

Sandia Developing Wind Turbine

Although it looks like a giant upside-down eggbeater, the thing on the roof on the east wing of Bldg. 802 is a windmill. More precisely, it is the Sandia Vertical Axis Wind Turbine — a device with potential for alleviating at least a part of the nation's energy shortage.

Many Sandians remember the Wincharger, generator and storage battery systems used in rural areas from the 30's to the early 50's which provided individual farms and ranches with electricity. The vertical axis wind turbine differs from a propeller system in that the blades are airfoils — like an airplane wing — and they rotate on a vertical shaft. The blades actually drive into and not with the wind. The one installed this week on the roof of Bldg. 802 has a 15-foot diameter. It is expected to produce about three hp in a 20 mph wind.

The wind turbine project was initiated by Randy Maydew, manager of Aerodynamics Projects Department 5620. Ben Blackwell (5628) is project leader.

"The objective of our wind turbine project is to demonstrate that the vertical axis wind turbine can be fabricated cheaper than conventional horizontal axis systems," Ben says.

A series of tests is planned with the current prototype. The design by Lou Feltz (5623) is extremely adaptable and will allow many ideas for future systems to be evaluated. These tests will be augmented by others in a wind tunnel using a smaller model of the wind turbine.

"We expect then to build a 35-foot prototype that would produce useful power — 10kw (13.4 hp) in a 17 mph wind," Ben says. "We visualize a self-contained unit, useful in isolated communities such as islands."

The current model was 90 percent fabricated in Sandia's Process and Fabrication Laboratories 3600. A study is being made of production costs using alternate materials and fabrication methods.

The vertical axis wind turbine was invented in 1925 in France by G.J.M. Darieus and patented in the US in 1931, but the idea lay dormant for almost 50 years. A Canadian research group independently re-invented the device recently and was surprised to find a prior patent.

Randy and Ben visited the National Research Council of Ottawa last October to discuss the device. Both Sandians are excited about the potential of the vertical axis system.

"At the 1973 Wind Energy Conversion Systems Workshop it was estimated that a significant portion of the country's electrical needs could be met by wind generators located at favorable sites in the US," Ben says.

Proper siting is the key to successful production of energy from the wind, Ben continues. According to Jack Reed (5644), project meteorologist, the best sites in the continental US are the upper central plains area and the northeastern and northwestern coastal areas. Islands in the Pacific and Caribbean and along the Alaskan coast are even better sites. Albuquerque, except for a couple of months in the spring, is not a good site for wind power.

"The importance of proper siting cannot be overemphasized," Ben says, "because the energy of the windstream rises with the third power of the wind speed. In other words, if the wind speed doubles, you have eight times more power; if the wind speed triples, you



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have 27 times more power. When you talk about the power rating of a wind turbine, you must also specify the wind speed."

In the national energy research program, wind energy is considered part of solar energy (two percent of solar energy deposited on the earth is converted into wind) and comes under the primary responsibility of the National Science Foundation. NSF has asked NASA's Lewis Research Center in Cleveland to assist in the wind energy program. Sandia is maintaining close contact with both agencies.

NSF and the Lewis Research Center are jointly sponsoring a five-year wind energy program aimed at development of a 125-foot diameter (100kw) wind turbine to be used for

studying commercial production of electricity. The 100 kw system will be a step toward projected wind generators capable of producing 1-2 megawatts; these could be tied into existing power grids.

Since Sandia's effort emphasizes a self-contained system for isolated communities or other power-need situations, the programs are complementary.

Significant contributions were made to the project by Sandians throughout the Laboratories. The LAB NEWS will discuss how a project such as this progressed through design, fabrication and installation in a forthcoming issue. • dg

Afterthoughts

You can be irritated but still give blood--Couple of years ago New Mexico Blood Services made a compact with a few thousand Sandians: give blood and if you ever need it you'll get blood for free. Recently, this blood plan insurance was discontinued by Blood Services, and the unilateral decision raised the ire of donors who felt that if the rules of the game were to be changed, then they would damn well elect not to play in the new game. And the number of donors has dropped--from 70 down to 10 per week.

The episode is a striking illustration of how not to handle a problem in human relations. Not a very difficult problem either, because there remain strong arguments for you to continue to give blood:

- for Sandians, the value of the discontinued blood plan insurance was either academic or small. If you're covered by Mastercare or Lovelace-Bataan, blood charges are paid for in full. If you're under Equitable, you'd pay 20% of charges.
- Blood Services isn't making a killing off your blood. In fact, charges for blood have gone down in the last two years, and you won't find many things around a hospital whose cost has diminished.
- Albuquerque's blood supply is touch-and-go at times. "Clean" volunteers are essential if the supply is to avoid the serum hepatitis threat, a derivative of the purchase of blood from winos and junkies. Should you ever need blood, it would be comforting to know that you're getting the high class stuff.

If it makes you feel any better, go ahead and be mad at the bureaucrat who changed the rules. But don't let pique interfere with your clear vision of the elements of the blood situation.

* * *

An awful lot of puffery--I don't smoke and the habit is clearly pernicious, but the current movement (and that's what it is) among non-smokers to ban smoking in offices, conference rooms, airplanes and hall closets begins to approach hysteria. There's even an outfit in town called GASP that's exclusively dedicated to the cause. They publish a newsletter that, among other things, lists establishments that now prohibit smoking, and the fervor of their pronouncements is of the order normally reserved for religious crusades, holy wars, and debates between political candidates. One suspects that much of the fervor derives from the ex-smokers who now show the fanatical zeal of the convert. Being in an office with a smoker is about like being in a restaurant near a bowl of okra soup--it's not edifying, but it's not worth making a fuss over.

* * *

A thought to ponder--"Obesity...is a type of overweight caused by an excess of fat." KAFB Bulletin, 7 May 1974 *js



TOM EDRINGTON (4733), left, and HARRY HARDEE (1543).

Supervisory Appointments

TOM EDRINGTON to supervisor of Systems Studies Division III, 4733, effective April 16. Since coming to the Labs in March 1961, Tom's work has included missile systems development, aerospace nuclear safety, and radar signal processes analyses. Responsibilities of his current position include analytical studies of advanced weapons systems. Tom had previously worked on radar systems at the Defense Research Laboratory in Austin, Texas.

He earned BS and MS degrees in EE from the University of Texas. Tom was a participant in Sandia's Doctoral Study Program, and his PhD was awarded in 1970 from UNM. He is a member of IEEE and the American Statistical Association; his favorite hobbies are skiing and aviation.

Tom, his wife Daphne, and their two children live at 2712 Alvarado NE.

* * * *

HARRY HARDEE to supervisor of Heat Transfer and Criteria Division 1543, effective May 1. Beginning in 1957, Harry worked at Sandia during summer vacations. As a permanent employee he has worked in field test, aerospace nuclear safety and, since 1967, has been assigned to the division which he now supervises. His work with this group involves heat transfer and fluid mechanics.

Harry's mechanical engineering degrees — BS, MS, and PhD — were awarded by the University of Texas. After receiving his doctorate, he taught ME at New Mexico State University for a year and then returned to Sandia.

The most popular activity off-the-job with the Hardees is flying. Both Harry and his wife Loye are licensed pilots. They've recently returned from trips to Dallas and to Mexico. They have a son and two daughters and live at 8715 Delamar NE.

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College Credit for CPS

The University of Albuquerque has announced that 24 academic credits will be granted to Certified Professional Secretaries toward a bachelor's degree in business administration. The credit will be accepted in the areas of concentration and skill requirements for the business administration degree.

Bobbi Voelker (9320) worked with officials at the U of A to gain this program. Contact Bobbi on ext. 2972 for specifics of the arrangement.

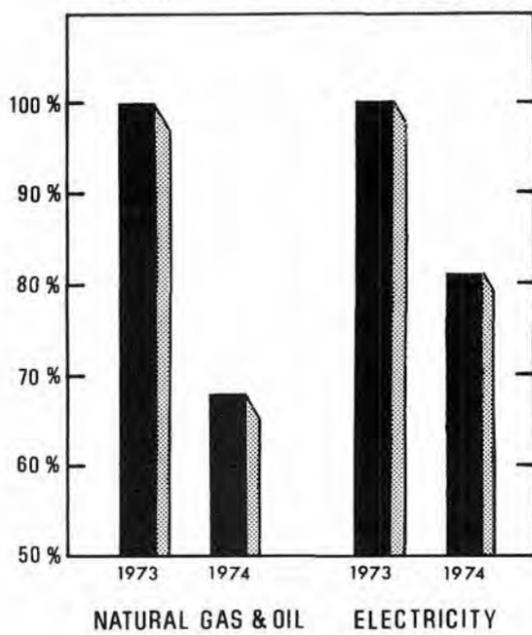
LIVERMORE NEWS

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THE LIVERMORE ENERGY PICTURE APRIL CONSUMPTION



Bus Service — Yes and No

Two bus surveys, recently conducted, checked employee interest in private carrier service from the Walnut Creek-Danville area and from Livermore.

Of 50 employees from the Walnut Creek-Danville area, 11 indicated they would use bus service, 16 said they would not. Of 670 Sandians living in Livermore, 38 said they would definitely use the service, 158 would use it occasionally and 123 were not interested. The carrier on the Livermore route has stated that enough interest has been shown by SLL and LLL to inaugurate service as soon as local and state approvals have been granted.

