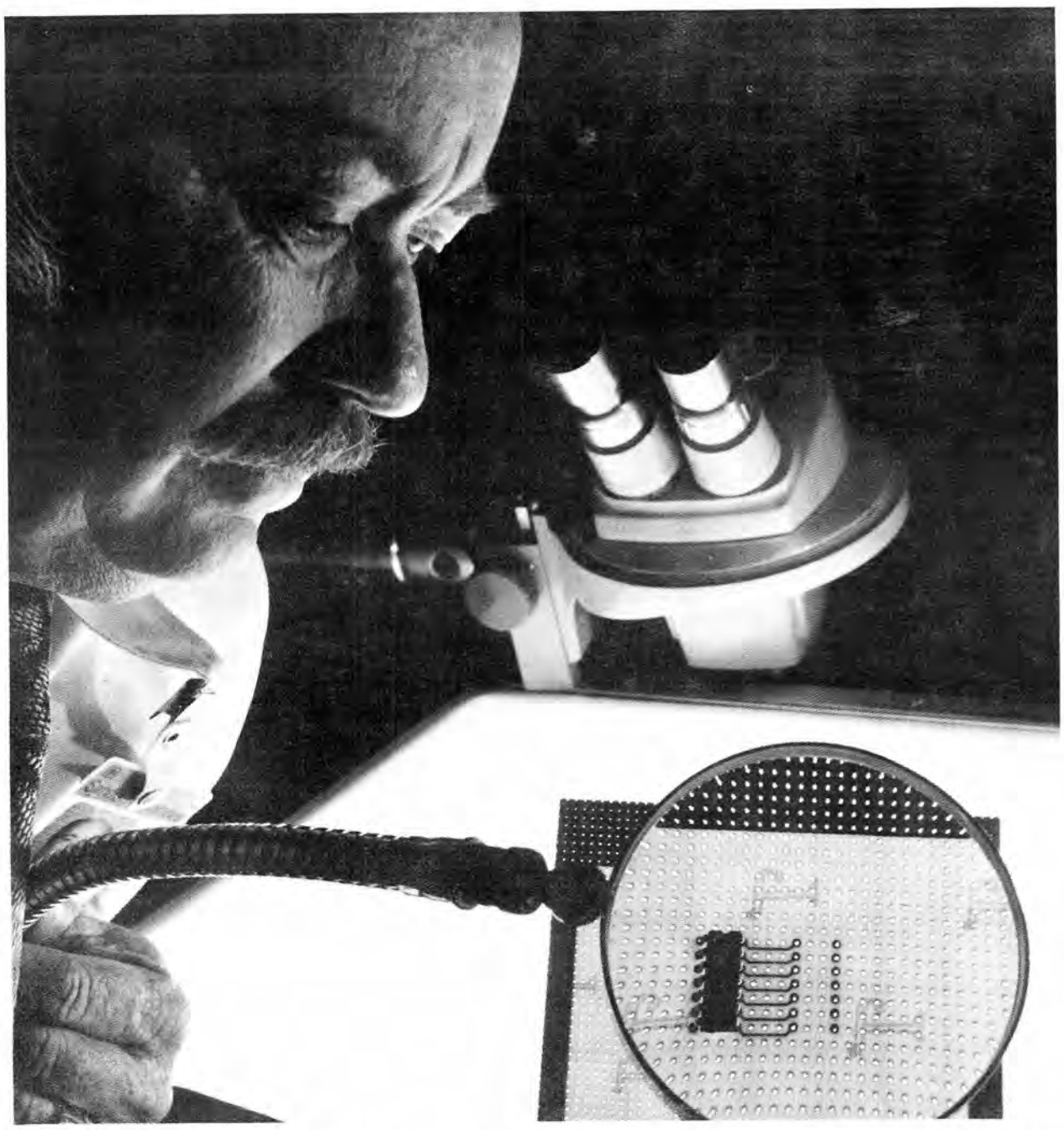

PREPUNCHED printed circuit board fabricated by a new technique which eliminates drilling "through-holes" in the dielectric substrate is examined by inventor T.A. Aller, 7123-1. The magnified section of the photo shows an integrated circuit (rectangle) with copper-clad circuitry and plated through-holes to its right.

LAB NEWS

VOL. 26, NO. 7 MARCH 29, 1974

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

New Process Eliminates Drilling PCB's

A new fabrication technique which eliminates the mechanical locating and drilling of "through-holes" in printed circuit boards (PCB's), thus permitting boards with plated through-holes to be made entirely by photochemical processes, has been devised at Sandia Laboratories.

Key to the new technique is a dielectric substrate containing preformed holes spaced on a .100-inch matrix. These .030-inch-diameter holes conform to accepted drafting practices and match the lead patterns on such PCB components as transistors, integrated circuits, etc., permitting components on both sides of the board to be connected.

The holes are punched, drilled or molded into the substrate during original manufacture, then covered on both surfaces of the board by the standard copper cladding. A row of holes is left uncovered along one edge of the board for registration.

To open the proper holes in the substrate, the board is covered with a standard negative photoresist coating and exposed through a photo-tool (postitive) containing the hole diameters and locations needed for a circuit. Standard developing and etching open the holes on each side of the board.

The resulting hole pattern is then cleaned and plated-through using existing techniques; remaining steps follow the standard "panel plate" process. Larger holes for mounting, potting and other purposes can be located by the technique, then drilled through with an inexpensive shop drill.

When desirable, a process variation allows unused holes to be eliminated by filling all holes with a B-state epoxy before the top layer of copper cladding is laminated onto the board.

Sandwiched between the two layers of copper, the epoxy remains soft and is easily flushed out of all exposed holes by pyrolidinone solvent. Epoxy remaining in the unused — and unexposed — holes is cured by baking the board, making the holes an integral part of the dielectric and allowing circuitry to bridge them.

The new technique eliminates the need for costly numerically controlled or optical

(Continued on Page 7)

Sandia Goes Metric

England. It is 1574, more or less or exactly: *The first 16 men leaving church are asked to line up with their left feet toe to heel. Someone measures the combined length and declares that a rod. One-sixteenth of that length is called, naturally enough, a foot.*

Sandia. **Four hundred years later.** *An explosive device is placed exactly 17.4 feet down a 23.5 foot hole 2.1 feet in diameter. No one uses a foot in measuring.*

England. 1324 (probably): *Edward II decrees "3 Barley Corn round and dry, placed end to end, equal one inch."*

Sandia. Four hundred and fifty years later: *A buyer writes up an order for some metal sheeting, 8 x 12 x .007 inches. He has never seen a barley corn in his life.*

Sandia's scientific organizations have used the CGS (centimeter, gram, second) metric units since the beginning. But the modern metric system, which uses the meter,

(Continued on Page 10)

METREPS get acquainted with some means of metric measuring. Left to right, Earle Chapman (1525), Ken Harper (9742), George Donaldson (2433), Jim Kenagy (3640), and Glen Brandvold (5710); not shown, Bob Hepplewhite (4810) and Ralph Cozine (8410). Each is the metrication coordinator for his vice-presidency.

Afterthoughts

Person the barricades!--The following appeared in the KAFB Bulletin: "A recent determination by the Office of the Assistant Secretary of Defense advises that the use of the word 'man' in position descriptions and team position requirements is discriminatory and that the word 'person' should be used in lieu of any word connoting only one sex." Now this is intriguing and a little provocative. The manipulation of language, especially by fiat, is a tricky business. The simple fact is that language is a fractious child, really not amenable to discipline. Consider, for example, the currency of those notorious four-letter words, even in genteel circles, in spite of the wide disfavor with which their usage is viewed. Perhaps the marshalled forces of the Department of Defense do indeed have sufficient power to expunge "man" in all those tons of job descriptions. But let's wait and see.

* * *

Service award photos--Once upon a time LAB NEWS took a deep breath and made a pronouncement: no more service award photos. The resulting flak was so heavy that we had to relent. So we noticed with special interest this announcement in a WE paper: "Please Note- It is the policy of this publication to publish the picture of each employee who has a service anniversary of 35, 40, 45, or 50 years." You know, I think we may have found the answer...

