

Direct Magma Tap Proposed

One of the more exciting, although highly speculative, concepts emerging from the numerous proposals to alleviate the nation's energy shortage is being explored by a small group of Sandians headed by Glen Brandvold, manager of Exploratory Projects Department 5710.

Glen proposes a direct magma tap, an idea which was originally proposed by George Barr (5121) and Tony Zuppero (4730).

Magma is the molten material under the earth's crust. Typically, magma has temperatures of about 1200°C.

"Magma represents high quality energy," Glen says. "In one cubic mile of such material, for example, the extractable energy should be adequate to run several 1000-MW electrical plants for a hundred years. Further, it has been estimated that lowering the temperature of the earth's magma by 1°C would provide enough energy for the planet's energy needs at the present level for 40 million years."

Average thickness of the earth's crust ranges from 5.5 kilometers (3.4 miles) under the oceans up to 33 kilometers (20.5 miles) under the continents. However, magma is believed to exist much closer to the surface in areas of active volcanoes and other geothermal activity. Glen admits many technical difficulties stand in the way of achieving a direct magma tap but believes the potential payoff warrants a serious research effort.

A major problem in dealing with the magma is the corrosion which any kind of heat transfer device would experience in a pool of the substance. Mark Davis, manager of Metallurgy Department 5830, looked into this problem, and his people along with those in 5820 have studied lava samples heated to the molten state in contact with various metals. They learned, among other things, that an oxygen fuel cell could be created in magma. (An oxygen fuel cell is similar to an automobile battery — current is generated between two dissimilar metals within a conducting medium.) Reversal of the current in such a cell produces galvanic protection for the metals used.

"The electrical energy gained from such a device operating in magma could be used to provide corrosion protection as well as power," Mark says. "Also, we learned that modern alloys could function as heat transfer materials in a magma environment, at least in the samples created in our labs. From a materials standpoint, it is not unreasonable to assume that a long-lived heat transfer system could be developed to operate in magma."

Harry Hardee of Criteria and Heat Transfer Division 1543 has designed such a system and a prototype is being built. When delivered, the heat exchanger will be immersed in a crucible of molten lava in Area III. The experiment will yield data about both corrosion and energy extraction. Steam generated by the heat exchanger will drive a turbine to create electricity. Over and above this process, other factors will be studied — insertion problems, convection in the moving magma, the crust that is expected to form around the cooler heat exchange system, and operation of the system itself.

In the meantime, John Colp (5716) is concentrating on actual magma sources, their location and identification, compiling literature on the subject, and arranging cooperative exchanges with other interested agencies. One such group is the Hawaiian



MAGMA TAP PROJECT includes development of air-dropped earth penetrator vehicles with instrumentation to take resistivity measurements and to sense subsurface heat for use in locating suitable magma sources. Twenty-nine penetrators were dropped in Hawaii recently to help with a University of Hawaii geothermal project. Another operation is planned with the University of Alaska. Wayne Young (5716), John Colp (5716) and Glen Brandvold (5710) discuss the program.

LAB NEWS

VOL. 26, NO. 10

MAY 10, 1974

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

Geothermal Project, conducted by the University of Hawaii, which is studying the geothermal potential of the island of Hawaii by means of electrical resistivity measurements through the earth.

On the island of Hawaii, placement of the instruments to make these measurements is difficult because of the rugged terrain. Sandia's suggested use of air-dropped terradynamic penetrators for the instrumentation was taken up, the penetrators were used, and the results have been extremely successful.

"We have developed a useful technique — one that can be rapidly fielded — for making these earth measurements," John says. "It could be valuable in any exploration for a magma source."

Glen participated in the Joint US-Japan Science Seminar on the Utilization of Volcano Energy held in Hawaii in February. John is editing the proceedings of the seminar for publication by Sandia.

A modest effort is underway at Sandia to perform the initial studies necessary before launching a field experiment. The AEC's

(Continued on Page Six)

Morgan Sparks on Bonds

Launching the Savings Bond Drive is one of my more welcomed duties as president, welcomed because I can sincerely urge Savings Bonds as a wise investment for all Sandians. Bonds are easy to buy through our payroll deduction plan. They are an absolutely safe investment with special tax options. And the new interest rate — now 6% — makes them more attractive than ever.

There's another consideration too. We're a federally funded laboratory, and I suggest that we who spend federal funds have a special insight into the value of Bonds, on both the personal and laboratory level. And it follows that our rate of subscription should reflect this appreciation of their value.

Bonds are a good buy — for Sandia investors, for Sandia citizens. I urge you to continue buying them and to increase your subscription if practicable, or to sign up if you are not now enrolled.

More on Bonds on Page Five

Afterthoughts

Hail to the murkyism--Combine the fatuous with the flatulent and what have you got? Obviously, a murkyism. Out of Chicago come these examples: "He who would rule the sand must be brother to the wind" and "Be kind to your dear and true to your always." Look for a quick flowering of this rhetorical device. Local and national political statements clearly reveal that the murkyism is a force whose time has arrived.

* * *

And in the automotive world--"Continuous driving with a failed axle bearing could result in the disengagement of the axle shaft, and adversely affect vehicle control." (from a car manufacturer's recall letter) Translation: your rear wheels might fall off.

* * *

Annals of Albuquerque crime--Across-the-street neighbor knocks on door. "Hey, did you see our tree?" Huh- did I see your tree what?" "Someone took it--just pulled it out of the ground." And indeed, there was a ragged hole where once had stood a noble (and recently planted) pine. The incident was reported to the police, who wisely refrained from promising to get to the root of the matter.

* * *

When the phone rings--A friend describes his tactic with telephone solicitations. As the spiel begins, he quickly interjects "Is this a telephone solicitation?" When the other end says "yes," he then declares "Oh I'm sorry, but we never accept telephone solicitations over the phone." In the ensuing befuddlement, it's generally possible to quickly conclude the conversation.

* * *

Insight--In nature there are neither rewards nor punishments--there are consequences. Robert Ingersoll, Some Reasons Why *js

Enroll Your Kids Now In KAFB Kindergartens

Registration is now open for the 1974-75 KAFB Pre-School Kindergarten. Sandians may use these facilities as well as the KAFB Day Care Centers, both East and West. A Night Nursery is open on KAFB-West, Tuesday through Saturday.

An organized program for school age children through age 12 will be offered at both East and West Day Care Centers this summer. The program includes picnics, movies, bowling, field trips, and other activities.

For additional information, call East Day Care, 4-2314; West Day Care, 247-1711, ext. 3296; East Kindergarten, 4-3827; or West Kindergarten, 247-1711, ext. 2795.

Former Energy Head Speaks May 17 at UNM

John Love, former head of the Federal Energy Policy Office and governor of Colorado, will discuss implications of the energy crisis at national, regional and local levels Friday, May 17 at 8 p.m. in Rodey Theatre, UNM. Admission is free and the public is invited.

Earlier in the day, Gov. Love will visit Sandia Laboratories to discuss energy programs with Sandia management.

Since assuming his new position as Senior Vice President of Ideal Industries, Inc., in Colorado, Gov. Love has kept abreast of developments in the energy field and is an authority on the nation's energy problems. His visit to Albuquerque is sponsored by UNM, Sandia and the New Mexico Academy of Science.

Variable Annuity Unit Value

May	1.486
April	1.513
Average 1973	1.752

Sympathy

To Warren Arthur (9718) on the death of his father in Webster Springs, W. Va., April 22.

To Ray Clark (4250) on the death of his father, April 23.

To Gene Aronson (2642) on the death of his mother in Fairfield, Conn., April 9.

