. Schmidt (5165), "An Approximate Technique for Obtaining Stress Intensity Factors for Some Difficult Planar Problems," 13th Annual Symposium on Fracture and Flaws, UNM, March 1-2, Albuquerque.

T.H. Martin (5245), "The Hydra E-Beam Machine"; G.W. Kuswa, L.P. Bradley and G. Yonas (all 5242), "Ion Acceleration in Electron Beams," 1973 Particle Accelerator Conference, March 5-7, San Francisco.

N.J. DeLollis (5332), "Designing for Adhesives - A Look at Some Key Considerations for Sound Design," Seminar on Industrial Adhesives Applications, March 6-7, Univ. of Wisconsin, Madison.

W.R. Hoover (5314), "The Fracture Toughness of B-A1 Composites," Fracture Seminar, National Bureau of Standards, March 8, Washington, D.C.

E.A. Kjeldgaard (1915), "ARAZ Effort In Division 1915"; D.E. Bennett (1915), "ARAZ Experimental Program"; H.S. Schuldt (1915), "ARAZ Exploratory Chemical Efforts," ARAZ Meeting, Feb. 6-7, Livermore.

F.W. Muller (7425), "The AEC Reliability Assessment Program," Amarillo Chapter Meeting of the ASQC, Feb. 15.

L.L. Bonzon and J.S. Philbin (both 5221), "Absorbed Dose and Kerma (Reactor) Neutron Spectra," and "SPR II System Parameters," Fast Burst Reactor Symposium, Feb. 15, White Sands Missile Range.

J.A. Reuscher and T.R. Schmidt (both 5222), "Moderator Effects with the Sandia Pulsed Reactor II"; T.R. Schmidt and R.L. Coats (both 5222), "Fast Burst Reactor Design Calculations"; J.A. Reuscher, "In Pile Testing of Fast Burst Reactor Fuel Materials"; T.R. Schmidt and J.A. Reuscher, "Reflector Burst experiment with SPR II"; J.A. Horak (5222), M.M. Karnowsky (5531) and D.J. Sasmor (5222), "Nondestructive Testing of Pulsed Reactor Fuels"; J.A. Horak, E. Yao (UNM) and D.J. Sasmor, "Mechanical Properties of a Potential Pulsed Reactor Fuel, U-6 w/o Mo"; J.A. Reuscher, "Recent Developments in Stress Analysis Techniques for Fast Burst Reactors"; R.L. Coats, "Sandia Pulse Reactor III," Fast Pulse Reactor Symposium, Feb. 20-21, White Sands Missile Range.

C.B. Norris (5112), "Electron Beam-Semiconductor Devices," invited paper for Lecture Series on Microwave Solid State Devices and Their Applications, Professional Group on Electron Devices, Washington Section, IEEE, Feb. 22, McLean, Va.; also invited presentation at Harry Diamond Laboratories, Washington, D.C., Feb. 23.

R.T. Johnson, Jr. (5155), "Electrical Switching and Memory Phenomena in Amorphous Semiconducting Alloys," Physics Colloquium, Colorado State Univ., Feb. 23.

L. Thigpen (5643), "Projectile Penetration of Elastic-Plastic Earth Media," Seminar, Howard Univ., Feb. 23, Washington, D.C.