* * *

How to gain economy by sheer & excruciating detail--Norma was on a trip and we needed a box of photographic paper and we looked and found something called a "Purchase Requisition." Aha! we'll just fill this thing out and have our paper in a trice. Then we began to examine this form. The front side bears mysterious legends--"Government Priority DO-E-2," "Commodity Class," and many others. Scratching our head, we turned to the instructions on the reverse side. Well there's 31, count 'em, 31 instructions (and two NOTES) and by the time we got to number 18--"CC: Enter 0 (zero) for new amounts and increases; enter "M" for decrease."--a feeling that's common in editorial circles was coming over us. Called "MEGO," you find it written in the margin of particularly exciting copy. Translation: my eyes glaze over. Anyhow, we concluded we didn't really need that paper. And other people around here must be equally persistent, or unpersistent, so what we have here in this innocent appearing form is a real economy measure, gained through subtle and clever design.

* * *

One more energy formula--

See how these masses mill and swarm
And troop and muster and assail;
God! we could keep this planet warm
By friction, if the sun should fail.
Edna St. Vincent Millay,
Three Sonnets *js

LAB NEWS

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SANDIA LABORATORIES

An Equal Opportunity Employer

ALBUQUERQUE, NEW MEXICO
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TONOPAH, NEVADA

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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

Supervisory Appointment

ROGER CHAFFIN to supervisor of Exploratory Radar Development Division 2125, effective March 16. Since coming to Sandia in 1967, Roger has worked with advanced radar systems and performed radiation effects studies on microwave semiconductors. He is the author of a book, "Microwave Semiconductor Devices: Fundamentals and Radiation Effects," published in August 1973 by Wylie Interscience Publishing Co.

He earned his electrical engineering degrees — BS, MS, and PhD — from the University of Wisconsin. An active member of IEEE, Roger has held a number of offices with the local group and, currently, is chairman of the Albuquerque Section. His leisure time activities include jeeping, camping and fishing.

Roger and wife Nancy have three daughters and live at 6220 Katson N.E.

Sandia Colloquia

April 2

Sandia Research Colloquium
Dr. Augustine Furumoto
Hawaii Institute of Geophysics
University of Hawaii
Subject: Hawaiian Geothermal Project
Bldg. 815, 8:15 a.m. (inside Area)

April 2

Technology Colloquium - Video
T.O. Hunter (1133)
Subject: High Fluence Recovery Development for NTS
Bldg. 815, 10:15 a.m. (inside Area)

April 2

Computing Colloquium
Leo J. Cohen, President
Performance Development Corp.
Subject: Computer Communications
Bldg. 815, 2:30-4 p.m. (outside area)

April 4

Technology Colloquium - Video
T.O. Hunter (1133)
Subject: High Fluence Recovery Development for NTS
Bldg. 632, 1:30 p.m. (inside Area)

April 5

Sandia Research Colloquium
Dr. Ivan P. Kaminow
Bell Telephone Laboratories
Subject: Electro-Optics or Optical Communications
Bldg. 815, 10:15 a.m. (outside Area)

Events Calendar

March 30 — NM Mt. Club, Jemez Mts. hike, 5 to 8 miles, Gulf Mart, 8 a.m.
April 1-2 — "The Old Maid & The Thief," 8:15 p.m., Rodey Theater.
April 1 — Lecture, Dr. Richard Ellis, "Indian Records and the Writing of American History," Zimmerman Library, UNM.
April 2 — UNM Jazz Band Special "Nostalgia Program," 8:15 p.m., Popejoy Hall.
April 2 — UNM Chamber Singers, Fine Arts Center, 8:15 p.m.
April 3 — Ravi Shankar Concert for benefit of the Albuquerque Symphony Orchestra, Civic Auditorium, 8 p.m., 265-3689.
April 3 — Speaker: Billy Friedkin, 8 p.m., SUB Ballroom.
April 6 — Community Concert Association: William Walker, baritone, 8:15 p.m., Popejoy Hall, 255-3474.
April 6 — "Three Bears" for children, 10:30 a.m., 1 and 3:15 p.m., Rodey Theater.
April 6 — NM Mt. Club, moonlight hike in Sandias, Western Skies, 7:30 p.m.
April 7 — Music Vesper Series Concert: Flora Butteri, violin; Charlotte Vane, piano, 4 p.m., First Methodist Church, 4th & Lead.
April 7 — Albuquerque Solo Group, 8:15 p.m., Keller Hall, UNM.
April 8-10 — AM Film Theater: "Rhinoceros," 2 and 8 p.m., Fox Winrock Theater.

LIVERMORE NEWS

VOL. 26, NO. 7 LIVERMORE LABORATORIES MARCH 29, 1974

Supervisory Appointment

Liveo Olivotti to supervisor of Test Assembly Section 8412-1, effective March 1.

Since joining Sandia/Livermore as a technical staff assistant in 1960, "Ollie" has worked chiefly in design and hardware support activities.

Before Sandia, he served in the Air Force for 21 years. During WWII, he survived the Bataan Death March and was held a Japanese prisoner of war in Manchuria for three and a half years. For his last 12 years of military service he was mechanical supervisor in weapons assembly at Sandia Base, N.M., Clarksville, Tenn., and Fairfield, Calif.

Ollie enjoys golf, skiing and square dancing. He and his wife Harriet live at 4089 Pomona Way, Livermore. They have three daughters — one is a sophomore at Livermore High School, another is a senior at California State University at Chico, and a married daughter teaches school in Felton, Calif.

WHAT hath Simon wrought? Jackie Sparger (8155) shows. Picture at top was taken several years ago. All lights burned long and bright, thermostats were high and skirts were short. Now the lights are fewer and burn less, the thermostats are lower, and the dresses longer. No doubt there is a direct relationship between the heat and the hem.

PHOTOMICROGRAPH shows bond region (at 400X magnification) between copper plates produced by impact welding technique.

PRIOR TO IMPACT WELDING EXPERIMENT, Gene Neau (8342), left, and Gayle Cain (8415) place specimens above an exploding foil.

New Application of Exploding Foils In Impact Welding

A new impact welding technique using an exploding foil has been devised by Gene Neau of Device Studies Division 8342, and Gayle Cain, supervisor of Simulation Testing Division 8415.

Exploding foils have been employed to produce high pressure shock waves in studies of materials response; however, this is the first application of an exploding foil specifically to achieve a bond between similar or dissimilar metals. Original material characteristics are retained in the process.

The new technique uses an exploding metallic foil, typically 0.1 to 1.0 thousandths of an inch thick, which is vaporized by the current supplied from a large and reusable capacitor bank. The expanding heated foil vapors propel one metal into the other with sufficient velocity to result in melting and local jetting along the contacting surfaces of the metals being bonded.

The technique can be used in two types of impact bonding. In the first method the expanding foil vapors drive one metallic plate into another at an angle; this produces a bond over the contacting surfaces of the two plates. In the second method the plates are initially in contact and the foil vapors produce spot welds at the locations of preformed dimples.

Conventional joining processes often destroy certain properties of the materials being joined, and special treatment of the bonded areas is needed to restore these properties. The properties of the two materials could be sufficiently different (for instance, aluminum and stainless steel) that the restoration process would further destroy the properties of one of the materials. The restoration process might also tend to weaken the bond.

In addition, the use of explosives in conventional impact welding creates safety problems — explosives handling, shock waves from the detonation, and flying shrapnel. These problems are largely overcome by use of the exploding foil technique.

Authors

Harvey Pouliot (8332), "Hand-Tightened, High-Pressure Ball-Seal Connection," INDUSTRY WEEK, DESIGN NEWS and INSIDE R & D, Oct. 1973, and ASME MAGAZINE and COMPRESSED AIR, Dec. 1973.

Ron Musket and Walt Bauer (both 8334), "Surface Analysis Using Proton Beams," THIN SOLID FILMS, Vol. 19, p. 69 (1973).

Sympathy

To Mose Mouton (8256) on the death of his father-in-law in Benton, Ark., March 1.

To Mearle Hicks (8361) on the death of his mother in Atlantic, Iowa, March 3.