International ISA Symposium Scheduled Here May 21-24

A number of Sandians are participating in the upcoming Twentieth International Instrumentation Symposium set May 21-24 at the Hilton Inn in Albuquerque.

Sponsored by the Aerospace Industries Division and Test Measurements Division of the Instrumentation Society of America, the Symposium will present 80 technical papers in 18 sessions, plus 5 workshops and 6 tutorial sessions. Some 400 delegates are expected to attend.

In addition to technical sessions, tours of Sandia's Area III facilities and LASL's Meson Facility are scheduled. A full program for wives of delegates is also set.

Active on the Symposium planning committee are John Otts (9333), Technical

Program Chairman; Bob Butler (9321), Facilities Chairman; Duane Arlowe (9474), Registration Chairman; Bob Baker (2111), Properties Chairman; and Dick Richards (9652), Tour Chairman. Mrs. Butler and Mrs. Arlowe are in charge of the ladies program.

Technical Session Chairmen include: Jack Wilson (8413), Dave Smallwood (9332), D.B. Davis (2342), and Duane Arlowe.

Duane, as Registration Chairman, is handling Sandians separately so that they may qualify for the \$20 group registration fee. For a copy of the program and a registration form, call Duane (4-6555) or Bob Butler (4-1632). Checks and registration forms must be returned to Duane no later than May 17.

LAB NEWS

Published every other Friday

SANDIA LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO
LIVERMORE, CALIFORNIA
TONOPAH, NEVADA

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

In Livermore Area 415 455-2111

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

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

in livermore lorena schneider does all



PLAN SYMPOSIUM — Sandians (l to r) Bob Baker (2111), Dick Richards (9652), John Otts (9333) and Bob Butler (9321) are part of the planning committee for the 20th International instrumentation Symposium scheduled here May 21-24. Duane Arlowe (9474) is registration chairman. Contact him for a copy of program, special group registration rate.

Supervisory Appointment



HARRY SAXTON to Supervisor of Material Characterization Division 8314, effective April 16.

Since joining Sandia/Livermore in March 1971, Harry has studied the mechanical behavior of materials, first in the Metallurgy and Electroplating Division and, since last October, in the Material Characterization Division. Previously, he was a systems analyst with the Center of Naval Analysis in Washington, D.C.

Harry received his MS and PhD degrees in material science from Stanford University in 1962 and 1969, respectively. His PhD work was completed under a National Science Foundation grant. He is a member of the American Society for Metals. His leisure time activities include skiing, flying, hiking, and camping.

Harry and his wife Vicki have two children, a girl and a boy. They live at 1118 Farmington Way, Livermore.

Take Note

Alyce Loveless (8424) has been appointed chairman of the newly established Planning Advisory Committee on the Criminal Justice Mental Health Program for the County of Alameda. The nine member committee serves as liaison between mental health agencies and the criminal justice system under a new penal code requirement. Alyce has been serving in various capacities with mental health organizations. She is currently a member of the Mental Health Advisory Board of Alameda County and chairman of the local Mental Health Association Valley Council.

* * * *

The LLL Recreation Association has announced a 14-day trip to New Zealand leaving Jan. 24, 1975. The \$853 tab includes the round trip transportation, 14 nights at a choice of 100 hotels or motor inns throughout North and South Island and 500 free miles on a rental auto. For additional information, contact Alice Schwarber, LLL ext. 7471. Reservations for the trip require a \$100 deposit. Deadline is Sept. 30, 1974.



TYPEWRITERS are standard equipment around the Labs, but here's a new type created by Jim Roger's (8441) wife to honor secretaries Karen Poor (8441), left, and Sherry Bowen (8361) during National Secretaries' Week.

LIVERMORE NEWS

VOL. 26, NO. 10

LIVERMORE LABORATORIES

MAY 10, 1974



SLL-DEVELOPED EXPULSION SYSTEM and instrumentation recovered from recent rain erosion flight tests of transpiration cooled nosetips (TCNT) are examined by (from left) Mac Spivey, Bill Wilson and Roy Tackett (all 8362).

TCNT's Keep Cool

A Sandia/Livermore team effort has produced two highly successful rain erosion flight tests of transpiration cooled nose tips (TCNT). Conducted at the NASA Test Range on Wallops Island, Va., the tests are part of a Sandia/Air Force Material Study Program funded by the Air Force.

Transpiration cooling is a method of protecting nose cones against heat of reentry. Coolant is pumped through the porous or channeled matrix to form a thin liquid layer on the surface of the nose tip. The coolant absorbs heat as it flows through the matrix and vaporizes. Main objective of the test was to ascertain the effect of rain impacting on full-scale TCNT's at reentry velocities.

The project team formed last spring to develop an expulsion system to meter coolant to the nose tip consisted of Bill Wilson, Mel Brown, Mac Spivey, and Roy Tackett, all of Systems Development Division 8362, and Bob Kee of Aerodynamics Division 8364. "Everyone recognized the problem of starting from scratch in May with the intention of flying the qualified unit during the winter storm season — and the cooperation was tremendous," comments Bill, lead engineer for the program.

Launch vehicle for the flight tests was the three stage research rocket TATER, developed at Sandia/Albuquerque. The rain impact experiment was performed during ascent and the payload was later recovered from the ocean; a parachute/flotation bag system of integrated with the payload.

Two nose tip designs, one by Aerojet Liquid Rocket Company and the other by McDonnell Douglas Astronautics, were tested. Nose tip performance prior to flight (in the laboratory), during the flight (with appropriate on-board diagnostics), and after the flight (test components recovered and re-tested in the laboratory) was determined.

With transpiration cooling, the tip region of a nose cone maintains its shape throughout the flight and, hence, has predictable aerodynamic characteristics. Ablative nose tips, on the other hand, change shape and their aerodynamic characteristics are thus altered. Question remained, however, as to what effects severe weather might have on the stability and operation of TCNT's, and these tests have helped to resolve this question.

Death



Gordon Bjork, supervisor of Information and Distribution Section 8266-1, died suddenly April 27. He was 59.

Gordon had worked at Sandia since November 1957.

Besides his wife and children, Gordon is survived by his father.

Death



Donovan Browning of A&F Systems Division 1132 died April 25 after a long illness. He was 57.

He had worked at the Labs since March 1955.

Survivors include his widow and three sons.

Take Note

Two additional out-of-hours courses are being offered next week: Standard First Aid is a basic course covering essentials for handling injuries or sudden illnesses. The class will meet one evening a week for four weeks and is open to employees and members of their immediate families who are at least 14 years old or in the 9th grade. First Aid and Personal Safety, a replacement course for Advanced First Aid, is a nine week course and covers skills not taught in the standard course. Prerequisite is a Standard or Multimedia First Aid Certificate, or current Advanced First Aid Certificate.

For more information or to enroll, call Ruth Brooks (3131), ext. 6538.

The Mathematical Subroutine Library Committee will hold an open meeting at 10 a.m., May 15, in room 216, Bldg. 892. The committee, which oversees the development of the Sandia Mathematical Program Library, is reviewing data fitting routines and solicits comments both on the needs of computer users in this area and on the utility of routines currently available. Other comments on the future development of this library are welcomed. Ron Detry (2642) is chairman of the group; members include Carl Bailey (2642), Larry Shampine (5121), Bob Thompson (5122), Jim Rogers and Bob Huddleston (both 8441).

Phil Owens (9615) has been elected to the Professional Engineers in Industry Executive Board as 1974-75 chairman-elect. PEI is a division of National Society of Professional Engineers. Phil will take office in July at the NSPE Annual Meeting.