Take Note

One hundred seven employees donated blood during the annual Blood Bank Drive at Sandia/Livermore. Sixty-five pints went to the Sandia Blood Bank and 42 to Kaiser Health Care Plan. Training and Benefits Division 8214 coordinates the drive each year.

Sympathy

To Moe (8161) and Shannon Houk (8442) on the death of his father in Castro Valley, April 17.

To John Brengle (8184) on the death of his daughter in Ukiah, Calif., April 13.

To Bernie Dunne (8433) on the death of his sister in New York City, May 2.

Death

Joseph Weihe, manager of Computer Department 8440, died May 7. He was 52.

Joe joined Sandia in October 1954 in Albuquerque and transferred to Livermore in February 1969. He had been a department manager since February 1963.

Survivors include his widow, a son, a daughter, one grandchild, and his mother and step-father.



JEWELRY cast in silver and gold is displayed by Mickey Rindone (8362) and Hans Birnbaum (8423).

'Lost Wax' Process Used in Jewelry Casting

"I've never done anything as artistically creative, yet realistic," says Mickey Rindone (8362).

"What fascinates me is the challenge of developing a finished article that matches an individual's taste," adds Hans Birnbaum (8423).

Both are enthusiasts of the same hobby — designing and casting finely detailed jewelry in metal. Using the "lost wax" casting process, they work primarily in silver, but also in gold.

Casting in metals is one of the oldest art crafts, with a history dating back to biblical times. Today the lost wax process is the most popular mode of casting because it offers the truest replacement of an original model.

Mickey explains that the process first requires forming in wax an exact replica of the finished article. This model is placed in a steel cylinder or flask, and a creamy plaster-like material (investment) is poured over it. When the investment has set, the flask is put in an oven and heated to eliminate the wax. Using a centrifugal casting machine and a torch, molten metal is then thrown or "cast" into the cavity left by the lost wax; it hardens into an exact reproduction of the original wax model. Grinding and polishing complete the process.

"What makes the lost wax method unique," points out Hans, "is that only one piece of jewelry is cast from each design since the model melts in the process."

"Generally, he continues, "I sketch the pattern before carving, but the wax must first be built up from thin sheets by heating, then

dripping. And there's a definite knack to controlling the droplets. Tools similar to dental instruments, only more pointed, are used. I've made mostly brooches, pendants and men's and women's rings, although any item can be cast providing it conforms to the size and shape of the flask held by the casting machine."

At times Hans replicates Indian jewelry, and he is especially interested in making a squash blossom necklace by casting the beads and flowers. "The challenge comes in trying to reduce the weight," he comments. "Indians take flat sheet silver, cut it to shape, then silver solder beads, squashes and bezels to contain the stones."

Hans took up jewelry casting through his sister, who holds some 175 patents as a designer of silver tableware. Mickey's interest stems from attendance at a Sandia retiree dinner a few years back where he read some literature on the subject. As a result, both enrolled in various classes to develop their techniques.

"I found," remarks Mickey, "that simple rings like wedding bands are easy, but to produce something really interesting you must do stone work. That opened up a whole new area — rock hounding and cutting and polishing rocks."

Several of Mickey's ring designs combine the pentagonal Thunderbird symbol of the old Sandia service award jewelry with the square motif of the new-style jewelry. "I just like the contours of the old design," he comments.

Credit Union Reporter

By Earl Simonson,
President

When Are Your Savings Accounts Insured?



You might feel your savings are safe in any bank, credit union or savings and loan institution. You might also be attracted by higher-than-average dividend rates, but watch out — you could lose your savings.

Before you deposit your money in a bank make sure it is a member of the "Federal Deposit Insurance Corporation (FDIC)." Not all state chartered banks are insured. Insured banks display signs stating they are a member of FDIC. Similarly, at an insured savings and loan institution a sign will state: "Member of Federal Savings and Loan Insurance Corporation (FSLIC)."

And before you deposit money in a credit union make sure you see this sign: "Each member account insured to \$20,000 by Administrator, National Credit Union Administration (NCUA)." Not all state chartered credit unions are insured. Your Sandia Credit Union is a member of NCUA.

CU Bulletin Board

Now before Congress is the bill to establish the Consumer Protection Agency. The Agency would be a potent force for the consumer. It would become the consumer's first formal representative at the federal level and thus would be involved in any federal policy-making affecting consumers. In addition, it would serve as the consumer's lawyer/questioner/watchdog in federal agencies such as the FCC, F&DA, and the like. It would be a clearinghouse for consumer complaints and suggestions, collect information on consumer safety and health, and even go to court to appeal rulings not in the consumer interest. Needless to say,

stalwarts of industry such as the National Ass'n. of Manufacturers and the US Chamber of Commerce look upon the bill with something less than enthusiasm, and it faces rough opposition. One of the bill's sponsors has described the bill as "a barracuda in a carp pond" and, if passed, its significance as consumer legislation will be far reaching.

Construction Started — Cole-Templeton Construction Company has started construction on our 2500 sq. ft. addition. They were the low bidder at \$117,660. The addition should be complete in December.

Bus Passes — The National Credit Union Administration has approved our selling of bus passes and has authorized their sale to all Sandia employees, not just Credit Union members.

Tickets for Athletic Events — Each week we conduct drawings for free tickets to upcoming athletic events in Albuquerque and Livermore. Winners are called and their names are posted on the bulletin boards at the Credit Union.

Audit — As part of its normal audit procedure, the Supervisory Committee recently mailed statements to members with account numbers from 4000 to 4999, 7000 to 7999, and 11,000 to 11,999. If your account number is in any of these series and you have not received your statement, please notify Otis Cox (4273), committee chairman.

Mr. Smith Goes To Washington



Willis Smith, Solid State Electronics Division 5113, has won an IEEE congressional fellowship to serve in Washington, D.C., for a year as a scientific consultant to one of the technical committees in the Senate or House of Representatives.

The fellowship, earned in national competition with other IEEE members, is one of two sponsored each year by the group. Various technical societies sponsor an additional 10 fellowships as part of the program.

Technical fellows write background reports on pending legislation relating to energy and other technical subjects; draft and revise legislative bills on technical subjects; and perform technical liaison activities.

Will begins his year of service in late summer, probably with the House of Representatives' Science and Astronautics Committee.

He joined Sandia in April 1970 and since that time has done research on the properties and device applications of PLZT ceramics. Recently he began investigations of photovoltaic materials and devices.

He holds a BS degree in physics from Bradley University and MS and PhD degrees in the same field from Washington University, St. Louis.

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P.D. Thacher (9532), "Phase Changes and Optical Effects in a Ferroelectric (Pb,Ln)(Zr,Ti)O₃ Ceramic"; D. Emin (5155), "Phonon-Assisted Electronic Transition"; J.E. Schirber (5150), "Pressure Dependence of Superconductivity in PdH and PdD"; A.C. Switendick (5151), "Band Structure of TiH₂"; P.S. Peercy (5132), "Pressure Dependence of Inelastic Light Scattering from 'Soft' Phonon Modes"; W.J. Meyer (5151) and A. Narath (5000), "NMR Shifts of ³¹P in LaP₂Ce"; A. Narath, "Local Moment NMR of ⁵⁹Co in WCo Alloys"; L.R. Edwards (5132) and L.C. Bartel (5151), "On the Magnetic Properties of the Fe_{0.65}(Ni_{1-x}Co)_{0.35} Alloy System"; G.W. Arnold (5112), "Ion Implantation Effects in Al₂O₃"; L.C. Bartel (5151), et al., "Temperature Dependent Properties of the Hubbard Hamiltonian Including the Resonance-Broadening Terms for an Arbitrarily Filled Band"; R.K. Quinn (5154), R.T. Johnson (5155), and C.J. Miglionico (5822), "Surface Nucleated Crystallization in Ge₁₅Te₈₀As₅ Semiconducting Glasses"; R.A. Assink (5811), "Plasticization of Polydimethyl Siloxane by High Pressure Gases"; C.W. Frank (5811), "Excimer Formation in Vinyl Polymers III: Poly(4-vinylbiphenyl)"; W.J. Camp and J.P. Van Dyke (both 5151), "The Anisotropic Heisenberg Model at High Temperatures"; G.E. Pike (5155), G.L. McVay (5154), W.J. Camp (5151) and C.H. Seager (5155), "Percolative Effects on Germanium Diffusion in SiGe Alloys"; R.C. Hughes (5814), "Generation and Transport of Ionic Charge Carriers in Single Crystal Quarts."

R.G. Kepler (5810) and P.M. Beeson (5814), "Pyroelectricity in Polyvinylidene Fluoride"; D.M. Mattox (5834), "Recent Advances in Ion Plating"; D.W. Schaefer (5814), "Light Scattering Studies of Motile Microorganisms"; G.A. Samara (5130) and I.J. Fritz (5132), "Pressure Dependence of the Dielectric and Ultrasonic Properties of Polychlorotrifluoroethylene (PCTFE)"; C.H. Seager

(5155) and R.K. Quinn (5154), "Seebeck Measurements in a-As₂Se₃"; P.M. Richards (5132), "ESR Measurements in an Impure Heisenberg Linear Chain"; A.R. DuCharme (5154), J.R. Holland (5157) and G.K. Straub (LASL), "Theory of Solute Clustering in Binary Alloys"; S.M. Myers and R.A. Langley (both 5111), "Study of Au Diffusion in Be Using Ion Backscattering"; J.P. Van Dyke (5155), "Calculation of the Metal-Insulator Transition in Thallous Halides"; J.A. Borders (5111), J.M. Poate and W.J. DeBonte (Bell Labs), "Lattice Location of Implanted Gold in Copper"; J.G. Curro (5811), "Physical and Chemical Stress Relaxation of Elastomers," American Physical Society Meeting, March 25-28, Philadelphia, Pa.