Speakers

Jack Dini and Rudy Johnson (both 8312), "High Strength Nickel-Cobalt Deposits for Electrojoining Applications," American Society for Metals and Battelle Laboratories Symposium on Electrodeposited Metals for Selected Applications, Columbus, Ohio, Nov. 14-15.

Rand German (8312) and Ray Mar (8313), "Sintering Behavior of Boron," American Ceramic Society, Fall Regional Meeting, San Francisco, Nov. 1.

Rand German (8312), "Utilization of SEM in the Analysis of Porous Parts," and "Analysis of Partially Consolidated Powder Structures by Quantitative Metallography," Materials Engineering Symposium sponsored by American Society of Metals, Chicago, Oct. 1-2.

Congratulations

To Mr. and Mrs. Jerry Moore (8423), a son, Jason Wesley, March 11.

'Mr. Manpower'

Mel McCutchan vs. Unemployment

Mel McCutchan, supervisor of Community Relations Division 3163, is "Mr. Manpower" of New Mexico. On loan to the local office of the National Alliance of Businessmen, Mel, as Metro Director, heads a staff of nine professional "job getters."

For instance, Mel and his staff have found jobs for some 5000 Vietnam veterans in the past three years. Recently, they've trained 200 people for jobs in a new manufacturing plant in Mountainair. They are currently helping a new firm with plans to locate and hire 300 workers in the Los Lunas-Belen area. In all, they have helped to create 8000 new jobs in Albuquerque in the past year.

This is in addition to day-to-day activities: designing training plans for established businesses and promoting the hiring of people thought to be unemployable. "We are concerned about social problems," Mel says, "and good jobs solve most social problems."

Training programs conducted in the past for some of these people have been markedly successful. They have learned how to get to work on time, perform well, and stay with it.

"We keep hacking away at unemployment," Mel says. "New firms locate here and we work with them to find or train the people they need. If we created 10,000 jobs, we still wouldn't make a dent in the 5.6% unemployment rate in our state. We keep trying but the competition for new industry is fierce."

Mel works closely with AIDS, responsible for bringing new business to Albuquerque, and with the State Department of Development. With his intimate knowledge of government and state programs, Mel is able to cut through the red tape in applying for and obtaining funds for economic development, vocational training and social rehabilitation.

Mel has worked in this field a long time. Some 15 years ago, when Mel headed one of Sandia's training divisions, he was instrumental in establishing the eight vocational training institutions in the state. At the time, there was not a technical institute in New Mexico.

Much of Mel's work is the time-consuming participation in various committees, necessary in a bureaucracy to get things done. He chairs the Advisory Council on Vocational Education, and he is a member of the Commission for Indian Affairs, the Governor's Manpower Advisory Committee, the Albuquerque Crime Study Committee, the Employment Committee for the Southwestern Indian Polytechnical Institute, and the Rural Employment Committee. He serves also as special manpower advisor to AIDS.

MEL McCUTCHAN (3163) — "Mr. Manpower"

"The problem is," Mel says, "that we have to create 10,000 new jobs each year just to take care of our young people graduating from educational institutions. Even then, half of our college graduates leave New Mexico to find jobs."

In the meantime, Mel says, there is the constant need for jobs for disadvantaged workers, the need to train unskilled workers and the necessity to convince people of the urgency for economic development.

Mel is a serious fellow but occasionally he smiles.

"The fact is," he says, "we have some tremendous success stories. We have changed lives. There are people who have been on good jobs for several years that we've trained, people that before were unemployable. That makes the effort personally very satisfying and worthwhile." • dg

Voter Registration Here Next Week

IF:

— you didn't vote in the November 1972 election,

— your name or address has changed since you last registered,

— you just turned 18 (or will by May 7),

— you're a Bernalillo County resident,

AND:

— you want to vote in the Mayor-Council Election on May 7,

Then: Register. The League of Women Voters will staff a table for that purpose in the lobby of the Personnel Building (832) from 11:30 a.m. to 1:00 p.m. on April 3 and 4. (They will not be able to handle changes in party affiliation.)

Take Note

The Sandians, an organization of wives of employees, will meet Monday, April 1, at 7:30 p.m., at the home of Tami Veneruso, 7501 Arroyo del Oso. A member of the Albuquerque Police Department will show a film — "Child Molesters" — and answer questions. Call Mary Thompson, 296-2235, for more information.

* * * *

AESOP will meet at 4-Seasons April 2 to 4. Up to 100 persons are expected to attend the conference, which is concerned with computer operations within the AEC complex.

* * * *

Jack Sivinski, manager of Biosystems Research Department 5250, recently helped kick off a new program at Eastern New Mexico University at Portales called the "Distinguished Scientist Lecture Series." Jack was the first speaker of the program. He discussed "The Search for Extra-Terrestrial Life in the US Planetary Exploration Program."

* * * *

Bob Schuch (5226) is the new president of the Sandia Laboratories Horseshoe Pitching Association, and he's out beating the bushes for new members. With plans for tournaments, training sessions and practice competition, Bob says that the coming season will be the greatest yet. Bob extends a special invitation to the ladies and to retirees to join the group. Skill is the thing about pitching horseshoes, Bob says, not physical strength. Association activities start next week. Give Bob a call, ext. 2676, if you're interested.

Mayor Candidates On Albq. Environment

If you're interested in what the leading candidates for Albuquerque mayor have to say about the urban environment, save the evening of April 11 (7:30 p.m., Anthropology Auditorium at UNM). Organized by the Sierra Club (and co-sponsored by the League of Women Voters, New Mexico Conservation Coordinating Council, New Mexico Citizens for Clean Air and Water, Students for Environmental Action, and American Association of University Women), the meeting will give the candidates a chance to respond to prepared questions for an hour; then they'll answer written questions from the group attending.

conserve

SANDIA'S ENERGY AND RESOURCE CONSERVATION

CONSERVE PAPER!

Both sides of the paper can be used when making copies on the Xerox 2400, 3600, and 7000.

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3. push START PRINT button
4. remove copies from hopper

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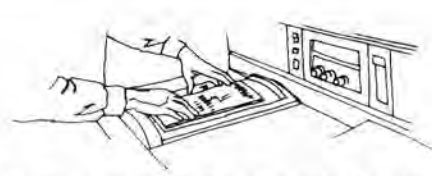


7. repeat procedure for other side of paper

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

Brotherhood Awareness April 5-8

William A. Anders, a member of the U.S. Atomic Energy Commission, will be the featured speaker at the Saturday morning session of the Brotherhood Awareness conference in Albuquerque next week. Commissioner Anders is expected to pay an official visit to Sandia and to Los Alamos Scientific Laboratory while in New Mexico.

The three-day Brotherhood Awareness observance will open Friday night, April 5, with a special program of entertainment in the Picuris room at the Convention Center. The Saturday session begins at 9:30 a.m. in the west banquet room with a series of brief inspirational talks and entertainment by the Ballet Folklorica before Commissioner Anders' keynote address.

A buffet luncheon will be served, after which the program will continue until 4:30 p.m., with a film, musical entertainment and discussion.

The concluding session on Sunday will open at 10 a.m. with music by the UNM Collegiate Singers, followed by a devotional program, under the direction of the Rev. Harry Summers, general chairman of the arrangements committee. Featured speaker will be the Rev. B. Cortez Tipton, Washington, D.C., whose talk, "Putting It All Together," will complete the program. The benediction will be given by Reies Lopez Tijerina, originator of the program.

H.M. Willis (3130) is program chairman for this year's Brotherhood Awareness observance.

ISRAELI visitors from that country's Nuclear Research Center listen as Dan Thompson (3313) explains operation of the Labs personnel radiation dosimetry program. Center is Adam Gabriel and, at right, San Litai. Sandia influenced design of the Harshaw automated thermoluminescent dosimetry equipment and has employed the first production model of the system in its program since 1971.

May Require Medical Attention

Dizziness No Laughing Matter

Mention to someone that you've been feeling dizzy and the comeback might be, "What took you so long to find out?"

This column is about dizziness as interpreted medically, and frankly, true dizzy spells are no laughing matter.