Credit Union Reporter

Truth (and some confusion) In Lending

by Earl Simonson, President



In spite of the truth-in-lending laws, interest rates are still confusing to most consumers. People will shop for days to save money on a car, carpeting or some other large purchase, but end up with an installment contract that wipes out any savings. Study these brief summaries of various installment plans.

Revolving Charge Accounts (Open-End) — Typical examples include bank cards, gasoline credit cards and major department store cards. Most states permit a charge up to an annual percentage rate of 18% (1-1/2% per month) on the unpaid balance. Minimum payments are usually 1/20th of the balance or \$10, whichever is greater. The effect of such a payment schedule is not only to spread your payments — the longer you take the more interest you pay. But by paying off the totals prior to the due date, you avoid any interest charges.

Installment Loans (Consumer Loans) — Typical examples are monthly payment contracts signed with stores or banks for the purchase of an item. State laws vary as to the maximum "add-on rate" they may charge. However, under truth in lending laws, the contract must state the "annual percentage rate," the total "finance charge," and if charges are made for late payments. The actual finance charge will be as stated in the contract, provided you make each for the amount and within the 10-day grace period stipulated. However, if you deviate from the contract provisions, this is generally what happens:

Late payment: You will be charged a penalty or you may be required to pay the remainder of the loan. Usually you will be assessed the penalty.

Early payment: you receive no benefit for making your payment early. Interest is charged as if payment were made on the due date.

Prepayment penalty: If you pay off the balance of your loan in advance, you might expect that remaining finance charges (including credit life insurance costs) would be reduced in proportion to time remaining on the note. Not so. Under nearly all installment contracts, a penalty is applied in the event of prepayment.

Remaining Balance — This method is sometimes referred to as "simple interest." At the time of payment, or prepayment, it is a calculation of your interest expense, at annual percentage rates, broken down by months and days since your last payment. The first part of your payment is applied to your interest expense, and the remainder goes on your principal.

Prime Rate

This is the rate charged by New York banks to favored customers for commercial loans. The prime rate for New York banks is not necessarily the prime rate for other banks, and a change in the prime rate has little effect on rates for consumer loans. The prime rate is considered an inflation indicator.

Consumer Tips

Under truth-in-lending laws, you have three business days to void a contract you have signed for the purchase of an intended place of residence.

Drugs are available at reasonable prices through the mail order services of the American Association of Retired Persons. For information, write to AARP, 1225 Connecticut Avenue, Washington, D.C. 20036.

Ask the store manager for a rain check if a food store has run out of an advertised special. This will entitle you to buy the item at the reduced price when it is in stock.

Ask your doctor to prescribe your drugs generically. You can save money if you buy them by the generic rather than the brand name.

Your Credit Union has copies of *Everybody's Money*, which contains many consumer tips. Pick up a copy at the Credit Union.



AT WORK on a bench are these Sandia managers who attended the one-week Integrated Circuits Course put together by Jim Williams (2112) and John Heightley (2116). Aim of the course is to update managers on new technology in this area.



Assembling a digital clock, each student's "diploma," are (from left) Herman Mauney (1530), George Hansche (1120), Klaus Bowers (2000), and Leo Gutierrez (8100).



SAVINGS BOND COMMITTEE members are asking for each Sandian's participation in the payroll deduction program of buying Bonds. More than three-quarters of employees are already enrolled. From left, Jack Wiesen (4750), Mark

Davis (5830), Joe Stiegler (9480), Ted Church (2340), Luke Heilman (9500), Chairman, and Howard Viney (1130). Members not pictured are Ted Sherwin (3160) and Bob Tockey (8181).

For You For USA **Be Bonded**

The Savings Bond interest rate now averages 6% over five years rather than 5-1/2% over six years (almost).

That's not exactly earth-shattering news, but it does make the new Savings Bonds an even more attractive investment than the old.

Certainly the purchase of Savings Bonds through payroll deduction doesn't produce the gut-wrenching excitement of putting your hard-earned dollars on a glamour stock — rich one day, wiped out the next. Savings Bonds aren't glamorous. But they are solid, safe, and secure.

As the brochure you'll soon get points out, Bonds in a child's name are uniquely suited to his or her education. No income tax need be

paid unless the child earns more than the exemption.

Because the interest earned on your E Bonds can be deferred until retirement (when you're in a lower tax bracket), they're admirably suited for supplementing your retirement income check simply by cashing them as needed. Another option is to trade in your E Bonds for income-paying Series H Bonds. All the accumulated interest on the E Bonds can be carried over, without declaring it for tax purposes until you cash the H Bonds. You'll keep your principal intact, have a steady guaranteed income for 10 years and, when the H Bonds are cashed, the tax you finally pay on the accumulated E Bond interest will be at your lower post-retirement rate.

Don't conclude that Bonds are good only for education or retirement. Probably their most important use is to help you make that big purchase without resorting to the loan arranger. Choose your goal — a color TV, a new deep freeze, a speedboat, any purchase you don't have to make immediately. Then plan your own personal Bond drive. It's almost painless — what you don't see in your paycheck, you don't miss. And instead of spending money on interest, you're earning it.

And, of course, your Bond collection provides a very comfortable cushion for that rainy day.

Bonds: you can't beat 'em. So join 'em — or let them join you. Be Bonded.

Events Calendar

- May 11** — N.M. Mt. Club, Bosque Peak, caves & graves, 7 miles, Western Skies, 8 a.m.
- May 11** — "The Big Sleep" w/Bogart and Bacall (1946), 10 a.m. & noon, Guild Theater, 3405 Central.
- May 11-12** — Iris Show, Flower Building, State Fairgrounds.
- May 11** — Albuquerque Youth Symphony Concert, 8:15 p.m., Popejoy Hall.
- May 11-12** — Antique and Classic Car Show, Sat. 10 a.m. - 9:30 p.m., Sun. 10 a.m. - 6 p.m., Convention Center.
- May 12** — Arts in the Park: Ballet de Folklorico, Columbus Park, 3 p.m., Free. 766-7427.
- May 12** — Rio Grande Kennel Club Dog Show, 8 a.m., Tingley Coliseum.

- May 12-13** — "Cube and Rose Parade," Adult Puppet Experiment, 8 p.m., Fine Arts Center. 243-9461.
- May 14** — Cat Stevens Concert, 8 p.m., UNM Arena.
- May 14** — Mexican Caravan of Stars, 8 p.m., Civic Auditorium.
- May 15-16** — Albuquerque Opera Theater: "La Boheme," 8:15 p.m., Popejoy Hall.
- May 17-19** — Rummage Sale, Flower Building, State Fairgrounds. To help raise funds for Garden Center, 9:30 a.m.
- May 17-18** — All Indian 4-H Fair, Winrock Shopping Center.
- May 18-19** — Appaloosa Horse Show, Horse Arena, 8 a.m., State Fairgrounds.
- May 18-19** — N.M. Mt. Club, novice backpack trip in Sandias. Call Sydney, 268-

4771 by May 15.

- May 18-19** — Chess Tournament, Sat. 10 a.m., Sun. 9 a.m., White Winrock Hotel
- May 19** — Albuquerque Symphony Orchestra, "Talking To The Animals" Concert, 2 p.m. at the Zoo.

LAB NEWS
PAGE FIVE
MAY 10, 1974



feed *back*

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

Q. I was required to give proof of age to the Salary & Benefits Adm. Div. 4213 within 30 days of 2/25/74.

It was suggested I bring a copy of my birth certificate or other items listed on their form.