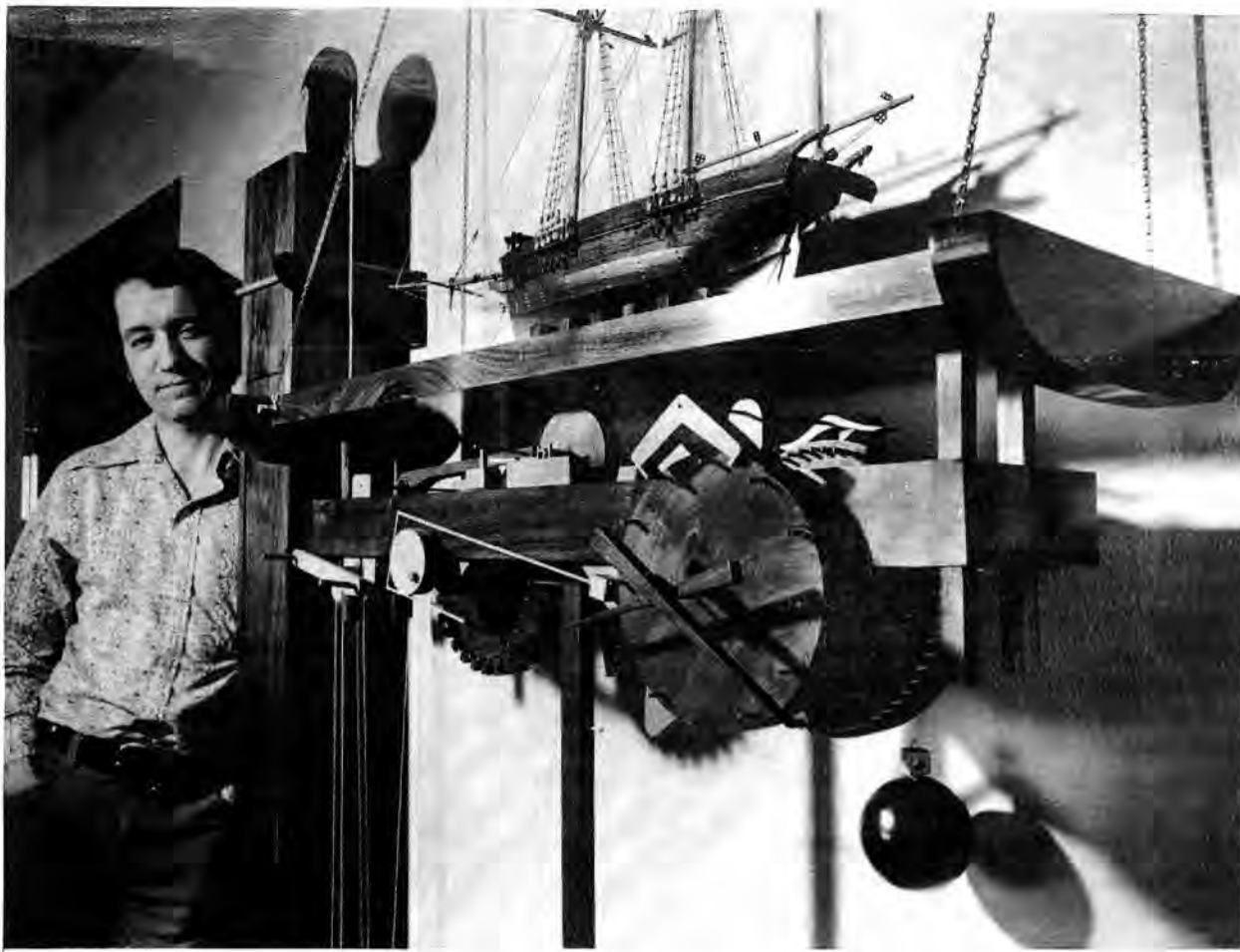
J.G. Curro (5511), "Configurational Statistics of Polymer Chains," Seminar, Dept. of Nuclear & Chemical Engineering, UNM, March 5.

A.W. Johnson and J.B. Gerardo (both 5243), "Diatomic Xenon Laser at 1730 Å," and M.J. Landry (1441), "Switching Characteristics of PLZT Shutters," Optical Society of America, March 13-16, Denver.

R.D. Flaxbart (4510), "Involving Supervisors to Become Leaders in Safety Compliance Programs," National Plant Engineering and Maintenance Conference, March 14, Chicago.

D.M. Schuster, W.R. Hoover and M. Moss (all 5314), "Fabrication of Metal-Matrix Composite Materials," AEC-AFML Technology Interchange, March 15, Wright-Patterson AFB, Ohio.

C.B. Norris, C.E. Barnes and W. Beezhold (all 5112), "Depth Resolved Cathodoluminescence in GaAs, ZnS, and CdS"; N.S. Gillis (5151), "Self-Consistent



DOUG DRUMHELLER (5163) displays two clocks which he built for decoration as well as function. Wall hanging wooden clock above, based on a drawing by Galileo, serves as shelf to display model of clipper ship. At right, table which keeps time. The glass covers the clock cavity. Base of table also has glass panels to reveal brass gears.