P.M. Richards (5132), "Magnetism in One- and Two-Dimensional Compounds," Physics Dept.

Speakers

Colloquium, March 29, Univ. of Kentucky.

L.R. Edwards (5132), "Effects of High Pressure on the Electronic Properties of Solids," Seminar, Metallurgy Dept., Iowa State Univ., March 29, Ames.

L.V. Rigby (0200), "Some Unusual Approaches to Quality Problems," California Quality Control Week Conference, March 29-30, Burlingame.

W.R. Perret (1111 consultant) and R.C. Bass (1111), "Attenuation of Explosively Generated Free Field Ground Motion," Annual meeting, Seismological Society of America, March 29-31, Las Vegas, Nev.

N.R. Armstrong, R.K. Quinn (both 5154) and N.E. Vanderborgh (UNM), "Electrochemical

Reduction of Benzaldehyde and Nitrobenzene Compounds in Sulfolane: (2) Spectroelectrochemical Observations of the Reduction Intermediates"; Armstrong, Quinn and Vanderborgh, "Electrochemical Reduction of Benzaldehyde and Nitrobenzene Compounds in Sulfolane: (1) Stationary and Rotating Ring-Disk Electrode Studies"; R.A. Lefever, G.L. McVay and R.J. Baughman (all 5154), "Preparation and Properties of Hot Pressed Silicon-Germanium Alloys"; G.A. Samara (5130), recipient of Ipatieff Prize, "The Hydrogen Bond in Ferroelectricity and the Role of High Pressure Research," American Chemical Society Meeting, March 31-April 5, Los Angeles.

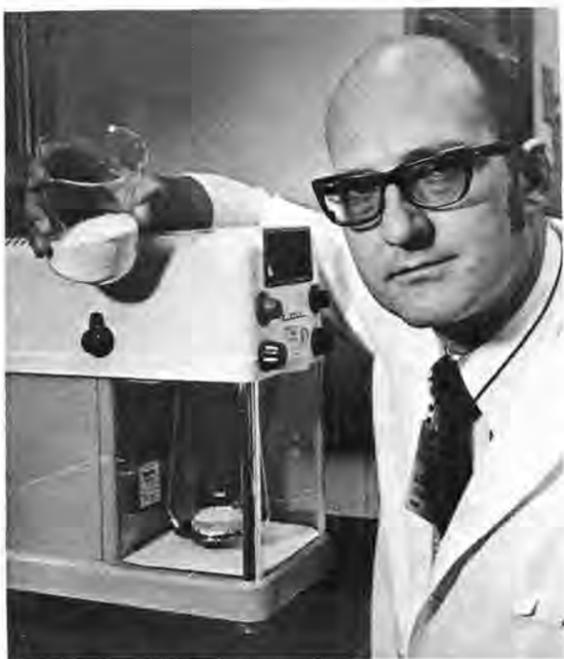
F.G. Yost (2431), "The Stochastic Nature of Electronucleation," Spring meeting of the Metallurgical Society of AIME, April, Pittsburgh, Pa.

D.W. Schaefer (5814), Invited paper, "Bacterial Motility from Scattered Light Intensity Fluctuations"; Schaefer and B.J. Berne (Columbia Univ.), "Dynamics of Charged Macromolecules in Solution," Conference on the Spectrum of Light Scattered from Biological Molecules, MIT, April 1-3, Cambridge, Mass.

A.J. Chabai, R.J. Lawrence (both 5166) and E.G. Young (5163), "Elastic-Plastic Target Deformation Due to a High Speed Pulsed Water Jet," 2nd International Symposium on Jet Cutting Technology, St. John's College, April 1-4, Cambridge, England.

J.A. Borders (5111), "Analysis of Semiconductor Device Metallization Systems Using Energetic Ion Backscattering," Central Research Laboratories, April 4, St. Paul, Minn.

G.A. Samara (5130), "Ferroelectricity and the Role of High Pressure Research: Soft Modes in Perovskites and Hydrogen-Bonded Ferroelectrics," Solid State Physics Seminar, Caltech, April 4, Pasadena.



INVENTION of a ferroelectric ceramic control process by Paul Wilcox (2521) was recently awarded a patent.

Patent Awarded Sandia Ceramic Production Process

The AEC was awarded a patent recently for a ferroelectric ceramic control process used in the production of PZT lead zirconate titanate ceramics. Inventors are Paul Wilcox, supervisor of Active Ceramic Materials Division 2521, and Dean Buckner, a former Sandian.

Mixing and firing of materials which form ferroelectric ceramics is a complex and painstaking process — minute deviations in the purity of materials or particle sizes can result in wide performance variations in the final product. More than 50 percent waste is not uncommon in the manufacture of highly specialized PZT products.

The new Sandia process provides a method to test and process the product during early stages of production to determine final performance characteristics. If specifications are not being met, then adjustments can be made. The production of special PZT ceramic products was improved to as high as 80% yield using the Sandia innovations.

The process has wide applications, not only in the production of special PZT for Sandia applications but in most piezoelectric PZT production where holding properties within specified ranges is important.

Dean Buckner is now with Gulton Industries, Fullerton, Calif. Paul has headed Division 2521 since August 1973. He joined Sandia after earning a PhD in ceramics engineering at the University of Utah in 1962.

Events Calendar

- May 24** — U of A Jazz Series: Trombonist Carl Fontana & Sandia Jazz Corp., 8:15 p.m., Fine Arts.
- May 25** — "Pather Pancali" (1951) dir. S. Ray, 10 a.m. & noon, Guild Theater, 1305 Central.
- May 25** — N.M. Mt. Club, Canyon Estates to South Peak, 7-8 hr. hike, Western Skies, 8 a.m.
- May 25** — Hayden School of Ballet: Spring Dance Program, 8:15 p.m., Popejoy Hall.
- May 25** — Senior Citizens Meeting, 9 a.m. to 12:30 p.m., Civic Auditorium.
- May 26** — June Music Festival Series: Fine Arts Quartet, Albuquerque Little Theater, 8:15 p.m. (256-9001)
- May 26** — N.M. Chamber Orchestra, 4 p.m., Keller Hall, UNM.
- May 29** — Fine Arts Quartet w/Derrell Randall, 8:15 p.m., Albuquerque Little Theater. (256-8001)
- May 30 through June 2** — New Mexico Charity Horse Show, Horse Arena, State Fairgrounds.
- May 30** — ZZ Top Rock Concert, 8 p.m., Civic Auditorium.
- June 1** — N.M. Mt. Club, Hamilton Mesa, 6-8 miles, Gulf Mart, 7:30 a.m.
- June 1-2** — San Felipe Fiesta Celebration, Old Town Plaza.
- June 3-15** — Re-Discover New Mexico, 12 to 8 p.m., Mon. thru Fri., Sat. 10 to 6 p.m., Winrock Shopping Center.

Colloquia

- May 29** Technology Colloquium, D.W. Ballard (9351), "Nondestructive Testing and its Changing Role at Sandia Laboratories" (Unclassified - passes not required), Bldg. 815, 10:15 a.m.
- June 4** Technology Colloquium, (Video), same as above, Bldg. 815, 10:15 a.m.
- June 13** Same as above, Bldg. 632, Auditorium (Unclassified - inside the Tech Area), 1:30 p.m.
- June 5** Sandia Research Colloquium, Dr. John H. Howard, Univ. of Calif./LLL, "Geothermal Energy Development," Bldg. 815, 8:30 a.m., inside tech area.



INVENTOR George Volda (2434) displays new battery cable that solves battery connector corrosion problems.

George Volda's Battery Cable Awarded Patent

Anyone who drives an automobile experiences battery problems. More often than not, the problem is the battery cable — corroded and deteriorated into a non-functioning mess.

The AEC was recently awarded a patent for a new kind of battery cable invented by George Volda of Interconnections Division 2434 which has the potential for solving all battery connector problems.

Although designed for weapons applications, the principle of George's cable is universal. The problem in conventional battery cables is that dissimilar metals are used and soldered together with still another material. In the presence of the battery electrolyte, the dissimilar metals become a source of electrical discharge through galvanic action. This action corrodes and breaks the lugs or clamps attached to the battery terminals. Most automobile battery cables require replacement within three years.

George's cable is constructed with nickel lugs and nickel shield and copper conductors clad with nickel. Joints are pulse-arc welded. Materials subject to galvanic action simply are not used. The cable is protected from external damage by a bonded polyurethane jacket.

George has worked as a chemist at Sandia for 19 years. He holds another patent on fluorescent soldering flux.

R.A. Graham (5131), "Shock-Wave Compression of X-Cut Quartz as Determined by Electrical Response Measurements," Vol. 25, No. 3, JOURNAL OF PHYSICS AND CHEMISTRY OF SOLIDS.

G.L. McVay (5154) and E.H. Farnum (LASL), "Anomalous Effects on H₂O on Na Diffusion in Glass," Vol. 57, No. 1, JOURNAL OF THE AMERICAN CERAMIC SOCIETY.