My question is: Why am I required to re-prove this? Can't it be taken from my personnel records — I had to have a birth certificate at time of employment.

A. The requirement for Retirement Income Plan participants to furnish proof of age to the Prudential Insurance Company of America helps Sandians avoid undue delay in processing their applications for retirement annuity and for the spouse's benefit in the event of an employee's untimely death. Proof of citizenship and age used to be required at time of hire, but this is no longer the practice. Because our personnel records do not adequately identify the date of birth source, even in the case of employees who may have submitted a birth certificate, they do not satisfy the requirements of Prudential. It is, therefore, our policy to review the proof of age records after employees reach age 55 and are entitled to the retirement benefits.

Benefits organization experience shows that many employees do not have acceptable proof of age documents readily available, and that by age 55 many experience some difficulty in obtaining those records. Employees are offered assistance by Benefits in acquiring them.

Because there are degrees of validity of the documents used for proof of age, Prudential and Social Security have established a precedence or preference listing of documents acceptable to them. The form letter which requests employees to submit proof of age, lists these documents in order of preference and groups them as to records established before age 5, of which any one of three is acceptable, and a larger number any two of which are acceptable. However, as noted above, to comply with the order of preference, if an original birth certificate is available, it is desirable to have it submitted over all other records. Failure to submit proof of age records could delay payment of benefits.

—R.J. Edelman - 4200

Q. Please explain how excludable sick pay affects social security pensions and federal income tax payments.

A. The rules are complex and not widely known, and usually different employees are affected each year. Two kinds of tax are involved, with widely different sets of rules and restrictions. We can only hope to expose the tip of the iceberg here; hundreds of pages of law, revisions, and interpretation are involved.

Because Sandia has an established sick leave plan, as defined by the regulations of the Social Security Administration, the law requires us to exclude payments on account of sickness absence when figuring FICA (Social Security) taxes and FICA wages on the W-2 Form. For many years the sick pay exclusion

Phyl Wilson (3161), Feedback coordinator, reports that she's received a number of Feedback questions whose content is such that it seems clear that an answer is desired. There's one slight problem — the questioner didn't include his/her name. One element of Feedback is that your identity is revealed only to the coordinator and is otherwise anonymous (unless you request that your name be identified). But if you forget to include your name, there's obviously no way the Feedback coordinator can send you a reply.

under FICA was not of wide-spread concern as a great many employees had gross pay in excess of the FICA taxable wage base to overcome exclusions. With the series of recent changes in wage base (now \$13,200), excluded amounts begin to affect more employees. Significant amounts of untaxed sick leave pay will reduce the social security pension.

The law covering sick pay exclusions for federal income tax and withholding purposes presents many more complexities. For instance, depending on the percentage of pay received while sick, different waiting periods and maximum amounts of exclusion are involved. Information from the employee may even be necessary if hospitalization is involved in a fairly rare combination of circumstances. Sandia, in determining the appropriate amount excludable, does so based on its knowledge of the circumstances. However, employees affected should study the tax return preparation rules carefully and make an independent analysis of excludable sick pay based on *their* knowledge of the facts. A difference from the amount furnished by the Labs on Form W-2 should be checked with Payroll as you may have some additional data. Unlike the FICA exclusion discussed above, a large exclusion is more desirable for income tax purposes.

—C.R. Barncord - 4100

Q. Since we need to save as much as possible, is it feasible to remove one or two bulbs from fluorescent fixtures in non-essential areas and therefore save quite a bit of power and still provide a minimum amount of light?

A. The fluorescent fixtures used at Sandia are wired so that one ballast controls two tubes. As a result, to effect a saving of energy either both tubes must be removed or the ballast taken out of the circuit. If only one tube is removed the ballast draws the full amount of current, overheats, and eventually burns. Even so, Plant Engineering and Maintenance have significantly reduced lighting levels wherever possible in our major buildings. (To date we have saved approximately 75,000 kilowatt hours per year of electrical energy.) We appreciate your cooperation in advising us of areas where light levels can be reduced. A telephone call to Mack Milner (9753) 4-7256, will produce engineering assistance on lighting requirements.

—R.E. Hopper - 9700



HARRY HARDEE (1543), left, is designing a heat exchange system for the magma tap project. He discusses a small-vane steam turbine for the project with Paul Montoya (1543).

Continued from Page One

Magma Tap

Division of Physical Research is expected to sponsor next year's work which will include more analyses of magma properties by Ed Graeber (5825), Dave Haaland (5824) and Dick Meyer (5824), plus metal compatibility studies by Bob Sallach (5831).

A.R. Shouman of New Mexico University, now on sabbatical leave at Sandia, is developing a small-vane experimental turbine to be used in the magma demonstration experiment in Area III.

An exchange with Juergen Keinle at the University of Alaska to study the structure of St. Augustine volcano is also underway. In this case, air-dropped instrumentation probes to measure subsurface heat flow are being considered.

"Sandia is uniquely qualified to conduct the magma tap research project," Glen says. "In addition to our sophisticated analytical techniques, good laboratory facilities, and instrumentation development capabilities, we have the terradynamic technology and field testing experience. Moreover, our work in advanced drilling technology is directly applicable to this project. Although a modest effort now, we have high expectations for magma tap." •dg

Sandia Colloquia

- | | |
|--------|--|
| May 14 | Technology Colloquium (Video), J.K. Cole (5644), "Rain Erosion", Bldg. 815, 10:15 a.m. (Classified-Inside Area) |
| May 16 | Same as above, Bldg. 632 Auditorium (Classified - Inside Area) |
| May 15 | Sandia Research Colloquium, Dr. Fred L. Ribe, LASL "Fusion Reactor Systems" Bldg. 815, 10:15 a.m. (Outside) |
| May 17 | Technology Colloquium, Dr. William Davidow, Intel, Inc. "Micro-electronics" Bldg. 815, 10:15 a.m. (unclassified) |
| May 21 | Computing Colloquium, Gino Carli (9624), "Computer Aided Design, Definition and Manufacturing System" Bldg. 815, 10 a.m. (Outside) |
| May 23 | Same as above (Video), Bldg. 815, 10 a.m. (Outside) |

Supervisory Appointments



BILL TUCKER to supervisor of Test Section - LASL Programs, 9524-1, effective April 16. Bill's work location is the Pantex Plant in Amarillo. He joined Sandia in December 1952 at Killeen, Texas, and worked for two years on surveillance projects. He has had assignments at Las Vegas, Nev., in QA inspection; at San Antonio in systems testing; and at Pantex in disassembly and testing. Since March of last year, Bill has been staff coordinator for Stockpile Systems Test Laboratory Division. He worked for the Army Signal Corps before joining the Labs.

Bill is working toward an industrial technology degree at night school. He's attended the University of Nevada, San Antonio College, and Amarillo College. His leisure time activities include hunting, fishing, woodworking, and rock polishing.

Bill and his wife Gwen live at 4427 Mesa Circle in Amarillo. They have a son and a married daughter.

JACK HICKMAN to supervisor of Safety Assessment Technologies Division 1653, effective May 1. He joined the Labs in July 1962 as a staff member in a systems project division. In 1967 Jack transferred to the systems safety organization where he worked as a technical advisor for the AEC in

Joint AEC-DOD Systems Safety Studies. Since 1969 he has been concerned with the development and implementation of systems safety concepts. Jack's new responsibilities will encompass continuing studies in the development and application of these concepts.