Real, Live Ding-Donger

Doug Drumheller Builds Clocks

At first glance it's a wall hanging — an array of handsomely finished walnut and maple shapes that, in toto, form a work of art. Then it moves. Take a closer look. Maybe it's some avant garde kinetic sculpture. Now that's clever, particularly the way it serves as a mantle piece for the model of an old clipper ship with full rigging. Wait a minute, it's still moving and — sonofagun! — it's a clock. Dig that tick-tick-tocking.

"We turn it on when salesmen come to call," Doug Drumheller (5163) says. "It sort of distracts them."

Doug has this thing about wood. He likes to build things — tables, benches, boats, clocks. In addition to the wooden clock which hangs on the wall, he's just finished another one which is contained inside a beautiful glass-topped coffee table, or maybe the proper name is clock table.

The one that hangs on the wall is a pendulum type. Doug was looking through a magazine when he saw an ad for a wooden clock kit. The idea intrigued him, but he turned down the kit. He went to the library and was looking up more information when he saw a drawing of a pendulum clock mechanism by Galileo. Using this as the basis of his design, Doug got out his slide rule and worked out the rest of it. After a year and a half of leisure time work, he had a clock. It's accurate to within a minute every 12 hours. Humidity affects it. He lubricates the moving parts with hand soap.

The clock table operates with a simple adaptation of an electrical mechanism — a magnetic reed switch and a solenoid which drive a torsional pendulum and a couple of



brass gears with an escapement. The table top is walnut, 40 inches in diameter, and cut in the shape of a gear. The gear encloses a circular piece of gray plate glass. Glass panels in the table allow a view of the mechanism.

"My theory is that furniture should do something more than just sit there," Doug says.

Doug will have ample opportunity to exercise this theory. Several months ago, he moved into a new house and plans to build most of the furniture for it. • dg

Coronado Women Bowlers At State Tournament

This weekend the Coronado Club Bowling League is represented by a team participating in the Women's State Bowling Tournament in Alamogordo. In a 12-team "roll-off" the six highest scorers were selected to make up the team. Members are: Eve Schubeck (wife of Don, 4117), captain; Hazel Courtin (wife of James 7415), Marie Nakayama (wife of John 1514), Edie Williams (AEC), Pauline Gabaldon (wife of Floren 1511), and Thelma Barton (wife of Bill 5624).

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Speakers

Calculations of the Lattice Modes of Solid Nitrogen"; E.H. Farnum (5154), "Crystallization Kinetics in the $\text{Li}_2\text{O}\cdot\text{Ga}_2\text{O}_3\cdot\text{SiO}_2$ System"; G.E. Pike and C.H. Seager (both 5155), "Percolation and Hopping Conductivity: A Computer Study (II)"; J.P. Van Dyke (5151), "Energy Band Structure of AuSn and PtSn"; A.C. Switendick (5151), "Hydrogen in FCC Metals"; R.C. Hughes (5514), "Transient Photoconductivity in Single Crystal and Fused Quartz"; H.J. Stein (5112), "Ion Produced Optical Absorption in Isoelectronic ZnSe, GaAs, and Ge"; J.F. Cuderman (5213), "Ionization of Fast K Atoms in Collision with Triatomic Molecules"; H.T. Weaver (5154), J.E. Schirber (5150) and A. Narath (50), "The Effect of Pressure on Nuclear Resonance Properties of $\text{Au}_{1-x}\text{Pd}_x\text{Ga}_2$ "; R.K. Quinn (5154), C.H. Seager (5155) and D. Emin (5155), "Electrical Transport Properties in Bulk, Amorphous As_2Te_3 "; D. Emin (5155), "Small-Polaron Jump-Rate in Ordered and Disordered Systems"; G.J. Thomas (5522) and W. Bauer (8334), "Electron Microscopy of He Implanted 316 Stainless Steel"; Thomas and Bauer, "Helium Re-Emission from 316 Stainless Steel During Implantation from -170°C to 700°C "; J.N. Sweet (1435) and G.E. Pike (5155), "Electrical Transport in Heavily Doped SiGe-Metal Junctions"; G.E. Laramore (5151),