J.A. Panitz (5114), "Preflashover Phenomena and Electron-Stimulated Desorption in High Electric Fields," Vol. 45, No. 3, JOURNAL OF APPLIED PHYSICS.

D.W. Schaefer (5814), "Enumeration Techniques," McGraw-Hill YEARBOOK OF SCIENCE AND TECHNOLOGY, 9174; and "Single-Interval Statistics of Light Scattered by Independent Scatterers," Vol. 7, 530 (1974), JOURNAL OF PHYSICS A.

H.J. Rack (5832) and D. Kalish (BTL), "Improved Fatigue Resistance of 18Ni(350) Maraging Steel Through Thermomechanical Treatments," March issue, METALLURGICAL TRANSACTIONS.

W.J. Brya (formerly 5132) and P.M. Richards (5132), "Frequency Moments for Two-Spin Light

Scattering in Antiferromagnets," March issue, PHYSICAL REVIEW B.

D.F. Wolf (5626), "A Simplified Dynamic Model of Parachute Inflation," Vol. 11, No. 1, JOURNAL OF AIRCRAFT.

S.M. Myers (5111) and A. Narath (5000), "Study of Paramagnetic Spin Fluctuations in the Rare-Earth

Authors

Monophosphides via Pulsed NMR," Vol. 9, No. 1, PHYSICAL REVIEW B.

P.S. Percy and I.J. Fritz (both 5132), "Pressure-Induced Phase Transition in Paratellurite (TeO₂)," Vol. 32, No. 9, PHYSICAL REVIEW LETTERS.

J.E. Boers (2414), "Digital Computer Simulation of Charged Particle Beams and Electrostatic Lenses," Vol. 10, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

J.L. Jellison (5833), "Plastic Deformation and Fracture of Fe-V Alloys," Vol. 13, No. 3, MATERIALS SCIENCE AND ENGINEERING.

J.G. Kelly (5242), "Generation, Transport, and Compression of an Annular Intense Relativistic Electron Beam with Return Current Feedback Through the Cathode," Vol. 10, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

L.P. Mix, J.G. Kelly, G.W. Kuswa, D.W. Swain (all 5242), and J.N. Olsen (5213), "Holographic Measurements of the Plasmas in a High-Current Field Emission Diode," Vol. 10, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

P.S. Percy (5132), "Uniaxial-Stress Dependence of the Raman-Active Phonons in TiO₂," Vol. 8, No. 12, PHYSICAL REVIEW B.

J.W. Poukey, J.R. Freeman (both 5241), and G. Yonas (5240), "Simulation of Relativistic Electron Beam Diodes," Vol. 10, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

H.T. Weaver (5154), J.E. Schirber (5140), and A. Narath (5000), "Pressure Dependence of ⁷¹Ga and ¹⁹⁷Au Nuclear Magnetic Resonance in Pure and Pd-Doped Au₃," Vol. 8, No. 12, PHYSICAL REVIEW B.



THE NEW MEXICO CHARITY HORSE SHOW will be held over the Memorial Day weekend and this Sandia family will be active in many of the events. Carter Broyles (1100) and wife Pat watch Susan and Steve as they prepare for a ride. Proceeds are chiefly donated to the Casa Pasitos Kindergarten for children with multiple handicaps. Show starts May 30, runs through June 2, and is held at the State Fair Grounds. Over 450 exhibitors will take part.

Recreation Notes

FUN & GAMES

Bowling — The Women's Sandia Labs Bowling League ended its season last month with the "Q's" team winning first place over "Maaco" by one-half game. First place trophies were presented at the Awards Banquet to team members: Helen Davison (4700), Thelma Harrell (4750), Dorothy Pinkerton (retired), Margaret Lucas (1002) and Helen Stake (5250).

Other presentations included: Pat Ximenes (4154), high individual series, scratch; Debbie Hill (5131), high individual series, handicap and high individual game, scratch; "Jokers," high team series, scratch and high team game, handicap; "Pin Poppers," high team series, handicap; "Fowls," high team game, scratch; Betty Parker (2632), high individual game, handicap. The WIBC Achievement Award for most improved average went to Laura Sandoval (5000).

New officers for the '74-'75 season were elected: Pat Ximenes, president; Eva Franks (5643), vice president; Aurora Baca (1612), secretary-treasurer; and Helen Payne (2111), sgt.-at-arms. Outgoing president was Dora Montoya (1542).

* * * *

Sandia Runners & Bikers — An item in the May issue of *Runner's World* is appropriate for the beginning of summer. Entitled "Keep Your Running Cool," the article early notes that "the ability . . . to survive heat stress is among the prerequisites for successful endurance performance." Which most of us knew anyway. But here are a few additional observations by the author, Dr. Alan Claremont:

- sweating losses of up to one liter (2.2 pounds) per hour can be sustained during heavy work at air temperatures of 90°
- at such a loss rate, fluid volume and electrolyte losses can be so large that normal functioning of the body cannot continue without fluid and electrolyte replacement
- if a runner or a biker relies solely on the thirst mechanism, he or she will inevitably acquire a water deficit, for the sensation of thirst is satisfied before adequate fluid volumes are restored
- to maintain a hydrated state, take small volumes at frequent intervals, e.g. 250

ml (about 8 oz.), every 15 minutes an analysis was made of commercially available drinks, but none was totally satisfactory and it was concluded that tomato juice taken with equal volumes of water (separately or together) provides an almost ideal replacement. It contains about twice the required amounts of sodium and chlorine, and more than six times the recommended quantity of potassium. (And it's cheaper than the ades.)

* * * *

Rail Fans — If you haven't taken the ride from Chama to Antonito, Colo., on the Cumbres & Toltec narrow gauger, you should. This is the old D & RGW line that was bought up by the states of New Mexico and Colorado a few years ago. It runs through magnificent high country. A newsletter from the railway indicates that the schedule for the summer is still uncertain because of the gas situation, but we have written for a supply of the schedules when issued and you can get one by calling LAB NEWS on ext. 1053.

Another item in the newsletter relates that the C & TS was recently used in the movie "Showdown," which starred one Dean Martin until he walked off the set. Weeks later, apparently after lawsuit threats, Martin returned and further endeared himself to the community by observing that "If the world came to an end, Chama wouldn't hear about it for three days." With his kind of perception, it isn't clear that Martin would recognize a world-ending anyway.

* * * *

Philatelists — The Albuquerque Philatelic Society is sponsoring a Stamp Show — opening at noon today, 9 a.m. to 10 p.m. on Saturday and 9 to 6 on Sunday — at the Holiday Inn East. Sandia retiree James McCutcheon arranged the show. The 50 plus frame show (each frame is eight album pages) and bourse will include a U.S. Post Office Substation with special show cancellation. Admission is free. Sandians Anthony Mulac (5642), William Cocke (1514) and Peter Kaestner (5625), all members of APS, can tell you more about the event.

R&D Transfer

Getting It Out

Sometimes a Sandia-developed tool or technique can do more for someone else than for Sandia. That — plus the fact that Sandia's R & D is government supported — is the rationale behind a current drive to move promising R & D results out and into the nation's businesses, industries, and classrooms.

The project, called R & D Transfer, is a part of the AEC's Technology Utilization program. Similar projects are underway at LLL, Oak Ridge, and Argonne. Heading the Sandia effort is Corry McDonald (9623).

"Our first task," says Corry, "is to identify what we're doing that might be transferable. So we'll query all our scientific and technical people as to their current and recent projects. We expect to find some on which we can move out immediately. But we'll also tag some to follow up on later."

Obviously, not every group is going to be able to come up with transfer candidates right away. Even so, the query "should stimulate some action in time from most groups," says Corry. "The query will serve as a kind of reminder that we're here and willing to help."

The help includes advice on how best to export an idea or device, assistance in getting a project licensed, even help in arranging tours to show off a specific innovation. "We need at least a week's notice for such tours," says Gene Emerson (also 9623), who is helping Corry in this area.

R & D Transfer is designed to be more than a one-way street: the project includes identifying outside needs for technical help and informing appropriate Sandia groups of those needs. Initially, much of the input will likely come from industry and government agencies in the Southwest, but R & D Transfer services will also be available for the whole country.

Corry gets a gleam in his eye when he talks about a Southwest Regional R & D Transfer Symposium. "I guess my pride in Sandia shows when I think about bringing people from surrounding states to the new Convention Center to hear and see what we do that might be transferred to the public, which is to say, taxpayer. This is a kind of open show-and-tell that we haven't done before." •bh

Retiring



John Thomas (9524)

feed *lib*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.

Q. The memorandum "Standardized Format and Distribution Policy For Technical Reports" specifies the format and distribution differences between Official and Unofficial Technical Reports, but it does not define differences in technical content and completeness for quality of work that should distinguish the two reports. It would appear that the IDO designation now takes the place of SCTM, but what really distinguishes an Unofficial Report (internal memorandum) from an Official Report? When is an Official Report to be preferred to a general publication and vice versa?

A. The purpose of the memorandum was to standardize cover formats, approval levels, and designators for Sandia Technical Reports. The memo did not seek to impose qualitative criteria to differentiate between the official and unofficial categories. That decision remains the prerogative of the author and his line management.

The new system appears to give authors maximum flexibility while, at the same time, reserving to management the necessary control over external distribution. The author and line management supervision decide, on the basis of the material, the purpose for reporting it, and the audience desired, whether a report should be official or unofficial. The responsibility thus rests with the people most involved and best qualified to make the decision. As to the final questions, "when is an official report to be preferred to a general publication, and vice versa?" again it is a line organization choice. The decision must rest in such factors as the significance of the material, the purpose of the publication, the audience sought, time factors, and the comparative cost. The prestige factor usually favors general publication; and need for early publication favors the report.