Jack earned a BS degree in EE from Oklahoma State University; he earned his MS in EE from UNM under Sandia's Technical Development Program. Navy service was performed from 1954-58, mostly in Newfoundland and on the east coast. He is a member of the Systems Safety Society. Jack likes to climb mountains and to fly airplanes. He and his wife Dorothy and their two children live at 12316 Collier Court NE.

ROSCOE WILLIAMS to supervisor of Transportation Section 9754-3, effective May 1. Roscoe worked as a personnel clerk for his first six months after joining the Labs in March 1966, and since that time has been a dispatcher in the motor pool. In his new position Roscoe will supervise the 33 drivers who move people and material for Sandia.

Before Sandia, Roscoe retired from the U.S. Army as a First Sergeant with 20 years of service. His duty assignments included Alaska, Japan, and Germany. Roscoe is a Lobo fan — basketball and football — and enjoys bowling. He and his wife Minn live at 1616 Eastridge Dr. NE. They have a daughter living in Albuquerque, a son in California, and four granddaughters.



ROSCOE WILLIAMS (9754-3) and JACK HICKMAN (1653), foreground.

Recreation Notes

FUN & GAMES

Sandia Tennis Association — Sandia and AEC employees are eligible to play in the STA Spring Tournament: singles - May 18 and 19, doubles - June 1 and 2. Entry deadline for singles is today; doubles entry deadline is May 24. Contact Don Hardesty (5131), singles tournament director, for entry forms for both competitions. Participants will be notified of the time and place of each tournament. Tom Kerley (5167) is doubles tournament director.

Handball — Is a manic activity played off four walls and a ceiling by men in breathless pursuit of a small, hard black ball. In the Base's first integrated tournament (civilians allowed to play), Sandia's Carroll Hungate (9550) easily won the final round, 21-2 and 21-4. Carroll is a little bit of a ringer — he was No. 2 ranked player in the Air Force until his recent retirement.

Sandia Bicycle Ass'n. — "The Bikeway Study," an impressive and ambitious plan for the development of bikeways in Albuquerque and Bernalillo County, has been issued. Sharla Vandevender (4734) is chairman of the Bikeway Advisory Committee that prepared the Study, and she reports favorable action on its many and detailed recommendations. Bikers will want to gain some familiarity with "The Bikeway Study," and copies are

available at the circulation desk in the Tech Library and at the Lab News office. If you have a child in school, copies have been sent to each school for checkout by students.

One thing you can say about bike riding to work using the Wyoming entrance — it's never dull; every morning can bring a surprise. At this writing, all riders must use the southbound lane to enter (that's the one in which there's generally a few cars). That's so the guard can see your decal. Some motorists question the legality of your occupying a lane. It's legal, both on and off base. But he's so much bigger than you. . .

New subject. Don Bliss (9633) is turning bike evangelist. Inspired by the grandeur of his recently completed 100-miler, Don wants to introduce novice bikers to the charms of touring, easy touring, say 10 or so miles on that tranquil Sunday morning. Give him a call if you'd be interested.

Sports Car Club — A TSD rally, "SL55," sponsored by the Albuquerque Sports Car Club, will be held Sunday, May 19. Starting point will be the American Truck Plaza, 1915 Menaul Blvd. NE. Registration is at 8 a.m.; first car starts at 9:01 a.m. The course: a leisurely drive, mostly over good paved roads and through scenic countryside, of approximately 200 miles. For more information call Charlie Clark (1643), 294-3112.

Retiring



Truett Blackmon (1244)



Clarence Kassens (1254)



Thurman Moyer (9535)



Arthur Young (2514)

Metres and Litres

In 1866, the metric system became the official standard for weights and measures in the United States; the traditional foot, inch, pound, and all the rest have since been defined as percentages of a metre and kilogram. In fact, since 1821 Congress has hoped that the metric system, simply because of its obvious advantages, would gradually and painlessly replace our conventional set. Today the patience of the Congress wears thin. Almost sure to be passed soon is HR 11035 which decrees a 10 year period during which the United States will become predominantly metric.

Ten years seems like a long time. After all, the Systeme International (SI) is a widely accepted, proven measuring system. But barriers there are: education, logistics, and, especially important to Sandia, standards.

The need for education is obvious. New textbooks will shift to metric; speed limit and mileage signs must be replaced; conversion tables will be best sellers. Luckily, the shift is to a simpler system, and it won't take long to remember that one kilogram of hamburger takes more than twice as much space in the refrigerator than does one pound.

Textbooks are generally replaced every five years anyway, so no major problems are expected there. A bonus is that kids learn arithmetic an estimated 20 percent faster with the metric measuring system.

As for highway signs, the recent shift to 55 mph indicates that signs can be changed without undue disruption.

Sandia Style Guide for Frequently Used SI Expressions

- Use the correct capital and lowercase letters for unit and multiple unit symbols.
EXAMPLE:
K for kelvin, k for kilo
M for mega, m for metre
N for newton, n for nano
NOTE: Unit names are NOT capitalized even though some of their symbols are, with the exception of degree Celsius.
- Symbols are NOT to be used in their plural form.
EXAMPLE:
5 mm NOT 5 mms
8 kg NOT 8 kgs
- NEVER use a prefix without a unit.
EXAMPLE:
kilometre or kilogram NOT kilo
millimetre or millilitre NOT milli
- Use a zero before decimal quantity less than a unit.
EXAMPLE:
0.601 mm NOT .601 mm
0.2 g NOT .2 g
- When two units are multiplied, a dot (•) is recommended to avoid confusion.
EXAMPLE:
coulomb = A•s NOT As
newton metre = N•m NOT Nm
- The use of an oblique stroke (/), a negative power, or a horizontal line is acceptable to indicate division.
EXAMPLE:
kilogram per cubic metre = kg/m³
metre per second squared = $\frac{m}{s^2}$
- Prefixes in denominators are to be avoided (with the exception of kg, a basic SI unit).
EXAMPLE:
MN/m² NOT N/mm²
- Commas or spaces are NOT to be used as a thousands marker.
EXAMPLE:
459321.3979 NOT 459,321.3979 or 459 321.3979
- NEVER put a full stop (period) after a symbol, except at the end of a sentence.
- Always leave a small space between figures and symbols.
- Prefixes differing by 10³ (micro, milli, kilo) are preferred; others should be avoided.



In mundane matters of measurement, the shift to SI is not likely to be difficult. Given the availability of conversion tables and the likelihood that labels will carry both measurements for a few years, most of us will find ourselves thinking metric within a few months. Following a recipe from a metric cookbook will mean checking a table to learn that, for example, 125 millilitres of cooking oil fills the old measuring cup to a little over the eight ounce mark. That's called "soft" conversion. "Hard" conversion takes place when the old cup gets broken, and the cook buys a new one with millilitre markings.

On the Sandia-technical level, the SI conversion is a bit trickier. Our new policy calls for implementing SI "in an orderly, cost effective manner." Because we are dealing in the Labs with many cooks, it is important that some don't go immediately into "hard" conversion while others stick with "soft." The necessary coordination is one of the responsibilities of the metrication representatives from each vice presidency (see LAB NEWS, March 29, 1974).

Another problem arises in the ordering of materials and components. Some are available in metric sizes but, as Corry McDonald (9623) points out in a March 1974 MECHANICAL ENGINEERING article, the search can be long and frustrating. Fortunately, each new issue of a catalog carries more metric stuff than did its predecessor.

* * * *

Then there's the problem of standards and standardization. Our industry operates with standardized, interchangeable parts. Whether on the nuts-and-bolts level (literally) or on the black-box-for-a-computer level, whether it's the strength of the safety belt or the weight of a nickel, standards are necessary. About 25,000 standards, generated by hundreds of technical societies over the years, are in use. Each must be looked at and converted to an agreed upon metric standard.