"Analysis of LEED Intensity Profiles for the (100) and (111) Faces of Nickel"; Laramore, "Convergence Comparisons of the Third-Order t-Matrix Method with an Exact Inelastic Multiple Scattering Method"; J.G. Curro (5511), "Computer Simulation of Semi-dilute Polymeric Systems"; G.L. Cessac (5513) and J.G. Curro (5511), "Raman Scattering in Uniaxially Oriented Samples of Planar Zig-zag Polyvinylidene Fluoride"; R.G. Kepler (5510), "Saturation Polarization of Polyvinylidene Fluoride"; A.G. Beattie (9352), R.T. Johnson (5155) and R.K. Quinn (5154), "Acoustic Emission Produced by Switching Amorphous Semiconductors"; P.M. Richards (5132), "Temperature Dependence of Ferromagnetic Resonance in $\text{Fe}_{64}\text{Ni}_{30}\text{Mn}_{6}$ Alloy"; L.C. Bartel (5151), "Calculation of the Dynamic Susceptibility for an Itinerant Electron Ferromagnet"; W.J. Camp (5151), "Decay of Correlation Near Free Surfaces in the Ising Ferromagnet," American Physical Society Meeting, March 19-22, San Diego.

C.E. Land (5113), "Binary Optical Storage in PLZT Ceramics," Topical Meeting, Optical Storage of Digital Data, Optical Society of America and IEEE Quantum Electr. Council, March 19-21, Aspen, Colo.

R.G. Easterling (1643), "A Comparison of Some Significance Tests Under Experimental Radomization," International Symposium on Statistical Design and Linear Models, March 19-23, Ft. Collins, Colo.

C.W. Bert and R.H. Ericksen (5314), "Analysis of Room-Temperature Creep of Filamentary Metal-Matrix Composites"; F.P. Gerstle, Jr., (5314), "Analysis

of Fiber Reinforced Composite Spherical Pressure Vessels"; R.C. Reuter (1542) and T.R. Guess (5314), "Analysis, Testing and Design of Filament Wound, Carbon Carbon Burst Tubes," ASTM Symposium on Composite Materials: Testing and Design, March 19-23, Williamsburg, Pa.

O.M. Stuetzer (1440), "Technology Forecasting," Albuquerque Section, IEEE, March 22.

J.M. Hueter (3131), "Creativity — Choice or Chance?" N.M. Chapter, AIEE, Feb. 17; "The Influence of Creativity in Organizational Planning," Junior League of Albuquerque, Feb. 17.

H.C. Monteith (9344), "ESP Research in Russia, England, and America," Sertoma Club, Feb. 1, and science class, Annunciation School, Feb. 23.

G.E. Tucker (3313), "Radiation Detection Fundamentals," history class, Del Norte High School, Feb. 5.

O.L. Wright (4610), "History of Sandia Base," Harvard-Yale-Princeton Club, Feb. 5, and science class, Eldorado High School, Feb. 20.

R.M. Jefferson (5221), "Nuclear Reactor Safety," science class, Eldorado High School, Feb. 6, and North Albuquerque Lions Club, Feb. 28.

T.F. Marker (6010), "The Process of Invention," Albuquerque Breakfast Lions Club, Feb. 8.

A. Goodman (5323), "Inventing — The Dream Versus the Reality," Career Information Center, Highland High School, Feb. 13, and Sandia Civitan Breakfast Club, Feb. 16.

M.J. Landry (1441), "Lasers," science class, Eldorado High School, Feb. 13.

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5. For Sandia Laboratories and AEC employees only
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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.

LAID OFF?

For the balance of this fiscal year (through June 30), LAB NEWS will accept classified ads from persons laid off by the Labs.

TRANSPORTATION

- '65 FORD Galaxie 500, 4-dr., HT, w/AT, PS, air, \$700. Fitzgerald, 296-1341 after 5:30.
- '60 STUDEBAKER, \$275. Boling, 298-8141.
- '69 BUICK Skylark, 4-dr. Custom HT, 43,000 miles, air, blue book. Maydew, 294-5663, 7527 La Madera Rd. NE.
- '71 HONDA 450 CB, fairing & sissy bar, 11,225 miles, \$800. Roberts, 298-3062.
- '65 FORD Fairlane, 4-dr. sedan, AT, 289 V8 engine, \$495. Barber, 299-8744.
- 23' MOTOR HOME, formerly '58 GMC bus, rebuilt V8, Michelins, shower, toilet, appliances, fully self-contained, make offer. Neiswander, 294-1312.
- '70 MACH 1, AC, Hurst 4-spd., disc brakes, AM/FM stereo, \$2200 or best offer. McCrory, 298-2874.
- '71 DODGE Sportsman van, 318-V8, AT, PS, PB, AC, FM-AM, 17,000 miles, \$3600. Chavez, 877-2707.
- '63 T-BIRD Landau, loaded, interior & tires good, needs some mech. repair, \$300. Pappas, 266-4757.
- '68 PLYMOUTH wagon, small V8, air, PS, AT, make offer. Copeland, 344-1133.
- '61 RAMBLER Classic, engine recently overhauled, \$250. Baskett, 243-5425 after 5.
- 14' GLASS BOAT, trailer, skis, Johnson 35, \$600. Bayer, 296-8346.