—K.A. Smith - 3100

Q. Although reserved parking for carpoolers is a great idea, we find we are occasionally unable to use our space because the cars on either side have not left ample room.

Most of the problem seems to be the varying angles of parking. To aid in parking correctly why not put stripes on reserved parking spaces?

A. The writer's points are well taken and have been discussed at some length with appropriate Plant Engineering personnel who are responsible for layout of the parking lots. As a result of these discussions, a study of all parking lots by a group comprised of personnel from Security and Plant Engineering was started 4/2/74. The group was given responsibility and authority for defining and resolving any parking problems created by lack of space and/or improper parking angles. Obviously, the group must give due consideration to cost of any solution.

—L.J. Heilman - 9500

Q. Handling correspondence, I find it the practice of organizations reporting meetings to include a set of all the viewgraphs used. A lot of paper could be saved if a summary of the meeting was prepared and copies of the viewgraphs made available upon request.

A. Your suggestion that organizations limit the number of illustrations included with their summary reports has merit. On Oct. 26, 1973, a memo signed by W.J. Howard was sent to all technical staff and supervisors urging them to limit the distribution of SLA reports to the real need. Consideration is now being given to the issuance of a follow-up letter summarizing other methods by which the use of paper could be reduced. Your suggestion would certainly be incorporated.

K. A. Smith - 3100

Q. At one time there was an assortment of tables and chairs in the patio of Bldg. 836. For some reason all that equipment with the exception of the chairs was removed. Would it be possible to return the tables to the patio area for out-of-the-office lunching?

Since the patio is protected from the wind, it is enjoyable to use the facility from early April until late November.

A. Your suggestion is a good one, but tables are not immediately on hand. We will, however, order additional patio furniture and install tables in this area when they arrive.

R. E. Hopper - 9700

Q. Will any funds allocated recently to the city for bike paths and the like be used inside KAFB? If not, does the city planning include bike path approaches to the major entrances to Kirtland? If this should be the case, can we anticipate that the military would "connect up" and carry on inside the Base?

A. The city's recently approved bond issues include bikeway funding in two categories — \$100,000 for the transportation bike lanes and bike routes to be matched 50/50 with state funds, and \$140,000 for bike trails to be matched 50/50 by federal funds.

The city funds cannot be used on KAFB. However, KAFB does have a bikeway system planned, construction to begin this summer, which will connect with the city Bikeway Network. The Wyoming gate is receiving the most attention in both plans, with all gates except Eubank being included in the base bikeway plan.

K. A. Smith - 3100

Q. I would like to know if any consideration has been given to the establishment of non-smoking work areas?

I'm disturbed that I have to be subjected to cigarette, cigar and pipe smoke in my work area. I believe an individual has the right to smoke if he wishes; however, I also believe that I have the right to breathe clean air.

A. Although there have been articles in the lay press suggesting that the smoke from others is detrimental to non-smokers, up to the present time no scientific studies have confirmed this. Until there is such proof, the Laboratories is unwilling to legislate against smoking. It is felt that for those who find smoking to be objectionable, they discuss this fact with their colleagues who do smoke, for the purpose of arriving at a mutually satisfactory solution.

S. P. Bliss, M.D. - 3300



JOHN LOVE has held many jobs — 3-term governor of Colorado, Navy pilot, attorney, and a host of appointive positions with the federal government, most recently as the nation's first energy director. He chats here with Pres. Sparks during a recent visit to the Labs.



Bus Notes

Dust on the seats — that's the problem 1) for city buses, whose drivers are "forgetful" about cleaning them off as they should; and 2) for rural buses, where too many seats are gathering dust because they're vacant.

So: 1) Tom Gore, head of Albuquerque Transit System, informs us that the drivers have been instructed to dust the seats at the beginning of each run (more often if necessary on windy days) and that rags, cleaning materials, and "start-up time" are provided for that purpose. If seats are really dirty, please call 4-RIDE with route number and date (plus driver's name, if available). The Employee Transportation Committee has been asked to notify ATS management whenever these keep-it-clean instructions are violated.

And: 2) honchos on all the rural buses stand (or sit) ready to improve service to make it more attractive to prospective patrons. Bus service will continue only as long as enough riders support it; that's why the Corrales bus is a thing of the past. If a route change (such as a Bosque Farms loop for that bus) would increase the number of riders, contact the appropriate honcho, or call 4-RIDE. Bosque — Bob Martin, 4-3117; Belen-Los Lunas — Frank Garcia, 4-2431; South Valley — Dave Shank, 4-2186; Mountain — John Southwick, 4-7700.

As the Credit Union Reporter indicates, the CU can now sell bus passes to all Sandians, not just to members. Next time you buy a pass, give them a thank you — they're performing a real service for both patrons and carriers. Thanks, Bill Bristol and staff, and thanks, Board of Directors!

ENERGY SAVINGS

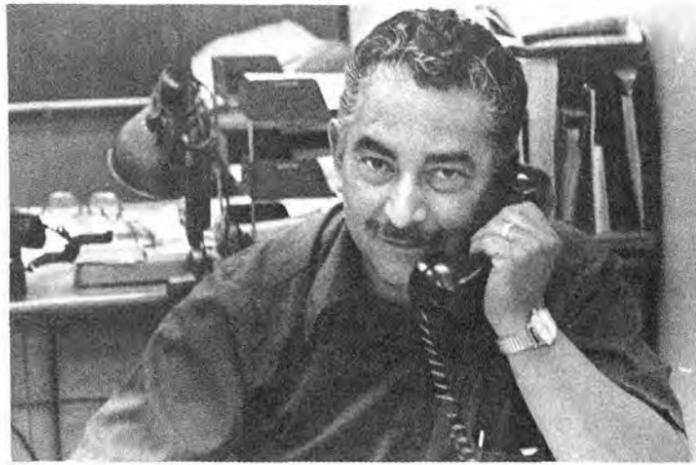
COMPARED WITH LAST YEARS USAGE
REPORTING PERIOD SEPT. '73-APRIL '74

ELECTRICITY	1973 60,800 MWH.	12.3%
	1974 53,300 MWH	
STEAM PLANT FUEL (EQUIV OIL)	1973 157,800 BBLs	12.3%
	1974 138,400 BBLs	
VEHICLE MILES	1973 1,671,000 MI.	18%
	1974 1,377,000 MI.	