Let me explain:

First, what is dizziness?

It is not faintness. It is not lightheadedness. It is not slight swaying. These are merely physiological symptoms. They can be caused by things such as getting up out of bed too quickly, the sudden resumption of the upright position after prolonged squatting, or the lightheadedness and actual fainting that may occur from too-prolonged motionless standing (as in the case of soldiers standing at attention on parade grounds).

All of these are exaggerations of normal body reflexes that occur in all of us at some time.

Dizziness is a pathological symptom. It means something is wrong with a person's equilibratory apparatus. The truly dizzy person suffers from vertigo, which is a feeling of whirling — usually the external world seems to be whirling around the person — or is a feeling of up-and-down or side-to-side motion.

In contrast to light-headedness or faintness in which some peculiar feeling seems to be present in one's head, in dizziness something seems to be wrong with the steadiness of the environment.

Every person who first experiences the onset of dizzy spells should be given a thorough history and complete physical examination followed by evaluations of the ears, nose and throat. The evaluation usually focuses on the ear region because dizziness often turns out to be caused by some affliction of the vestibules, which are organs of balance located deep in the inner ear.

The vestibules are not the sole organs of balance, however, for they have nerves leading to specific sections of the brain and the problem could also lie in those nerves or the brain itself. Even the eyes and their nerves and brain connections are involved in maintaining one's balance.

Among the brain afflictions that can be responsible for dizziness are some strokes and certain internal brain tumors. A unique form of brain tumor is called an acoustic neurinoma. It is located not so much in the brain as at the base of the brain, and is *usually* associated with vertigo. Its presence must always be considered a possibility.

Other causes of dizziness would include the partial or complete closure of a blood vessel at the base of the brain, or some vascular abnormality of the ear or brain.

All of these, while potentially very serious conditions, luckily are not the *common* causes of dizziness.

More common than these are conditions associated with the ear, as noted earlier. One of the most common is Meniere's disease or syndrome.

Not every patient with Meniere's disease will have all three of the following symptoms at first, but all of them should eventually experience attacks of whirling vertigo, ringing in the ear and some degree of hearing loss.

They have isolated attacks of severe whirling vertigo with no dizziness or instability between attacks. The attacks usually begin suddenly but not so quickly that the patient falls. Typically, the attack gets worse and worse during the first hour, persists unchanged for several hours and then subsides.

Meniere's vertigo lasts for hours, not days or weeks. Some people may experience nausea and vomiting with their attacks. If untreated, Meniere dizziness episodes tend to become more frequent, from months apart to sometimes as often as once a week or even every few days.

Some of the other causes of vertigo include such things as entrapped wax or foreign bodies in the external ear canal, especially if it's packed tight against the eardrum itself. Generally this produces only mild dizziness. Another cause is pressure in the middle ear which causes blockage of the Eustachian tube — usually from a cold — and also can cause dizziness.

Acute and chronic middle-ear infections can cause mild vertigo but this can become quite severe if the infection extends into the mastoids.

Even injuries to the ear can cause vertigo. A sharp blow with the open hand may rupture the eardrum and dislocate the three middle-ear bones.

So dizziness can be serious and require medical treatment. If you have the symptoms described above, the best person to consult is your personal physician.

feedback

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. Sandia's marked parking slots are extremely narrow in comparison to the vehicles using them. Practically every car at Sandia has been badly chipped because of the resulting crowding.

Can't we have wider parking slots?

A. Next time we re-surface or repair our parking lots, we will consider providing wider parking slots; however, our parking slot widths are in accordance with recommended standards. It probably would not be possible to provide slots wide enough to prevent a door from touching an adjacent car if open ninety degrees.

—R.E. Hopper - 9700

* * * *

Q. (SLL) Could not the post number 3 gate be opened to vehicular traffic during working hours to effect a more efficient and less rigid traffic flow? The present executive parking could be eliminated and tech area access and parking privileges extended to executives and to a certain number of LLL employees in reciprocity.

Bicycle parking could also be provided throughout the tech area allowing cyclists to move efficiently to and from their places of work and encouraging wider use of bicycles.

Taxis and buses could have access to a wider area for pickup and discharge of passengers.

A. Post Number 3 is open for pedestrian traffic only on its current schedule in the interest of serving guard manhours.

Although no current AEC rules prohibit personal vehicles in secured areas, Sandia Labs policy is opposed to personal vehicle traffic in the tech area because of safety, security, liability, and fire fighting related problems. It is felt we should keep the streets and access ways as clear and open as possible for the use of emergency vehicles, as well as for the use of our own maintenance vehicles.

Currently, bicycles may be brought into the area through posts No. 3, No. 7 and No. 10 as well as the passenger pick up gate in front of Building 912.

Also, the LLL taxi will pick up passengers at post No. 7 (vicinity of Building 916) when requested to do so.

—C.H. DeSelm - 8200

* * * *

Q. Has any thought been given to improving the Equitable plan so that it is more nearly equivalent to the other two plans? Our doctors are not members of either Mastercare or Lovelace-Bataan, and because of this, we are not able to take advantage of the additional benefits the HMO plans offer.

A. Sandia has assisted in the development of the prepaid health plans in Albuquerque as alternatives to the more traditional form of indemnity coverage (Health Care Plan) thereby allowing employees to select the health plan coverage which best meets their individual needs. The Health Care Plan is designed as a basic plan to provide good coverage for the majority of Laboratories employees. It is not designed nor expected to be complete coverage of all health related expenses. Employees will have to make individual decisions on whether or not

1. to join the HMO (prepaid plan) which Sandia has helped develop,
2. to obtain a supplemental plan through a private carrier on an individual basis, or
3. to pay the present out-of-pocket expenses rather than insure against them.

Considering total plan costs and coverage, we feel that the present plans are in reasonable balance and do not foresee any additional changes.

—D.S. Tarbox - formerly 4200

* * * *

Q. The Shop requests six copies of all drawings when a "Shop Work Request", SA 6505-Z is submitted. Are six really required?

A. Our findings are that only two copies of drawings are needed if the work is done in-house and four copies (to accommodate a number of bidders) if the work is contracted outside. We will be processing an SLI revision in the near future. In the interim we are notifying our people to accept the smaller number of copies — two or four, depending on the probability of the work being done in-house or contracted. Additional copies may occasionally be needed if a job is split between in-house and outside. Until a request has been evaluated in terms of internal load balancing and cost advantages of in-house versus outside, it is often impossible to state whether the job will be done in-house, outside, or split.

Your question was timely and has resulted in an improved procedure sooner than it would have occurred otherwise.

—C.F. Bild - 3600

* * * *

Q. Would it be possible to have the Sandia commuter buses drop off and pick up passengers outside the Tech Area? This could be done easily by having the bus drive around the outside of the Tech Area and stopping at various gates. This would dispense with theneed for waiting for a security guard and would make the trip far more efficient. As it stands now I can drive home faster than it takes for the bus just to leave the Tech Area in the evening. And I'm sure Security would be glad to be able to assign their men to more efficient tasks.

A. Although there are occasional brief delays in checking badges of people entering Tech Area I by special bus, the people riding the buses are delivered much closer to their work locations than they would be if the buses circled the Tech Area. Further, the big buses would interfere with traffic flow at rush hours if they tried to make their deliveries and pickups outside each Tech Area gate.

Various alternatives are being considered for possible use if the number of buses increases to a point where admitting all of them at one time would cause substantial delays at the gates.

—K.A. Smith - 3100

* * * *

Q. What are chances of having the parking areas striped as an aid to drivers who still can't angle park?

A. We have not painted parking stripes in the parking lots due to the expense of the initial painting and also the periodic repainting required. Some drivers either cannot park properly or do not care about the inconvenience they cause others. You frequently observe this in shopping center parking lots which are adequately marked.

We have had better parking success in those lots where the parking bumpers are turned at an angle to better define the individual spaces. Consideration will be given to arranging the bumpers in a similar manner in other lots as they are resurfaced.

—R.E. Hopper - 9700

* * * *

Q. Is there a WE or Federal regulation against Sandia adopting a four-day work week? There are many of us who would be willing to work a 10-hr.-day in order to get a four-day work week. I think a survey should be taken to see what the consensus is.