'71 CHEVROLET Vega stn. wgn., radio, air, Positraction rear end, extra pr. tires. Davis, 281-3751.

'63 RAMBLER Classic stn. wgn., 6-cyl., AT, AC, 78,000 miles, new brakes, needs valve job \$275. Thorne, 298-9771.

'65 OLDS Delta 88, AC, PS, PB, \$375. Seamons, 298-5683.

BOAT & MOTOR, Elgin 14', 35 HP Johnson, Holsclaw trailer. Myers, 256-0750.

'71 FORD F-100, 302 V8, 3-spd. OD, HD springs, low mileage. Benson, 256-1350.

'64 CORVAIR Monza Spyder, convert., turbo charged, leaks oil, needs rear oil seal to be operable. \$100. Moss, 296-3877.

'70 F-100 pickup & tripper camper, AT, AC, L.S., 37,000 miles, \$3500. Sandlin, 299-8786.

'68 OLDS, AC, PS, PB, new tires. Bonner, 299-7413.

REAL ESTATE

- 3-BDR. MOSSMAN, 1 bath, garage, new carpet & stucco, almost new roof & AC, has 5 3/4 loan, 1022 Lester Dr. NE. Hudson, for appointment 296-6978.
- 2-BDR. HOUSE, lg. brick fp, carport, shop bldg., trailer access, new tile bath, carpets, drapes, appliances, \$15,500. Anderson, 299-7782.
- 3-BDR. HOME, 1-3/4 baths, fp, covered patio, Holiday Park, refinace or CTL. Hartman, 296-3810.
- 8 1/2 ACRES, off North 10, excellent water, view, access, title, pines, power, all or part. Tiefert, 299-2763.
- 3-BDR., 1-3/4 bath, DR or FR, garage, AC, dbl. fp, carpet, drapes, 1530', assume 5-1/4 or refin. conv., 10813 Princess Jeanne NE. Wetherholt, 299-5736.
- CORNER LOT NE, all utilities in, take best offer for equity. Pickel, 298-6046.

MISCELLANEOUS

- PR. metal clothesline poles, \$10; Petri 75 35mm camera, wide angle, telephoto lens, strobe light & tripod. Konrad, 299-8994.
- OZALID 9000 print machine. Peters, 266-0017 or 298-9183.

CRAFTSMAN 20" rotary mower w/catcher, used 1 season, \$50. Kepler, 298-5652.

WHEEL CHAIR, deluxe, chrome plated, detachable footrests, full reclining back, removable arms, \$225. Baczek, 255-3429.

GE REFRIG/FREEZER, 2-door, white. Ferraro, 296-7958.

GOLDEN RETRIEVER PUPS, AKC, OFA, championship blood line, whelped Dec. 28, \$75. Pryor, 344-2931.

BURROUGHS adding machine, full-key, manual, \$20; 3-spd. man's bicycle, Schwinn, dbl. baskets on rear, \$20. Fjelseth, 298-2456.

MOTORBIKE TRAILER, holds 2 bikes, includes 16 cu. ft. storage box, spare, running lights. DeGroft, 294-5543 after 6.

MOVE & REBUILD my boy's clubhouse, 8'x8', \$25. Johnson, 298-1011.

IRONRITE, best offer. Bowland, 256-1861.

SMALL Sears router, \$6; 3" Wards belt sander & 12 belts, \$20. James, 298-0709.

UPRIGHT PLAYER PIANO w/pedals & motor; '67 Honda Trail 90 w/carrier. Wilson, 281-3225.