MILEPOSTS

LAB NEWS

May 1974



Johnnie Garcia - 1135

25



James Hawkins - 9524 10



Earl Minor - 9511

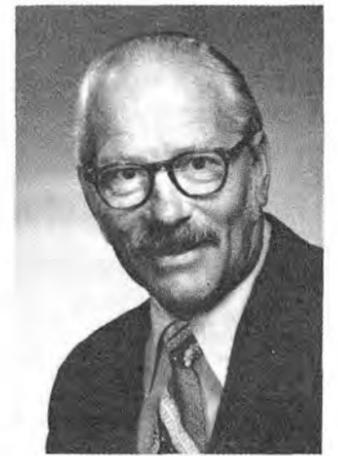
20



George Johnson - 9533 20



Leroy Stradford - 1551 25



Bruce Langford - 3616 25



Wilson Brown - 1254 20



Della Jelski - 3151

20



Juan Serrano - 9718 10



Salvador Armijo - 9712 25



Lawrence Nelson - 1239 15



Mike O'Neal - 2414 15



Tom Harrison - 2334 20



Fred James - 1244 10

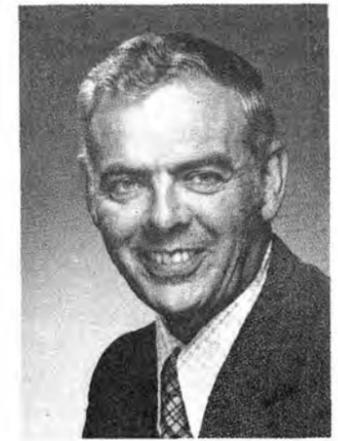


Pat Brannen - 5251 10



Frank Zamora - 9718

10



Bob Bailey - 1522 25



Bryan Arthur - 1640 25



Richard Vigil - 9484 15



Sam Moore - 9470 25



Al Smailer - 9710 15



Mary Bacon - 3147 20



Bob Ezell - 3148 20



Dale Hanely - 3611 20



Don Schueler - 5113 10



Carlton Kentfield - 9611 20



Eifego Sanchez - 9753 20



La Rue Wildgoose - 9530 25



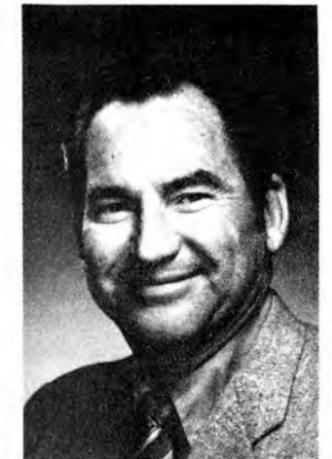
Harvey Kubiak - 1522 20



John Budlong - 9342 20



Reuben Weinmaster - 2314 15



F.S. MacDonald - 9443 20



Terry Unkelhaeuser - 9331 10



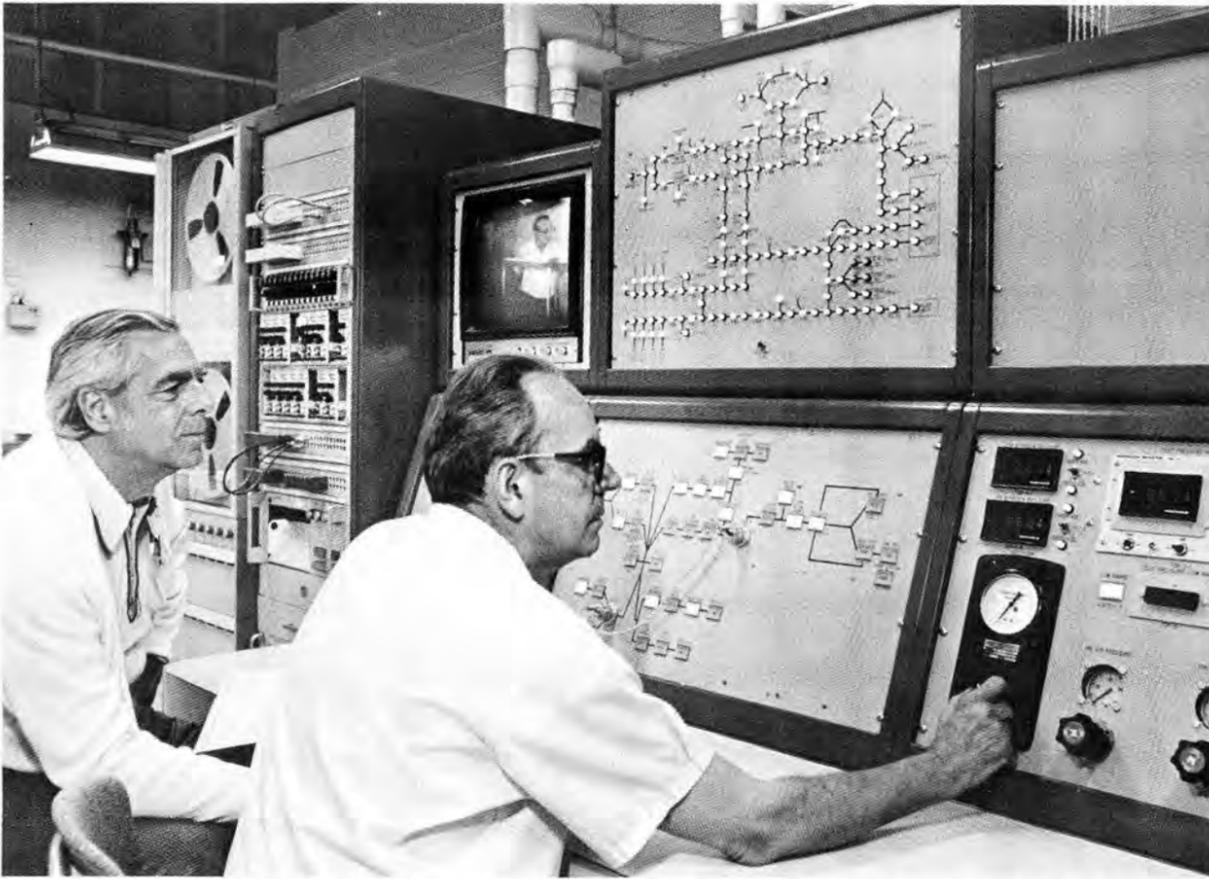
Lawrence Ford - 1544 10



Helen Richardson - 5121 10



Ivy Dunn - 2431 20



CONTROL, MONITORING AND RECORDING functions for the new pressure lab are provided by the master console, designed by Herb Plagge (9334), left. Bob Moll (9515) is facility administrator.

New High Pressure Lab Operating in Area II

A new high pressure evaluation laboratory went into operation in Area II this week. The new lab is the product of two years of planning and construction and will provide testing services for all pressure safety equipment used at Sandia.

Under Jim Hillman, supervisor of Materials and Energy Components Division 9515, the lab will proof test pressure vessels and systems and periodically inspect such vessels. It will also test, certify and calibrate; and provide consultation to Stock and Materials Management Division which will stock high pressure hardware such as fittings, tubing, relief devices, thread adapters and regulators. In addition, the lab staff will be consulted on all special pressure equipment proposed for purchase by Sandia.

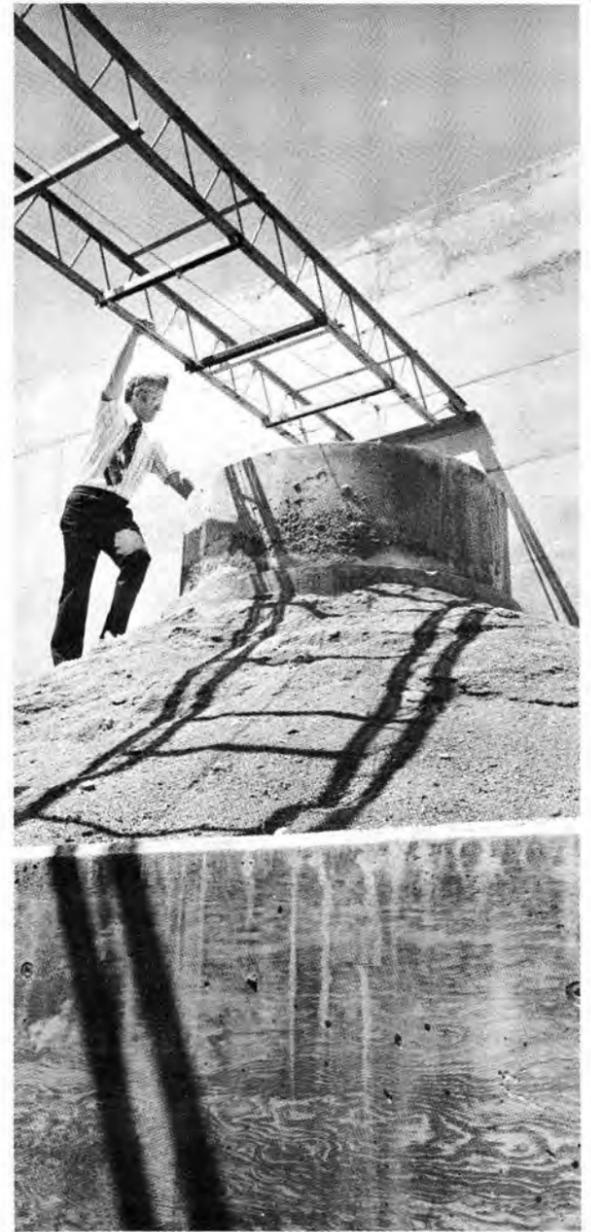
The major test chamber in the new lab can contain the explosive equivalent of two pounds of TNT. This amounts to one cubic foot of nitrogen under 20,000 psi, which is the maximum pressure currently used for testing in the new facility. For this purpose, two 20,000 psi reservoir vessels are stored outside

the facility in an earth-covered concrete pit.

Operators of the facility are Bob Moll and Bill Dobbins (both 9515).

Small size pressure components are tested in a "flow bench" chamber. Pressure and flow transducers monitor characteristics at the flow bench. Flow rates up to 100 scfm may be tested with an accuracy of 1%. Ultrasonic instruments are used to check for safety and relief device cracking. Strain gage, laser holography and framing camera instrumentation are available for vessel testing and evaluation.

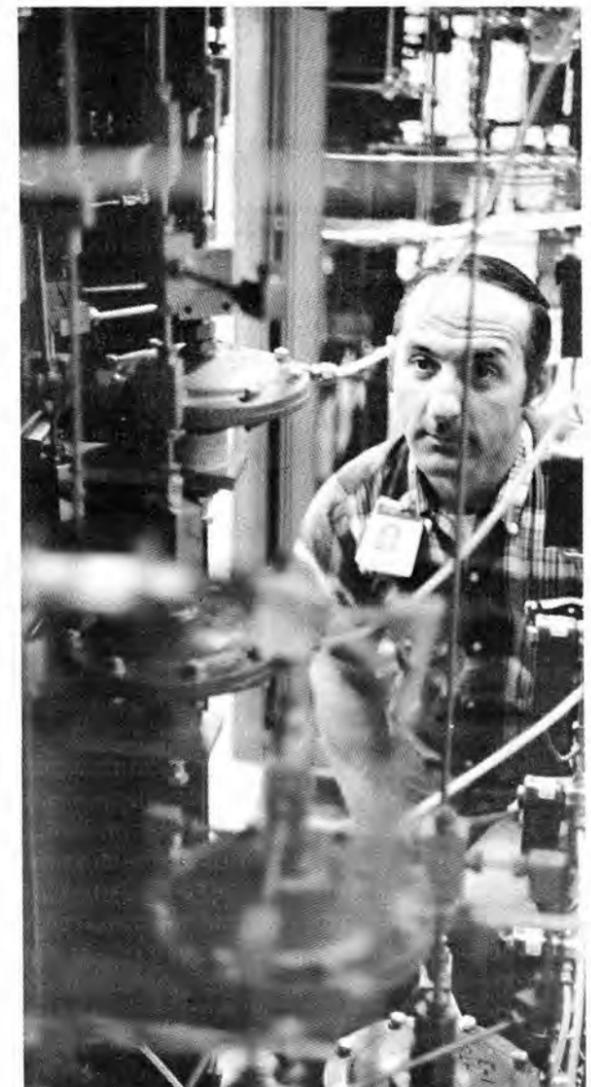
Need for the facility was determined in May 1971 by the Pressure and Vacuum Safety Committee. Initial design was performed by Division 9334 under Eldon Julius. Jo Davis performed mechanical development while Herb Plagge (both 9334) contributed electrical design, including the complex control and monitoring panel. Construction design was by Bob Piper of Plant Engineering Department 9740. Machining Division 3644 represented by Al Gendreau provided structural fabrication support.