Would the union contracts be the major problem?

A. There are no Federal regulations against the 4-day week as such. There are, however, current Federal statutes which require overtime payments to certain employee classifications if they work more than eight hours a day. Because these statutes cover many of the employees in our currently recognized bargaining units, all of our present labor agreements provide for time and one-half for all time worked in excess of eight in twenty-four consecutive hours. For much the same reason, our present Laboratories' policy for all non-exempt, non-represented employees (graded and Staff Assistants) is to make overtime payments for work over eight hours in a day. Without a change in the applicable Federal statutes, the current labor agreements, and our present policies any change in the work schedules involving more than eight hours daily could significantly increase our payroll costs.

There is no Western Electric policy against a 4-day week. Western Electric would have similar restrictions and has not introduced a 4-day week at any of its locations.

— D.S. Tarbox - formerly 4200

Julian Sanchez (9000)

John Christopher (4000)

Jim Kelly (2000)

Personnel Representatives Relocated

Traditionally at Sandia when you wanted to discuss personnel matters (e.g. educational programs, possible reassignment, or even personal problems) you would do so with your supervisor. In some instances additional discussions would be held with a Personnel Representative. On occasion, the discussion item might be such that you'd approach only the Personnel Rep. In every instance you were assured of confidentiality.

For a number of years the Personnel Reps reported administratively to a central Personnel organization. Effective April 1 this will change. The reps will be administratively assigned to vice presidential areas and they will have private office spaces in their respective areas. The basic functions of the reps will not change.

Primary purpose of the relocation is to bring the representatives physically closer to the employees they serve, non-supervisory and supervisory alike. At the same time the representatives will retain offices in the central personnel building where they will devote a considerable amount of effort to recommending and discussing laboratories-wide personnel policies and procedures and in closely coordinating their composite efforts such as assessing qualification of candidates for vacancies.

Each Personnel Rep will also act as EEO coordinator for his vice presidency and advise supervisors on implications of personnel actions with respect to the Labs' Affirmative Action Plan and Civil Rights Laws, and Executive Orders.

Harvey Brewster is the 1000 organization personnel rep. Harvey has worked in the personnel organization since 1967.

Jim Kelly, a 22-year Sandia veteran, will move from the compensation and benefits organization, to personnel rep for org. 2000. Jim's background includes auditing, business systems, compensation, benefits and personnel placement.

Ray Clark has been a personnel rep since 1969. Previously at Sandia he worked in job evaluation, wage and salary, and labor relations. Ray will handle the 3000 and 6000 organizations.

Ray Clark (3000)

John Christopher, known as "Chris," will move from job evaluation to handle the 4000 organization. Chris has been 26 years at Sandia working in reclamation, receiving and, for the past seven years, in job evaluation.

Gertrude Byrne will continue as the 5000 personnel rep. Gertrude has been at Sandia 26 years, the past seven in the personnel organization. She started as a secretary and became a supervisor of secretaries before transferring to personnel.

Julian Sanchez will handle the 9000 organization. Another Sandia veteran with 24 years with the company, Julian has worked at various administrative jobs at Sandia such as job evaluation and placement. He has been a personnel rep for the past four years.

Congratulations

To Mr. and Mrs. Randy King (2133), a son, Joel Keith, Feb. 3.

Gertrude Byrne (5000)

Continued from Page One

New PCB Process

drilling machinery, and the jigs and fixtures required for reference holes and registry of circuit artwork. It also reduces processing time for finished boards and allows complete automation of PCB manufacturing by reducing it to a batch process, thus lowering costs.

Elimination of jigs, fixtures and drilling machinery should make it possible for small, limited capital shops to turn out precision PCB's for the first time. Hobbyists should also benefit from the new technique since they will be able to construct items containing complex PCB's without need for expensive equipment.

Two-sided, non-plated hole boards can be etched in a single pass, opening the required holes and applying circuit paths with one master.

The new technique was invented by T.A. Allen, supervisor of Photofabrication and Precision Components section, 7123-1.