Or discarded. Herein lies the promise of cost savings in going metric. For example, instead of the current 57 types of bolts, we can probably do the job with just 25. That means smaller inventories and smaller warehouses (though for awhile we will have to stock both conventional and metric sizes).

Sandia is moving to metric on two fronts. Locally, high use components and materials

are being identified as targets for early standardization. On the national and international scene, these organizations are deeply involved in the metrication process: the International Electrotechnical Commission (IEC); the International Organization for Standardization (ISO); the American National Standards Institute (ANSI); and the National Bureau of Standards. In addition, the needs of countless technical/industrial societies have to be considered. At first glance, it would seem that the interested parties could just sit down and agree on each standard; but it is seldom that simple. Consider, for example that it took 10 million engineering man-hours to develop the standards behind color television.

Certain Sandians have a role in the development of the new standards. Among them: Phil Nicovich (9655), chief of the ISO's Engineering Drawing Practices Committee; Nick DeLollis (5813) is chairman of ISO's Task Group on Polymeric Adhesives; Corry is chairman of ASME's Special Committee for Metric Study and of the Fabrication Module Subcommittee, a part of IMOG, AEC's Inter-Agency Mechanical Operations Group. Glen Brandvold (5710) is on IMOG's Steering Committee; and Bob DeVore (9620) and Ralph Cozine (8410) are also IMOG members.

So far ISO has generated, either as recommendations or as accepted standards, only about 10 percent of the necessary standards. A busy 10 years lie ahead just to agree on other standards, another 15 to implement them. The country, the Labs, you and I are going metric. But think of it this way: if metrication is unavoidable, relax and enjoy it. • bh

Approximate Conversions from Customary To Metric and Vice Versa

When you know:	You can find:	If you multiply by:
LENGTH		
inches	millimetres	25
feet	centimetres	30
yards	metres	0.9
miles	kilometres	1.6
millimetres	inches	0.04
centimetres	inches	0.4
metres	yards	1.1
kilometres	miles	0.6
AREA		
square inches	square centimetres	6.5
square feet	square metres	0.09
square yards	square metres	0.8
square miles	square kilometres	2.6
acres	square hectometres	0.4
square centimetres	square inches	0.16
square metres	square yards	1.2
square kilometres	square miles	0.4
square hectometres*	acres	2.5
MASS		
ounces	grams	28
pounds	kilograms	0.45
short tons	megagrams**	0.9
grams	ounces	0.035
kilograms	pounds	2.2
megagrams**	short tons	1.1
LIQUID VOLUME		
ounces	millilitres	30
pints	litres	0.47
quarts	litres	0.95
gallons	litres	3.8
millilitres	ounces	0.034
litres	pints	2.1
litres	quarts	1.06
litres	gallons	0.26
TEMPERATURE		
degrees Fahrenheit	degrees Celsius	5/9 (after subtracting 32)
degrees Celsius	degrees Fahrenheit	9/5 (then add 32)

* or hectares

** or metric ton, or tonne

It Takes Work To Keep The Forest Primeval

56. El Malpais — 120,000 acres; BLM; ONA, pa? too; slight study; fair to good access; lava flow; Upper Sonoran to Transition; possible springs; possibly the outstanding lava area in the nation.

57. Bisti Badlands — 3240 acres; BLM; proposes ONA; conservationists' proposal done; fair access; badlands; Upper Sonoran; no water; barren, largely unbelievable badland formations; significant fossils and geology.

* * * *

Thus reads two — of 63 — items from a document of interest to those who like their New Mexico unspoiled, undeveloped, and untrammelled by the works of man. Entitled "Present & Potential Wilderness Areas," the report was used as a working paper at the recent New Mexico Wilderness Symposium. (BLM-Bureau of Land Management; ONA-Outstanding Natural Area; pa-primitive area.)

Corry McDonald (9623), a prime mover in the symposium, sums up the wilderness scene in our state: "We've got many magnificent wild areas in New Mexico. Some of them will never experience the blade of the subdivider or undergo the indignity of a billboard; others will. That's because some public lands are protected by federal law while other public lands are still up for grabs by the exploiter. Which is why we had the symposium: to identify areas that need a 'wilderness' designation."

Conservation Award Granted

Sandian Corry McDonald (9623), quoted in this article relating to wilderness work, has been named recipient of the KOB Radio Conservation Award For 1973. The citation mentions Corry's work as director of the Albuquerque Wildlife Federation, his chairmanship of the Save the Grand Canyon Committee, and his present membership on the Governor's State Trails Committee. It singles out his chairmanship of the New Mexico Wilderness Study Committee, "a coalition of over 20 conservation-oriented organizations representing thousands of New Mexicans," as his most notable service. In 1973, six wilderness bills drawn up under Corry's direction have been introduced in Congress; the bills would increase the state's wilderness acreage by more than 50 percent.

The public generally has the impression that public lands with scenic value just sort of automatically gain protection. Not so. Actually, it takes a fair amount of work by concerned citizens to research an area of wilderness interest and to prepare the study upon which a federal agency, such as the US Forest Service, and the Congress will act, i.e., formally declare the scenic area a "wilderness area."

Several other Sandians are committed to the work of the New Mexico Wilderness Study Committee — Phil Tollefsrud (5220A), Milo Conrad (1115), and Bill Stevens (1650). "Right now," says Bill, "we're pushing a program called 'Adopt A Roadless Area.' For example, if you happen to be turned on by



Ladron Mountain on our southwest horizon, which is not now a wilderness area but should be, then you could 'adopt' that area. You'd gain an intimate knowledge of one facet of the mountain, like learning about the roads into and around the mountain, and then, along with other Ladron enthusiasts who had investigated other mountain features, prepare a wilderness study which would be the basis of legislation to protect your mountain."

There's irony in the spectacle of wilderness lovers awash in the paper work and committee meetings that go with the preparation of a good wilderness study. Fortunately, those who do adopt a roadless area can look forward to the many hours they will spend in a favorite location. If you're inclined to lend a hand, Corry says the group might just be able to find a spot for you — give him a call. •js

Bonds are for making retirement easier.

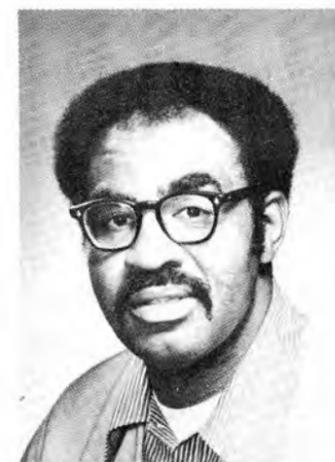


MILEPOSTS

LAB NEWS May 1974



Audrey Burns - 9717



James Johnson - 1124 15



Ted Sherwin - 3160 25



Charles Sullivan - 5642 20



Tex Samuelson - 9473 20



Harold Schulte - 9614 20



Isaias Gutierrez - 9715 10



Ben Conklin - 2322 15



Marie Carlson - 9654 15



Howard Romme - 4142 15



Lloyd Wilson - 9715 25



Leroy Rainhart - 3622 20



Glen Loeppke - 1511 15



Florence Bonnell - 6020 20



Bertha Williams - 3722 10

Authors

P.C. Lysne and D.R. Hardesty (both 5131), "The Fundamental Equation of State of Liquid Nitromethane to 100kbar," Vol. 59, (1973), JOURNAL OF CHEMICAL PHYSICS.