JIM HILLMAN, Division 9515 supervisor, inspects the massive concrete lid which covers the two 20,000 psi pressure vessels. Vessels provide reservoir pressure for the new lab.



JO DAVIS (9334) performed mechanical design of the mechanical systems used in the new Area II High Pressure Lab.



COMPLEX ASSEMBLY of pressure fittings for the new Area II lab was provided by Machining Division 3644. Al Gendreau was the 3644 representative at the facility.

Beware of Superglue

Following an item in last week's paper about a boy who glued an eye shut, LAB NEWS adhesives consultant Nick De Lollis (5813) called to remind Sandians that the compound used by the boy is found at the Labs and, for that matter, is now available commercially. "Keep it out of reach of children," says Nick. "Patience and water will ultimately free the bond, but it does take time." Superglue is chemically identified as methyl or ethyl cyanoacrylate. Commercially it's known as Eastman 910, as "instantly curing adhesive," and unfortunately, by a number of other names as well — read the fine print on the label.

Take Note

The Sandians, an organization of wives of employees, will meet Monday, June 10, at 7 p.m. at the home of Sue Bulmer, 12205 Apache NE. It will be a dinner meeting followed by installation of new officers. Those planning to attend are urged to call Barbara Guth, 298-3548, or Mary Thompson (new president of the group), 296-2235, for reservations.



Ray Powell, Vice President, 3000, right, long-time chairman of the State Personnel Board, read the citation for a Distinguished Community Service award presented to Mrs. Genevieve Chavez recently by Governor King. Mrs. Chavez, vice chairman of the Personnel Board, lives in Santa Fe. She was one of several citizens honored at the New Mexico Community Service Awards banquet. Mr. Powell received a similar award last year.

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

CLASSIFIED ADVERTISING
Deadline: Friday noon prior to week of publication unless changed by holiday.
A maximum of 125 ads will be accepted for each issue.

RULES

1. Limit: 20 words
2. One ad per issue per person
3. Must be submitted in writing
4. Use home telephone numbers
5. For Sandia Laboratories and AEC employees only
6. No commercial 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

REFRIGERATOR; dbl. size roll-away bed; stroller; high chair; jump seat; mattress; etc. Trujillo, 344-1259.

RCA 23" color TV w/manual, operates but needs work on RF amplifier, \$120 or will trade for a good portable B&W. Barnaby, 265-4353.

NEW GAS RANGE, \$200; water conditioner, \$400; electric dryer, \$125. White, 293-2219 after 5.

RABBITS; playpen; high chair; car bed; stroller. Hickman, 298-3804.

BUCKET SEATS (2); '66 Chevy parts including radiator, rear seats, windows, tach, speedometer, fuel gauge, hood, gas tank. Cook, 294-2348.

NIKON lenses, 50/1.4 Nikkor-S, \$100; 28/3.5 Nikkor-H, \$120; 105/2.5 Nikkor-P, \$145; soft case F-2, \$15. Mattox, 296-4149.

TEMPRO drum set, all tom toms have new skin, bass drum needs new skin, bass pedal is new, no cymbals included, \$80. Lucero, 243-7517.

SIGNAL GENERATOR, tube tester, volt ohmmeter. Schooley, 243-0828.

YASHICA Super 8 movie camera, model 50 N, 1.8 lens, 5-1 power zoom, battery check, 2 speed, thru lens metering. Duvall, 4805 Marquette NE. Apt. No. 103.

500-GAL. LPG tank, \$275. Shank, 877-4497.

HAMMOND, Phoenix electronic organ, N-series, 1 yr. old,

\$950. Hamm, 832-4213.

SEWING CABINET, makes into a desk, walnut veneer, 6 storage drawers, \$75; 44-qt. cooler, all plastic. Rogers, 268-8682.

REPAIR MANUALS for '65 Dodge. McGuckin, 299-1342.

ELECTRIC RANGE. Fisher, 299-9235.

SEARS 1400 watt alternator, electric power for camping and home, Sears price \$324, my price, \$224. Klecotka, 281-1466.

SWING SET, Wards, with lawn swing, glider, two child's swings and slide, \$30, will help move. Caffey, 296-3320.

HI/FI COMPONENTS, included are Crown, Teac, Thorens, Dynaco color TV, Heath bass guitar amp. Redding, 296-7379.

SPEAKER SYSTEMS, KL4 model 17, walnut, \$95. Jellison, 296-9155.

FRONT END LOADER, John Deere model 35, \$575. Patterson, 877-3158.

TROPICAL FISH, gold crescent wag platies, still young, 50 cents ea. Van Deusen, 299-4328.

SIX YEAR CRIB, needs new mattress, assorted baby clothes, unused diapers, crib toys, \$20, the lot. MacCallum, 842-0233.

DINETTE SET, black, six chairs. Garcia, 344-2236.

WILSON T-3000 steel tennis racket, 4-1/2 med., \$19. Healer, 298-6967.

BABY TUB, \$1; jump seat, \$3; bumper pad, \$3; Yamaha front wheel, \$25. Watterberg, 294-6759.

EUROPEAN HEALTH Spa V.I.P. Membership. Take over payments \$20.80/month for rest of 3-year contract. At beginning of 4th year, only \$25/year. Rugh, 268-5764.

BABY bed with mattress. Filusch, 299-5932.

357 MAG. Colt Trooper MK 111, 6" barrel, \$125. Adams, 268-5943.

KITTENS, 2 male, 1 female, 7 weeks old, mixed breed. Davis, 294-3324 after 6.

CHILD'S playpen, folds for storage, \$10. Smathers, 298-0613.

STEREO equipment, Altec 870 15" woofer, \$75; Scott 300 FM, \$75; BSR 4-spd. changer, \$25; Realistic TR 88, \$70. Cox, 265-9335.

BUNK BEDS with Bunkies, \$60; two twin box springs, \$20 each; cartop carrier, \$7; ironing board w/cover, \$7. Stewart, 268-2786.

SOFA, blue, Danish modern, \$75, matching chair, floral print, \$15; golf woods, man's, \$20, bag, \$10. Longcope, 292-2141.

GERMAN SHEPHERD puppies, AKC registered w/excellent pedigrees, bred for gentle temperament, will be ready for new homes week of June 2-9. Worrell, 299-0381.

BROWNING hunting bow, 38 lbs., adjustable sights, 6 fiberglass arrows w/field tips and broadheads, sharpening tools, \$50. Nelson, 298-0720.

MAPLE cedar chest & chest of drawers; Kenmore portable sewing machine; Underwood manual typewriter; classic guitar, nylon strings w/case; ice skates. Crumley, 299-5293.

DOUBLE BED, bookcase headboard w/footboard, rails and boards, \$25. Baker, 821-6357 after 5.

17 CU. FT. Coldspot chest freezer, \$75. King, 299-8768.

OSCILLOSCOPE, DC to 8mhz, triggered sweep, delay line, 5" CRT, tube type, Heathkit. Stoker, 299-7221.

GARAGE SALE, May 25-26: Power tools, appliances, camping gear, photographic equip. Kutzley, 255-3572.

HARDWICK gas range, \$80; Frigidaire portable dishwasher, \$70; G.E. refrigerated air conditioner, \$50. Edwards, 821-3464.

LABRADOR retriever pups, black, female, registered, excellent strain. Hueter, 242-1620 or 842-5482.

TRANSPORTATION

'62 T-BIRD, PB, AC, new tires.

Vigil, 296-3590.

'72 Kawasaki 500. Galloway, 255-0262.

'67 T-BIRD, 4-dr. Landau, PS, PB, PW, disc brakes, 428 cu. in. engine, \$800. Wright, 298-1789.

'64 LAND ROVER 88, 45,000 miles, \$1500, or best offer. Baca, 268-0943 after 4:30.

'65 DATSUN, station wagon, 4-spd., radio. Randall, 821-0388.

'67 SUNBEAM TIGER, Ford 260 V-8, 4-spd., hard/soft tops, radio, 38,000 miles, one owner, \$1350. Nicovich, 299-1430.

'71 FORD GALAXIE station wagon, 44,000 miles, white w/green body, leather interior, \$1875. Browne, 345-3910.

'58 LAND ROVER truck, 4WD/under drive, lock out hubs, recent valve job; shop manual, \$500 or best offer. Bailey, 299-5460.

'71 FORD 1/2-ton pickup, short-wide bed, 302 V8, 4-spd., \$1300 or best offer. See at 431 Texas NE. Aragon, 266-8597.

'72 GRAN TORINO Sport, automatic, power, air, stereo, mag wheels, \$2375. Rufsvold, 268-5970.

'72 OSSA 250cc Trail Bike, \$750. Munford, 296-4552.

'65 SCOUT 4-wd., 4-cyl., 31 cents a pound. Gammon, 268-1032.

'55 WILLYS JEEP, CJ 3B. Magruder, 255-2078.