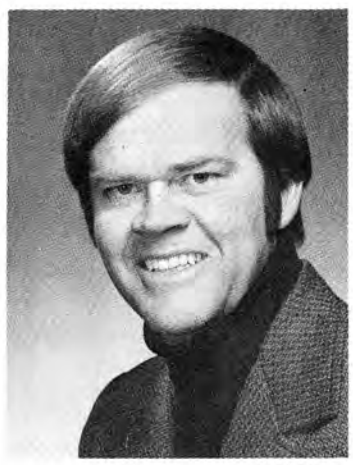
MILEPOSTS

LAB NEWS

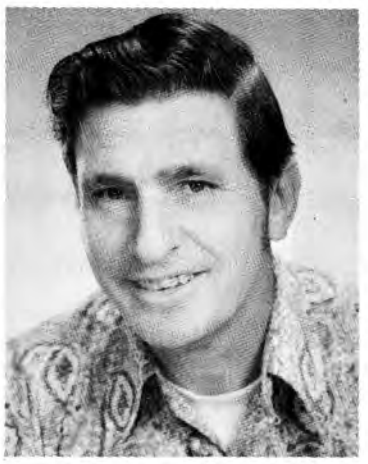
March 1974

Robert Stearley - 5725 10

Erminio Mata - 3148 10



Ed Burgess - 5156 10



Harold Hunt - 8257 15

Frank Casner - 15

Ed Beauchamp - 5846 10

Ben Benedetti - 8113 10

H.H. Patterson - 1230 25

Alice Miner - 4154 10

Phillip Wehrman - 1126 10

Dorothy Boyer - 4124 15

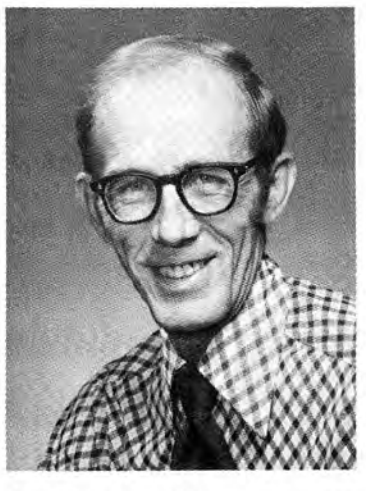
Frank Emig - 7613 20

Ray Arvidson - 9511 25

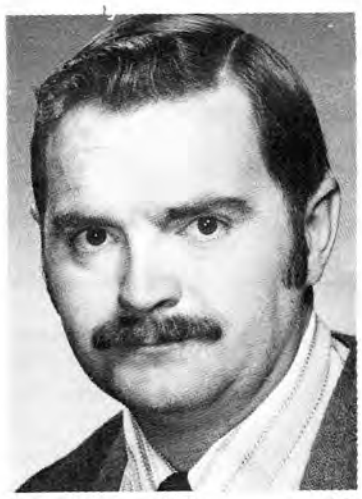
Ruby Cruze - 4152 15

Donald Hanson - 1232 15

A.A. Arrington - 9718 25



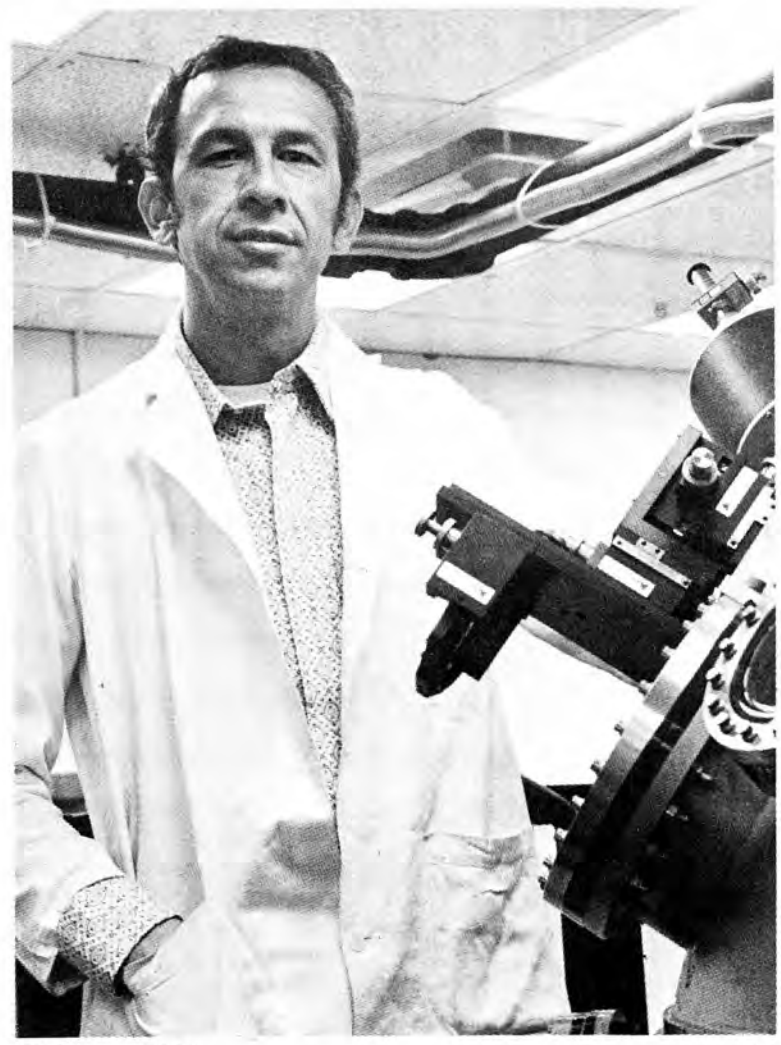
Jack Smith - 2516 25



Gary West - 9423 15

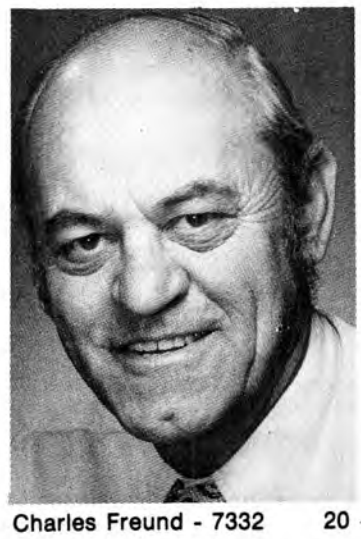
Glen Kepler - 5810 10

Jack Puariea - 1247 15



Gil Cano - 5213 10

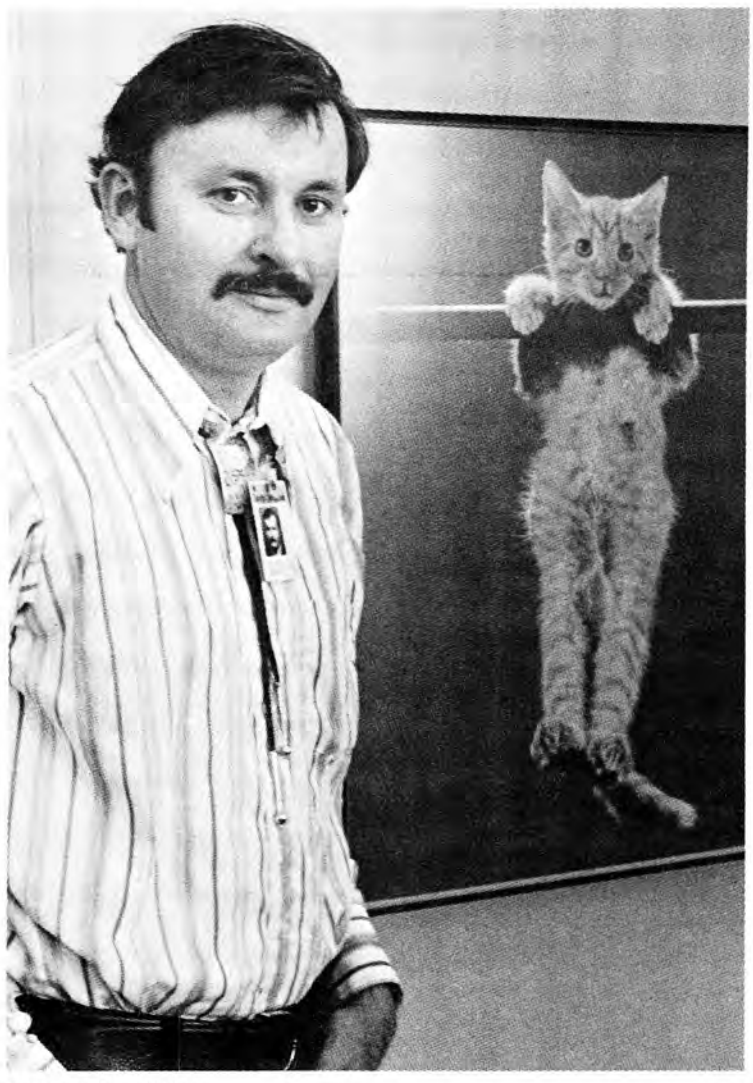
Henry Ward - 5723 20



Charles Freund - 7332 20

John Kirby - 9511 25

James Leeman - 2315 10

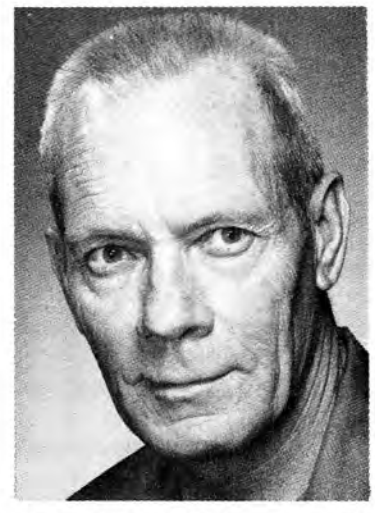


Al Narath - 5000 15

Jose Jojola - 7513 25

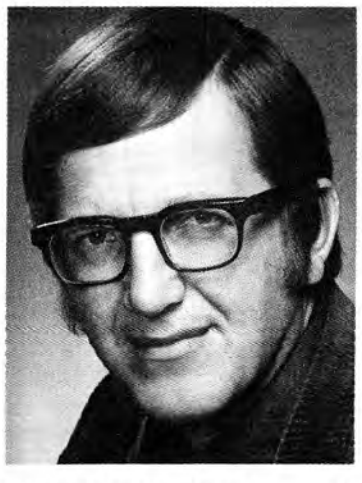
George Revels - 7134 20

Melquiades Sanchez - 7212 20



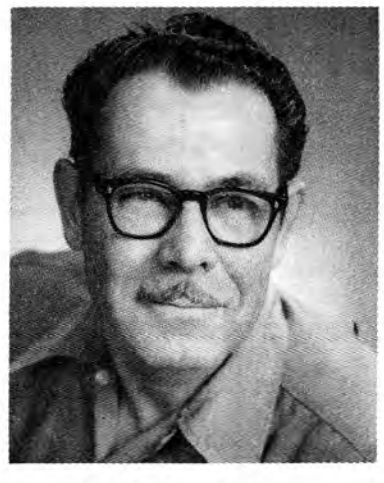
Lewis Pearl - 9550 20

Ernie Alford - 8256 25



Donald Jelinek - 2124 10

Rocky Roach - 8421 25



Frank McMurtey - 8421 15

B.C. Moore - 1131 15

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L.S. Nelson and N.L. Richardson (both 5824), "Formation of New Oxide Glasses by Laser Spin Melting and Free Fall Cooling," Vol. 12 (1973), JOURNAL OF NON-CRYSTALLINE SOLIDS.

G.A. Carlson (5323) and K.W. Henry (8314), "Fringe Shift Generators for Characterizing Interferometer System Response," Nov. 1973 issue, REVIEW OF SCIENTIFIC INSTRUMENTS.

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D.K. Brice (5111), "Theoretical Analysis of the Energy Spectra of Back-Scattered Ions," Vol. 19, No. 1 (1973), THIN SOLID FILMS.

R.A. Graham (5133), "Pressure-Induced Reversal of the Sign of the Hydrostatic Piezoelectric Constant of Lithium Tantalate," Vol. 13, No. 12, SOLID STATE COMMUNICATIONS.