R.E. Allred and W.R. Hoover (both 5844), "Elastic-Plastic Poisson's Ratio of Borsic-Aluminum," January issue, JOURNAL OF COMPOSITE MATERIALS.

L.D. Bertholf (5162), "Feasibility of Two-Dimensional Numerical Analysis of the Split Hopkinson Pressure Bar System," March issue, JOURNAL OF APPLIED MECHANICS.

K.L. Brower (5112), "EPR of a Jahn-Teller Distorted (111) Carbon Interstitialcy in Irradiated Silicon," March issue, PHYSICAL REVIEW B.

A.R. DuCharme (5156) and G.K. Straub (LASL), "Theory for Solute-Vacancy Binding Energies in Binary Alloys," March issue, JOURNAL OF APPLIED PHYSICS.

I.J. Fritz (5132), "Pressure and Temperature Dependences of Acoustic Wave Propagation in Polycrystalline Bismuth," January issue, JOURNAL OF APPLIED PHYSICS.

B.D. Hansche (9352), "Holographic Interferogram Analysis From a Single View," March issue, APPLIED OPTICS.

A.W. Johnson (5216), "Diluent Cooling of A 1721-A° High-Pressure Xenon Laser," February issue, JOURNAL OF APPLIED PHYSICS.

C.B. Norris (5113) et al, "Simulation of Static and Dynamic Large Signal Characteristics of Electron Bombarded Semiconductor Diodes," March issue, IEEE Transactions on ELECTRON DEVICES.



THIS is what's called a winning horse, appearances notwithstanding. Last year Bill Patterson (5716) rattled off a Model A in the name of the Amigos de las Americas and made a profit that would cause an oil company to blush. Well, this year the young Amigos are still going south to Central and South America to do good things for poor natives, and they still need a few bucks, so here's Bill again at the same stand. It's a good cause, and for your buck he'll even throw in the straw hat (when you win). If you wish to examine the merchandise, do so this weekend when Bill and his car will be one of many at the Antique & Classic Car Show at the Convention Center. Jack Hueter (3131), show chairman, reports that the Kiwanis Club is sponsoring the exhibit, which will feature "\$500,000 worth of classic and antique vehicles."

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

'71 14x60 VINTAGE MOBILE HOME, 2-bdr., house-type door & windows, AC, range, refrig., furnished or unfurnished, \$500 down, assume payments \$115, 7%, Babb, 821-4423 after 6.

STEREO CASSETTE-CORDER, Sony TC 121, used approximately 15 hrs., \$75. Sonnenberg, 266-4728.

CUSTOM DRAPES, wheat and gold, window 8'8" with sheer insets; sliding door, side pull, 7'5"x7', \$75. Hayes, 296-3909.

THERMO KING, car air conditioner, \$60. Luna, 299-2488.

MICHELIN TIRE AND WHEEL, for Peugeot 404, \$15; other Peugeot 404 parts. Smith, 299-6873.

BELT VIBRATOR EXERCISER, 1/4 h.p., 3-speed, 4" belt, \$50. Cox, 299-0480.

MOBILE home furniture, 2 regular size beds w/box springs & mattress, 72" sofa and chair, 1 lamp, \$150 (or separately). Crumley, 299-5372.

TWO 16.5 HD camper wheels, 8-1/4" wide 6-hole Chev. w/hubcaps, \$30. Baca, 265-2881.

HEATHKIT DESK CALCULATOR, 8 digit, \$60. Laskar, 299-1024.

WELCH PONY, 650 lb. gelding, 14 yrs. old, \$100. Baxter, 344-7601, 1610 Bayita Ln. NW.

PATIO SALE, home and sports gear, Sat. May 11, 10 to 4. 617 Dartmouth NE. Duvall.

16' SHASTA TRAVEL TRAILER, sleeps 8, w/load leveler hitch. McGuckin, 299-1342.

WOOD SHUTTERS, 8x26 & 7x26; porcelainized cast iron

bathroom sink; screen door, wood, 36x81. Rakoczy, 256-0433.

'70 TRAVEL TRAILER, Holiday Vacationer, 20 ft. self-contained, sleeps 6. Zickert, 898-3475.

KITTENS available, \$1 each or best offer; definitely will not pay more than \$1. Hines, 247-3581.

CHILD'S STURDY climbing tower, \$12; girl's white ice skates, size 1-1/2, \$6. Peterson, 256-7514.

16' MARK TWAIN BOAT, 120 h.p. IO, price negotiable. Uilbarri, 296-5816 after 4 p.m. 8528 Aspen NE.

METRIC SOCKET SET, new, 11 pieces, \$8. Merritt, 299-1482.

FREE KITTENS, four mixed breed, male and female. Moss, 296-3877.

U.S. DIVERS EQUIP.: suit, tank, pack, knife, pressure gauge, etc., all half price. Cundiff, 256-0043, 5905 Constitution NE. after May 12.

15' CAMPING TRAILER, sleeps 5, \$1000; 15' Larson boat, 20 h.p. Mercury, trailer, \$800; home built cab-over camper, \$250. Shock, 877-3728.

SINGER 503 zigzag sewing machine, last all metal model, in cabinet w/attachments and cams, just reconditioned, \$125. Kaye, 293-0499.

BUNK BEDS w/bunkies, \$50; 2 twin box springs, \$20 ea.; cartop carrier, \$5; boy's 26" bike, \$5; ceramic tile, \$10. Stewart, 268-2786 after 5.

SNARE DRUM, Ludwig, w/case & stand, chrome plated metal shell, \$55. Leisher, 281-5258.

2 EA. 10:45 x 15 Indy racing tires on 8" Chevy rims; 1 tachometer, 6-12V, 4-6-8 cylinder. Fuiler, 294-3089.

GOLF CLUBS, 4 woods, 9 irons & putter; baby walker; bassinet & bath. Bolin, 299-1114.

FURNITURE: small modern couch, 4 traditional occasional & end tables in fruitwood, parquet & wrought iron coffee table. Pepmueller, 898-5419.

TRANSPORTATION

'65 OLDS 88, 50,000 miles, \$375.

Gallo, 255-2488.

'72 PINTO, std. trans., 122 CID, 15,000 miles, \$2000. Varga, 242-2484 after 5.

1/5 INTEREST '69 Cessna 210, fast, well equipped. Burks, 821-0132.

'66 MUSTANG, 6 cyl., 3-speed. Moore, 298-9280.

'68 BMW 1600, new interior, new paint, AC, \$1450 or best offer. Nunez, 345-1058 or 247-2877.

MOTORCYCLE TRAILER, Holsclaw, \$140. Falacy, 344-9548.

'72 YAMAHA Enduro 125, 1600 miles, shop manual, \$400. Looney, 255-7349.

'64 THUNDERBIRD, white, new tires. Schooley, 243-0828.

'71 KARMANN GHIA, 4-spd., AM/FM radio, low mileage. Williams, 298-2671.

'68 BSA VICTOR 441. Boyer, 243-0493.

'70 FORD COUNTRY SEDAN, AC, AT, PB, PS. Meyer, 821-0123.

'62 CHEVY II, \$300 or best offer. Puccini, 255-0568 or 265-2232.

'68 CAMARO, 6-cyl., std. trans., new tires, low mileage, \$995 or best offer. Schulze, 898-2880.

'65 CHEV. WAGON, all power & air. Hanely, 2711 Gen. Chenault NE. after 6.

'65 INTERNATIONAL TRAVEL-ALL, 4-spd., PB, PS, AC, positraction, auxiliary tank, trailer package. Kepler, 298-5652.