'71 CHEVELLE SS-454, 4-spd., factory air, vinyl roof, headers, mag wheels, low mileage, consider trade. LeRoy, 296-2953.

REAL ESTATE

5-ACRE wooded lot, 14.6 miles east of Western Skies, north of old 66, \$3995 cash. Shumway, 865-7160.

SAN JUAN river property, 15 mi. below Pagosa Springs, 1.5 acres, good fishing, close to Navajo Lake. Robertson, 296-4613.

TWO 1-acre lots Brazos Lodge area, \$2900 ea., terms negotiable. Lassiter, 298-2461.

4-BDR., formal dining, den, utility room, \$41,500, 7% V.A., \$245 per mo., 2-1/2 yrs. old. Montoya, 293-3611.

3-BDR., 2-1/2 baths, office, basement, extras, on 2.16 acres, \$65,000. Barker, 299-1483.

MOUNTAIN LAND, 50 to 550 acres, \$200 per acre, 10% down, four-wheel-drive access. Zamora, 898-1295.

WANTED

DUTCH RABBITS, guinea pigs, hutch. Hickman, 298-3804.

FURNISHED 2 or 3 bdr. house for summer. Berthoff, 299-8549.

BACKPACKERS to join party going into Barranca De Cobre Canyon in Mexico, 10-day trip in October. Bill Stamm, 255-2640.

MATURE WOMAN to share home, private bath and entrance, central location, close to shopping and bus, carport and pleasant yard. Beck, 266-4354.

GOLF CLUBS, need a wedge, woman's. Miller, 281-3189 after 8.

FURNISHED 1-bdr. house, pref. near UNM for Tamarind Institute Fellow, June 10-July 7 only. Hawkinson, 281-5239.

FOR RENT

NEW FURNISHED 2-bdr., 2 full baths, refrigerated air home, dbl. garage, overlooks Elephant Butte Lake, weekends, weekly or monthly. Gallo, 255-2488.

SUMMER RENTAL adobe, on 10 acres, 20 min. from downtown. Johnson, 867-5849.

THREE bdr., one bath, central heating, A/C, built-in oven/range, garage, walled and landscaped yard, available June 1, \$200/mo. Patterson, 243-6219.

N.E. 3-BDR., den w/fireplace, 1-3/4 baths, screened patio, garage, \$250/mo., plus damage deposit. Harstad, 298-6551.

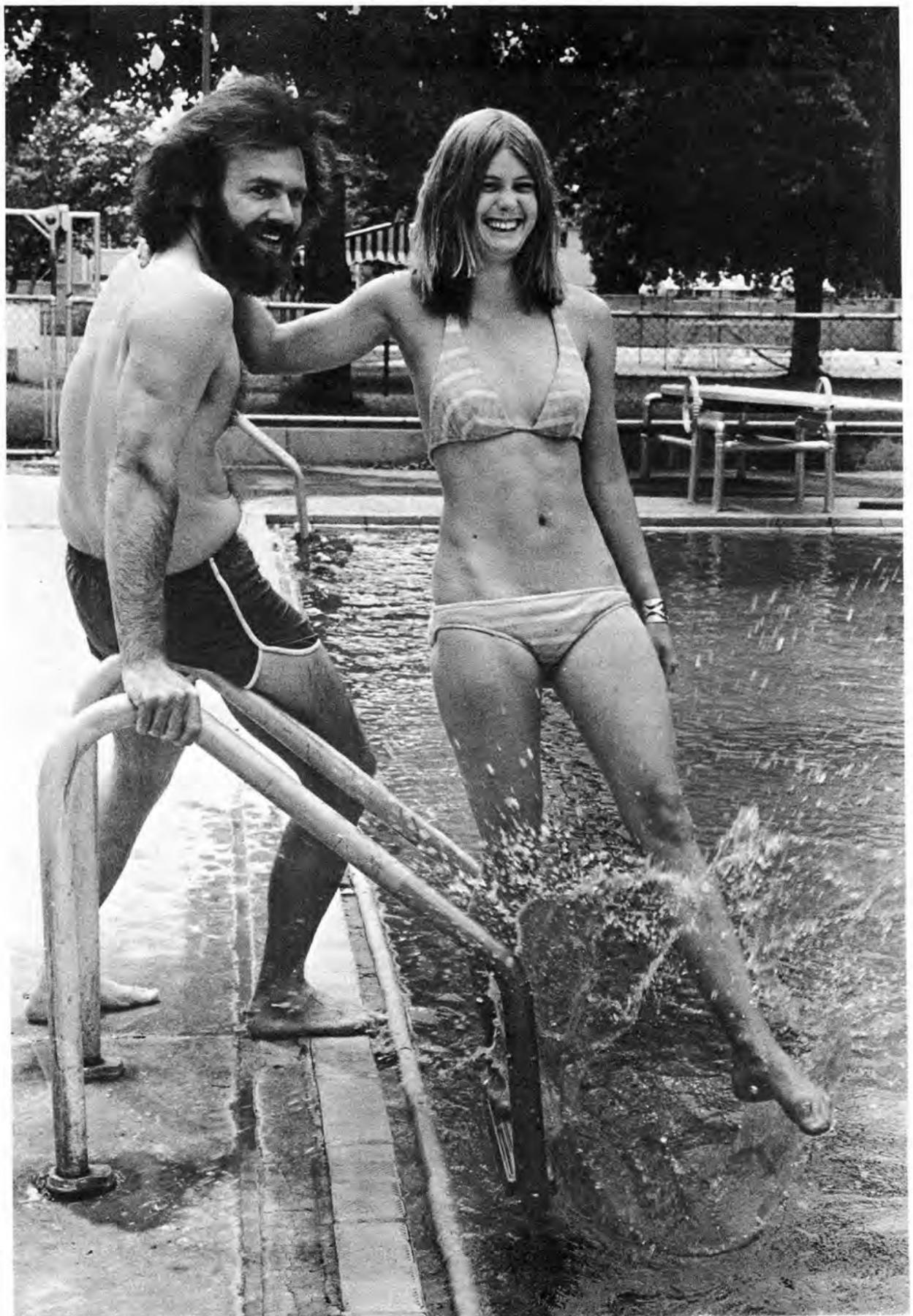
● MAY POOLS ● C-CLUB ● YORKSHIRE PUDDING ● JUNE GROOMS ● SANADO ●

FRIDAY	SATURDAY
24 — HAPPY HOUR BAVARIAN BUFFET Adults \$2.85 Under 12 \$1.85 PRISONERS Lounge Yolanda	25 — POOL OPENING PARTY 11 - 6 MIKE MICHNOVICZ — — — — — SOUL SESSION 8:30 - 12:30
31 — HAPPY HOUR ENGLISH BUFFET Adults \$2.90 Under 12 \$1.90 BOB BANKS TRIO TALENT SHOW On Stage Denny	1 — JUNE WEDDING RECEPTIONS Best Wishes To All!

GET WET — Tomorrow's the Grand Opening at the Club's 3 1/2 pools (kiddie pool counts 1/2). Mike Michnovicz and Accordion will remain dry on the patio. Everyone else can wade, swim, dive, sunbathe, loll, ogle, eat, drink (beer is 15¢), and do it from 11 to 6 without a ticket. From Sunday on, admission charge is \$1.00 per day for adult Club members, 50¢ for kids. Best deal is the season pass: \$10 for family, \$5 single (for members since September 1, 1973 or new employees who haven't let their membership lapse). \$55 for family, \$16 for adult, \$8 for kids otherwise.

BUFFETS — Tonight the Bavarian feast includes roast tenderloin of pork, Garraway; knockwurst; potato dumplings; that old favorite sauerkraut, and the trimmings. Next Friday is an Olde English Supper, with roast beef; Scotch eggs, meat-wrapped and broiled; Irish potatoes; Yorkshire pudding, etc. Expand your culinary horizons — enjoy a buffet.

TALENT SHOW — Denny will bring out the best in all the talented types next Friday night. Prizes for winners, fun for all.



MAKE A SPLASH tomorrow as the swim season begins. Kip Stanley (3646) and Deb Long show how it's done.



SOUL SESSION — Is there a band playing? *One Mile Ahead* at the C-Club tomorrow night. Swim all day, dance half the night, recuperate by Monday.

SANS ADO — If you're Sandian or AEC, it's easy — and fun — to join Sanado, the C-Club's Woman's Club. Members and their guests will hear Carol Bell, numerologist, on June 4 (reservations with Ann Tapp, 7433 El Morro NE, by the 31st). Later this year, they'll hear Peg "I Hate To" Bracken. Lots of other things going on too — Sanado has a host (hostess?) of special interest groups so each member can meet others with the same hobbies and skills.

Interested? Call Charlotte Johnson,

membership, at 298-4553. Or contact one of the other new officers: President Lois Smith, Secretary Carolyn Powell, Treasurer Colleen Shelton, Program Planner Sharon Gauerke, Publicist Laura Herrity, Decoration Arranger Judy Love, Special Interest Group Coordinator Mary Ann Crawford or Community Service Coordinator Cherry Swartz.

DISNEYITES — Deadline to sign up for the June 20-23 Disneyland excursion is the 31st. Two days there; visits to Knott's Berry Farm, Wax Museum, Japanese Deer Farm, Palace of Living Arts. More info from the Club.

MORE INFO — 265-6791.

● NUMEROLOGY ● DISNEYLAND ● KNOCKWURST ●