P.M. Richards (5132), R.K. Quinn and B. Morosin (both 5154), "Magnetic and Structural Properties of Manganese Pyridine Linear Chain Salts," Vol. 59, No. 8 (1973), JOURNAL OF CHEMICAL PHYSICS.

G.J. Simmons (5120), "Sums of Valences in Bigraphs. II," Vol. 15, No. 3, JOURNAL OF COMBINATIONAL THEORY.

J.M. Freedman (1542) and L.M. Keer (Northwestern Univ.), "Static Response of a Rigid Strip Bonded to an Elastic Layer," Vol. 1, No. 2 (1973), ACTA MECHANICA.

H.T. Weaver, R.K. Quinn, R.J. Baughman and R.C. Knauer (all 5154), "Nuclear Resonance and Magnetic Susceptibility Study of Platinum - Group IVA Compounds," Vol. 59, No. 9, JOURNAL OF CHEMICAL PHYSICS.

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J.G. Curro and E.A. Salazar (both 5811), "Mechanical Behavior of O-Rings," June 1973 issue, RUBBER CHEMISTRY AND TECHNOLOGY.

K.B. Wischmann (5813) and G.W. Brassell (former Sandian), "Low Temperature Transitions in a Crosslinked Urethane," Vol. 13, No. 2 (1973), POLYMER ENGINEERING AND SCIENCE.

D.E. Amos (5122), "Computation of Modified Bessel Functions and Their Ratios," January 1974 issue, MATHEMATICS OF COMPUTATION.

A.R. DuCharme (5154) and R.L. Gerlach (former Sandian), "L-Shell Ionization of Surface Atoms by Electron Impact," January 1974 issue, PHYSICAL REVIEW A.

J.M. Hoffman (5212), G.J. Lockwood and G.H. Miller (both 5226), "Emission Cross Sections for N_2^+ ($3914\,\mathring{A}$) for F^+, Ne^+ and Na^+ Ions Incident on N_2 Gas," January 1974 issue, PHYSICAL REVIEW A.

G.E. Laramore (5151), et al, "Surface Crystallography via Elastic Low-Energy Electron Diffraction," January 1974 issue, JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY; Laramore, "Analysis of LEED Intensity Profiles from the (100) and (111) Faces of Copper," February 1974 issue, PHYSICAL REVIEW B; Laramore, "Convergence Comparisons of the Third-Order t-Matrix Method with an Exact Inelastic Multiple Scattering Method," December 1973 issue, PHYSICAL REVIEW B.

P.M. Richard (5132) and M.B. Salamon (Univ. of Ill.), "Exchange Narrowing of Electron Spin Resonance in a Two Dimensional System," January 1974 issue, PHYSICAL REVIEW B.

INDIAN STUDENTS from various Albuquerque high schools toured Sandia Lab facilities recently to view activities and occupations. Here, Lynn Ernst (5712) and Bob Stromberg (4736) explain Sandia's solar energy collectors.

Continued from Page One

Metric System Official

kilogram, and second as base units, is official now:

> It is the policy of Sandia Laboratories to implement the International System of Units (SI) as the predominant measurement system for our operations, including reporting of scientific and engineering data and definition of engineering designs. This implementation should be done in an orderly, cost-effective manner consistent with efforts in the AEC companion laboratories and production complex.

Metrication representatives (or Metreps) from each vice presidency have been selected as follows: 1000 - Earle Chapman, 2000 - George Donaldson, 3000 - Jim Kenagy, 4000 - Bob Hepplewhite, 5000 - Glen Brandvold, 8000 - Ralph Cozine, and 9000 - Ken Harper. Their task is to put the new policy into practice.

Since early 1971, Corry McDonald (9623) has been working with metrication at Sandia. His primary duty was to keep his finger on the national pulse and to advise the AEC(ALO) and the Labs on the ramifications of going metric. He is chairman of the ASME Special Committee for Metric Study (NYC), and has generally promulgated the use of the SI throughout the AEC production complex.

And now the new policy — which essentially says that Sandia will actively begin conversion. Corry will continue to explore the problems accompanying conversion, but he and the Metreps will now work closely on the metrication process with people who specify, order, process, or use materials, components, supplies and equipment.

"We'll probably begin by asking each department to work up a PERT chart which shows the metric steps that the group will take. Then we'll help to coordinate the various schedules so that one organization isn't inconveniencing another by moving too slowly — or too quickly, for that matter."

Metrication at an R&D lab like Sandia will certainly present some problems. But the work already done means that many of the problem areas have been identified and can be cooperatively solved.

The biggest problem facing the entire metrication movement is education (more on that later), but from the point of view of an R&D lab, the biggest problem is one of standardization. When the specifications call for, say, .030 inch stainless steel, should Sandia accept .75 mm or insist on .762 mm? That is just a small sample of the standardization problem — currently the USA uses about 25,000 standards. But the International Standards Organization has thus far generated only 2500, and most of those are recommendations rather than accepted standards. Obviously, at the current rate it will take 50 to 75 years to agree on 25,000 standards, unless the adoption process is speeded up by some world-wide cataclysm — World War II stands as the best example of expediting agreement on standards.

So Sandia faces a formidable task. But Sandia is not alone. LASL and LLL have already begun an active metric program. The AEC complex itself is not far behind.

On the national scene, business and industry await — some with eagerness, some with reluctance — the passage of HR 11035, the bill which will establish a 10 year program for metricating the country.

Later in this series: the national and international scene, the SI (International System of Units). • bh

G.P. Steck (5122), "Evaluation of Some Steck Determinants with Applications," Vol. 3, No. 2, COMMUNICATIONS IN STATISTICS; "A New Formula for $P(R_j \leq b_i, 1 \leq i \leq m | m,n,F=G^k)$, Vol. 2, No. 1, ANNUALS OF PROBABILITY.

K.J. Touryan (5640), "Electric Probes in Stationary and Flowing Plasmas: Part II. Continuum Probes," February 1974 issue AIAA JOURNAL.

J.E. Schirber (5150), T.F. Smith and R.N. Shelton (both Univ. of Calif.), "Pressure Dependence of T^c for $(Au^{1-x}Pd^x)$ Ga_2 Alloys," Vol. 8 (1973), PHYSICAL REVIEW B.

M.J. Landry (2441), "Laser Q-Switched by a PLZT Shutter," Vol. QE-10, No. 3, IEEE Journal of QUANTUM ELECTRONICS: "Beam Characteristics of A Lidar System," Vol. 13, No. 1, APPLIED OPTICS.

J.A. Panitz (5114), "Selective Adsorption of Hydrogen on Catalytic Surfaces"; G.E. Laramore (5151), R.L. Park (5114), et al, "Low-Energy Electron Diffraction from Ni(100) and Ni(100)-P(2x2)-CO"; P.H. Holloway (5825), "The Effects of Surface Roughness on Auger Electron Spectroscopy," 34th Annual Conference on Physical Electronics, Feb. 25-27, BTL, Murray Hill, N.J.

G.J. Simmons (5120), "Synch-sets: A Variant of Difference Sets," 5th Southeastern Conference on Combinatorics, Graph Theory and Computing, Feb. 25-March 1, Florida Atlantic Univ., Boca Raton.

R.E. Luna (5644), "Long-Term Diffusion in the Stratosphere of Inert and Active Materials," Third Conference on the Climatic Impact Assessment Program, DOT, Feb. 5-March 2, Boston.

B.F. Blackwell (5628), "Windmills - Yesterday, Today, Tomorrow"; W.P. Schimmel and A.B. Donaldson (both 1543), "Determination of Effective Thermal Diffusivity for Composite Materials"; A.J. Chabai, R.J. Lawrence (both 5166) and E.G. Young (5163), "Elastic-Plastic Deformation of Targets by Hydraulic Jets," 14th annual Symposium on Engineering for the Materials/Energy Challenge, ASME, Feb. 25-March 1, Albuquerque.