WEDDING GOWN & veil, \$75. Montano, 877-7301 after 6.

54 VOL. SET "Great Books of the Western World," never used, plus bookcase. Maak, 281-5402.

KING SIZE HEADBOARD, best offer. Potter, 268-5451.

17' ROADRUNNER vacation trailer, sleeps 6, monomatic toilet, pressurized water, furnace, 75-lb. icebox, 12v/110v, range & oven. MacDougall, 299-8496.

TYMETER 24-hr. digital clock, \$9. Richardson, 268-7843.

HOOVER Dial-A-Matic vacuum cleaner, upright model, \$35. Hiltunen, 6500 Cochiti Rd. SE, Space 56.

SONY 600 series stereo tape recorder, \$90. Denton, 298-0566.

WESTERN YOUTH SADDLE, tooled leather, quick-change stirrups, no defects. Barth, 345-0172.

WHEELCHAIR; walker; adjustable dress form; Lange std. ski boots, size 7; boy's 20" 5-spd. bicycle, Sears deluxe. Hart, 266-6811 after 3.

SEARS refrig., coppertone, 18 cu. ft., top freeze, approx. 100 lbs., 2 yrs. old, \$250; double roll-away bed, \$15. Phelps, 344-0441 after 5.

GOLF CLUBS, left handed, 3, 5, & 9 irons, P.W., 1 & 3 woods. Gutscher, 298-7203.

3'X4' WINDOW, wood frame; 32"x80" solid wood door w/hardware; antique trunk. Nelson, 255-2364.

RANCH OAK bedroom set, dbl. dresser, chest, bed & night stand, \$200. McDonald, 299-9269.

MEXICAN FURNITURE, new, truck load sale, wholesale prices, buffets, bar, dining room set, Roman tables & more. Butler, 296-8095.

ACOUSTIC Model 260 guitar amplifier, four 12" speakers, \$600. Schultz, 299-2857.

BENCH SAW, 8" Craftsman, stand, 2 side extensions, 3 blades, less motor, \$85. Lysne, 296-5037.

SHETLAND SHEEPDOG, female, 8 mos. old, AKC reg., shots, reasonable price to good home. 299-5226.

AQHA gelding, 6-yr.-old, good Western or English prospects; Indian rugs: one Two Grey Hill, one Picture rug, collector's items. Weidman, 898-0331.

UTILITY TRAILER, 4'x8', lights, hitch, 1' high side boards, \$80. 268-1864 after 6.

FRIGIDAIRE elec. stove, 3 yrs. old, self-cleaning oven, avocado green, \$100; Frigidaire dishwasher, 2 yrs. old, maple cutting board top, port., \$100. Arenholz, 298-5603 after 5.

BEDROOM SUITE: dbl. bed, dresser w/attached round mirror, bedside table, no mattress or springs, \$75. Stark, 8212 Pickard Ct. NE, 299-5953.

BUNK BED for travel trailer, includes ladder & hdw. for installation, lt. birch wood, foam mattress. Marceau, 255-2343.

PHOTO EQUIPMENT: Vivitar 28/f2.5 wide angle (any SLR); Takumar 105/f2.8 telephoto; Rolleikin 35mm adapter; Pentax bellows, and more. Mason, 296-8390.

20" ELECTRIC FAN & STAND; Panasonic cassette tape

recorder; & misc. Evans, 268-8419.

GARAGE SALE: maple bunk beds; sofa; chair; 3 chests-of-dwrs.; desk; washer; dryer; books; clothes; misc. Weekend March 31. Anderholm, 11109 Hume NE, 298-2262.

16 1/2' TERRY travel trailer, shower, toilet, sleeps 2 adults, 4 children, Reese hitch. Karnes, 299-9033.

ONE-WHEEL luggage trailer, 54x42, steel frame, \$45. Peckumn, 256-3363 after 5.

FOR RENT

(TEMPORARILY) 3 furnished rooms, utilities paid, small dog OK, \$90/mo. Ash, 256-0120.

WANTED

MIMEOGRAPH MACHINE, good condition. Leisher, 281-5258. 3-BDR., den, fp, west of Wyoming, east of San Pedro, cash to equity. Brunacini, 345-3910.

WILL TRADE Sears 3x27" port. belt sander for floor stand belt sander or bandsaw of equal value. Frasier, 299-6933.