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

'64 GMC 3/4-ton truck, 48,000 miles, AC, w/1966 Open Road camper, monomatic toilet, boot to cab. Miller, 268-5992.

BIKES, matching pr., boy's and girl's, 26", 3-spd., \$100 pr. Dalphin, 265-4029.

BIKE, 10-spd., Austrian, (Sears), 22" frame, thornproof tubes, Simplex derailleurs, Normandy hubs, \$70. Sutherland, 265-1724 after 5.

BIKE, boy's 3-spd., \$25; 10" tricycle, \$5; 12x12 Safari tent, inside frame, \$25. Still, 299-8825.

'69 TOYOTA-Corona 4-dr., air, auto., R&H. Piraino, 255-5126.

'72 CUTLASS Supreme 2-dr., 13,000 miles, AT, power, air, tape deck, \$2250. Daniel, 268-8335.

'71 DATSUN PL510 4-dr. sedan, 4-spd. manual trans., \$2650. Hart, 266-6811.

'73 AM. GREMLIN, auto. 6, radio, in warranty at 6800 miles. below NADA at \$2345. Anderson, 299-2595 evenings.

REAL ESTATE

NINE ACRES on Frost Road, completely fenced, power available, located west of Sandia Knolls. McClure, 247-3095.

THREE BRD., 1 1/4 bath home w/large den, existing loan 6 3/4%. \$26,500. 817 Quincy NE. Ross, 265-4990 after 6.

HOUSE, 4-BDR., 2 1/2 baths, basement, extras, on 2.16 acres, \$65,000. Barker, 299-1483.

3-BDR., 1-3/4 baths, NE, immediate possession, total \$22,500, present mtg. 7% FHA at \$164/mo., low down. De Herder, 345-0764.

TRADE lg. 4-bdr. NE, den, raised hearth fp, paneled study, carpeted, draped, for smaller home, apt., or commercial. Thompson, 298-2253.

FOR RENT

SUMMER RENTAL 3-bdr. brick, den, separate office, heated pool, available June 10 - Aug. 17, \$100/week including utilities. Robertson, 296-3630.

WANTED

3-BDR. home to rent for July-Aug. by new staff member and family. Schwoebel, 298-4295.

DRIVING to San Jose, Calif., leaving May 17 or 24, take 2. Share expenses and driving. Calek, 296-1794.

SAILBOAT Sailers are now forming a Laser Class Sailing Club, for information, Parker, 299-0289.

HOUSE SITTING wanted for visiting professor. House or

one-bdr. apartment for July 20 to Aug. 20. Camp, 268-8700.

BANJO, for beginning student. Arenholz, 298-1724.

FURNISHED HOUSE for new hire, 2 children, 2-3 bedrooms, beginning June 1 for 3 months. Anderson, 299-9037.

HIGH CHAIR, not more than \$5. Hughey, 265-2190.

REPAIR MANUALS for 1950 3/4-ton pickup. Patterson, 243-6219.

OXYGEN/ACETYLENE torch and tanks; wide angle and zoom telescopic lenses for Canon 35mm camera. Ballard, 299-4530.

LARGE CHEST of drawers, at least 34"x18"x45", preferably maple or maple finish. O'Bryant, 268-9049.

FURNISHED APARTMENT for friends visiting during June & July. Norwood, 262-0073.

LOST AND FOUND

LOST! April 19- Constitution-Jefferson area - Recently spayed, young, red, female Irish Setter, "Brandy" Reward! Pogna, 299-6701.

LOST - Black leather case w/3 keys, brown windbreaker w/connectors right pocket, white gold link choker necklace, cuff link, man's black leather glove, man's wedding ring, man's wallet, Dodge keys w/name tag, manila envelope w/papers, car keys on chain, man's brown rim bifocals in black case, lg. rim square sunglasses, man's size 42 dark green corduroy jacket. LOST AND FOUND, tel. 264-3441, Bldg. 832.

FOUND - Sandia blue briefcase, color slides, lg. group of misc. keys, man's pipe, check made out to Barbara Burnett, key ring w/4 keys, man's green sun glasses, lady's brown sun glasses, 2 sets car keys with Credit Union key ring (holding at Credit Union). LOST AND FOUND, tel. 264-3441, Bldg. 832.

FRIDAY	SATURDAY
10 — HAPPY HOUR ORIENTAL BUFFET Adults \$2.75 Under 12 \$1.75 SHILOH Lounge Barbara	11 — FAMILY VAUDEVILLE PIPERS, DANCERS, SHAGGY DOG Show at 7 Food at 6 Free to Members
17 — HAPPY HOUR SEAFOOD BUFFET AND FASHION SHOW Adults \$2.75 Under 12 \$1.75 FRANK CHEWIWIE Lounge Denny	18 — MEXICANA FIESTA Los Guapanceros Los Dances Aquellas SOL CHAVEZ By Reservation

TONIGHT — Another new style, softly lit Super Buffet, this one Oriental with Beef Teriyaki, Sweet and Sour Pork, Shrimp Fried Rice, Snow Peas, and all the good things you have a yen for.

BAGPIPES — And dances and shaggy dogs tomorrow night at Family Vaudeville. Pipers are from Ballut Abyad Temple, dancers from Fishback Studio, movie (*Shaggy Dog*) from Walt Disney.

ART — It's the 11th Annual Sanado Winrock Art Show & Sale today and tomorrow, and it's on the mall at Winrock, and it's free. Displays and sales by 35 artists in oils, watercolors, and mixed media. Go canvas the canvases.

\$1,000,000 — Give W.C. Fields, Charlie Ruggles, Charles Laughton, Gary Cooper, and George Raft a million bucks and they become delightfully insufferable. Enjoy Cinema Classic *If I Had a Million* on May 13 at 7:30. Free to members.

FASHIONABILITY — The newest Spring Fashions will come alive on the 17th as Sandians Soila Candelaria, Archie Pearlman, and Rose Griffin plus Chris Baca, Jeannette Mares, Barb Stewart, and Donna Strange



STYLES & SONGS on the 17th. Chris Baca, Denny Gallegos (3148), Barbara Stewart, and Soila Candelaria (1537) provide a preview.

show off styles from Rita's Fashions. Comments by Rita, songs by Soila and Denny, shoes by DelGado, wigs by Sherbet, seafood by Szabo, fun by all.

FIESTA — Mexican food, music, and dancing with Los Guapanceros (6:30) and *Los Dances Aquellas* by Mexican Folklorica, a troupe of fifteen dedicated to authentic traditional Mexican dances (8:30, 10, and 11). Pick up tickets by the 11th.

UPCOMING — All three pools open May 25. Swim free all day.

SPORT SPECIAL — New C-Club group is forming to support UNM's Lobos, probably be called Coronado Wolfpack. Will include travel to sports events (likely three per year, the first to UTEP and Juarez next

November), meetings with UNM sports personalities (like Ellenberger, Mondt, McDonald, players), active participation in athletic contests and the whole athletic program. Small dues, big benefits. More info from: Julian Lovato at 299-1375, Shirley Dean at 296-3264, Bud Rufsvold at 268-5970, or George Horne at 296-1416.

MICKEY MOUSE — Disneyland's the highlight of a long weekend jaunt to Anaheim June 20-23. Four days and three nights — stay at Royal Inn; two days at Disneyland plus Knotts Berry Farm, Wax Museum, Japanese Deer Farm, Palace of Living Arts. For adults \$166, for kids \$136, including plane fare, hotel, transfers, admissions. Deposit \$50 per person by May 31.

MORE INFO — 265-6791.

Watch your savings grow.



Take stock in America.
Buy U.S. Savings Bonds