DRESS FORM, medium adjustable, w/stand. Clark, 256-3403.

GAL needed to share apt. w/another gal. Yrene, 344-2826.

MAINTENANCE MANUAL for '56 Ford, will buy, rent, borrow. Mikkelsen, 268-1485.

HARP, any condition. Adent, 345-9393.

CAR POOL from 8000 Rio Grande NW to Bldg. 836. Zickert, 898-3475.

LOST AND FOUND

LOST — 2 VW keys, 1 brown & 1 black man's leather glove, man's dark blue coat w/Burger printed inside collar, man's gold Timex watch, RX safety glasses, man's black mitten, man's Zodiac watch w/gold band. LOST AND FOUND, 264-2757, Bldg. 832.

FOUND — White metal loop earring, assortment of keys, assortment of ladies' gloves, gold metal necklace, pen knife. LOST AND FOUND, 264-2757, Bldg. 832.

Soul Session Tomorrow

HAPPY HOURS — Tonight, the Prisoners are loose on the bandstand, German food is featured on the buffet and Yolanda is holding the main lounge. Next Friday, March 30, Club manager Jim Schultz plans a tremendous seafood spread, Frank Chewiwie is booked to make the dancing music and Ed Shoaf returns to the main lounge. On April 6, Bob Banks and trio will play for dancing, Mexican food will be spread for the buffet and Denny Gallegos will entertain in the main lounge.

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SOUL SESSION tomorrow night from 8:30 to 12:30 repeats the same successful formula that makes these events outstanding — a great rock band wired into the bandstand (something called Brass Monkey II), free admission for members, guests pay \$1. Happy Hour bar prices are in effect and super sandwiches are available.

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CRIBBAGE TOURNAMENT for doubles is scheduled Saturday, March 31, starting at 11 a.m. Registration forms plus \$1 entry fee are due at the Club office by March 29. Cash prizes go to the winners.

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TRAVEL NEWS — The transportation only trip to Europe June 5-26 is still open at a price of \$288. You will land in London, be picked up three weeks later in Paris. A \$100 deposit is due at the Club office right away.

Matzatlan, Mexico, the Club's favorite vacation spot, is the destination Nov. 5-12. The luxurious package (which covers everything but lunch and includes a couple of fantastic cocktail parties) will cost approximately \$215 (double occupancy). Sign up on April 1. Only 135 seats are available, and there is a lot of demand for this one.



Anne Floyd

Recreation Notes

FUN & GAMES

The Kirtland Base Roadrunner Motorcycle Club is sponsoring a "Pony Express Ride" on March 25 at the Base riding area (south on Pennsylvania toward Manzano Base and follow signs). Entry fee is \$1, registration closes at 12:30 p.m. and the race starts at 1. There will be two classes: 0-250cc and Open. Pony Express teams will be determined by pulling names from a hat.

All persons who work on the Base are welcome to participate. For more information call Mike Cox, 264-5726.

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Softball season swings into action in late April, and Rick Orzel (5621) will be happy to sign you up as a member of the Sandia Labs Softball Association. If interested and if a sports rep has not contacted you, call Rick (4-2462) right away. The organization meeting will be held on March 30 and he needs to hear from you before then.

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Lil Mancuso (3301), tournament chairman for the Sandia Golf Association

(Women) urges members to make plans to play in these major tournaments: Socorro - April 28, UNM South - May 12, Los Alamos - June 16, Belen- July 14, Scotch Foursome - July 8, Los Altos (short) 36 holes - Aug. 4 and 11, and Los Altos (long) 36 holes - Sept. 8-9.

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The Sandia Labs Volleyball Association has started its Class "A" competition play and needs more players for the twice a week sessions. Call league president Mike Edenburn, Ext. 6872, if you are interested.

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The B-10 team of the Sandia Labs Basketball League finished the season in first place with a perfect 17 and 0 record. Team members are: Dennis Gutierrez (7121), manager; Joey Gutierrez (4512), Rich Sena (4512), Al Spencer (4543), Mike Nielsen (4542), Al Dickinson (4542), Carl Pennington (7121), Charlie Carter (7122), Leo Chavez (4614), Tom Simpson (7142), Jim Myers (7142) and Ernie Nevada (4512).