J.A. Panitz (5114), "The Analysis of Solid Surfaces Using Single-Atom Mass Spectroscopies," Invited Paper, Department of Materials Science Seminar, Cornell University, March 1, Ithaca, N.Y.

C.S. Johnson (9421), "A Nation in Quandary in a World of Crisis," Downtown Optimist Club, Feb. 1; and "The End of the Golden Age of Energy," East Heights Optimist Club, Feb. 21.

T.F. Marker (6010), "The Invention Process," Old Town Optimist Club, Feb. 13.

N.J. DeLollis (5813), "How To Beat the High Cost of Dying," Downtown Optimist Club, Feb. 15.

W.B. Gauster (5167), "Thermomechanical Response of Solids to Pulsed Radiation," Physics Dept. Colloquia, Georgia State Univ., March 4, Atlanta; and Univ. of Tennessee, March 5, Knoxville.

C.L. Olson (5241), "Theorectical Models of Collective Ion Acceleration"; A.J. Toepfer (5242), "Production and Focusing of Intense Relativistic Electron Beams and Their Application to Controlled Fusion"; J.B. Gerardo (5210), R.A. Gerber, E.L. Patterson (both 5212), and A.W. Johnson (5216),

Speakers

"Relativistic Electron Beam Excitation of Gas Lasers"; G.W. Kuswa (5242), "Experimental Studies of Collective Ion Acceleration," Conference on Electrostatic and Electromagnetic Confinement of Plasmas and the Phenomenology of Relativistic Electron Beams," March 4-7, New York City.

C.M. Tapp (2430), "Microelectronics Facilities of Sandia Laboratories," Microelectronics Symposium, March 6-8, Albuquerque.

H.C. Monteith (9344), "The Great Pyramid of Egypt," Jefferson Jr. High science class, Feb. 18; and "ESP Research in Russia, England and America," B'Nai Israel Friendship Club, Feb. 27.

R.P. Stromberg (5717), "Solar Energy Research at Sandia," Western Electric symposium, Feb. 20, Winston-Salem.

R.T. Meyer (5824), "High Temperature Laser Studies of Carbon," Chemistry Dept. Colloquium, NMSU, Feb. 28.

G.A. Samara (5130), "Ferroelectricity and the Role of High Pressure Research," Research Seminar, National Bureau of Standards, Feb. 19; and Physics Colloquium, Univ. of Colorado, Feb. 20, Boulder.

T.R. Schmidt (5222), et al, "Pulsed Irradiation of Enriched UO_2 in the Annular Core Pulse Reactor (ACPR)," TRIGA Owner's Conference II, Feb. 25-26, Albuquerque.

D.J. Sharp (2432), "Interconnection Consideration in Gold Based Hybrid Microcircuits," International Microelectronics/Semiconductor Conference, Feb. 27, Anaheim, Calif.

G.W. Kuswa (5242), "Application of Intense Electron Beams to Collective Ion Acceleration and Pulsed Fusion," Physics Dept. Colloquium, North Carolina State, March 1, Raleigh.

T.A. Duffey (1544), "Transient Response of Elastic-Plastic Shells Submersed in Fluid Media," ASCE annual meeting, March 8-9, NMSU.

W.R. Hoover (5844), "Instrumented Impact Testing of Carbon-Carbon and Borsic-Al Composites," WESTEC Conference, March 12, Los Angeles.

H.R. Spahr (5625), "Computer Generated Visual Documentation of Theoretical Store Separation Analyses," Rio Grande Chapter winter meeting, Association for Computing Machinery, Feb. 4, LASL.

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2. One ad per issue per person
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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

ELECTRIC GENERATOR, portable, 115V, 1500W, 60 cycle, cost $245, $195. Alden, 281-5356.

TWIN REVERB amp, Fender, 100 watts, 2 12" speakers, $325. Pierce, 268-2122.

DINING & BEDROOM furniture, Early American; Americana encyclopedia set with 22 yearbooks. Gorney, 299-8401.

DISHWASHER, Wards, 5-cycle, 6-level, avocado with wood finish top, portable, $125. Shepherd, 247-2552 (6:30-8p) or 296-1238 (after 8).

BLAUPUNKT AM-FM-SW radio, 12 or 6 volt for VW, $25. Campbell, 299-4830.

TYPEWRITER, Royal, white; oxygen & acetylene regulators; heliarc torch & argon regulator. Norris, 873-1677.

BEAR SHOTSHELL loader, 12-gauge, 1000 1-piece wads, 1000 primers, 1000 hulls, some powder, $75. Matthews, 869-2370.

SEWING MACHINE, Singer Touch & Sew, needs adjustment, cost $300, $100. Schalles, 298-4732.

KITCHEN RANGE, gas, std. size, reasonable. Sanchez, 344-4702.

SPEAKERS, Marantz Imperial 7, 12" woofer, pair $300; Gibson mandolin, A-50, with case, $325; lefthand golf clubs, bag, cart, $80. Perryman, 294-7040.

WASHER & DRYER set, Frigidaire Custom Deluxe, harvest gold, will deliver & hook-up, guarantee working. Moody, 821-1128.

TWO TRADITIONAL chairs, $100 each; ping pong table with acc., $30; 3-spd. man's bike, $25. Whiteman, 293-4473 after 5.

STEER BEEF calf, 500 lb. Angus-Holstein, under current market price. Waddoups, 865-7952.

ALFALFA bales, never wet, $2 each at stack, $2.50 delivered (10 bale min.). Shock, 877-3728.

COMBINATION washer and dryer, GE, used 2 years, $50. Ottinger, 242-7935.

SINGLE BED box spring, mattress, headboard, $40; blond coffee table, $5; Shetland floor polisher, $15; waffle iron, grids, $5. Smith, 299-7151.

MINIATURE SCHNAUZER, male, 10 mos. old, all shots & license. Taylor, 266-3208.

TWO ELECTRONIC crossovers, Marantz, variable frequency and level controls, $75 each. Pepmueller, 898-5419.

GYM-DANDY climbing tower; swing set with slide; need paint; either $25, both $40; will disassemble. McEwen, 268-1440.

CRAFTSMAN 36" wood lathe, no motor, new, $75. Eaves, 299-7728.

PRO LINE golf clubs, 3 - 9; PW Haig Ultra irons, $30; 1, 4 Wilson Staff woods, $20; all for $45. Cilke, 296-3665.

ELECTRIC TYPEWRITER, Underwood, 15" carriage, $70; CCM hockey skates, 5-1/2, $15. Canfield, 299-9628.

KITCHEN TABLE, 29-1/2" X 47" incl. 8" leaf, plastic top, metal legs, $10; new 6" X 9" oval car speaker, $2.50. Wright, 298-4567.

WOOD DESK, corner, 31" on each corner edge, 30" high, with drawer, no chair, $20. Ristine, 298-8383.

MAYTAG WASHER and Whirlpool dryer, $50; recreational trailer, sleeps 5, rigid walls but collapsible, extras. Holley, 898-1777.

BOAT LADDER, 3-step, $9; travel trailer electric brake control, $10; new queen box springs, $45; travel bag, $9. Lassiter, 298-2461.

CAPTAINS CHAIRS, two, hardwood, maple finish, $24 each. Dalphin, 265-4029.

LABRADOR RETRIEVER puppies, black, male & female, AKC reg., $75 each. Hueter, 842-5482.

CAMPER SHELL for short wide bed. $300; man's 26" bike, $15. Aragon, 266-8597 after 3:30.

SCHWINN 10-speed, $85; dinette, 4 chairs, leaf, $40; Mamiya Sekor, 500TL, 50mm F2, for parts, $40. Bradley, 265-2981.

SLIDING GLASS door, 6', with frame and hdwe. Maestas, 345-3292.

DRUM SET with stool & cymbals, $100. Sanchez, 877-3071.

BUNNY RABBITS, 8 wks. old, for pets or breeding, spotted black & white, $3 each; 5 mos. buck, brown & white, $4. Bassett, 898-1840.

REFRIGERATOR, RCA Whirlpool, 13 cu. ft., 7 yrs. old, pale green, $50 firm. Kubiak, 265-6525.

CHILDREN'S THINGS: portable playpen, wading pool, bed guard rails, painting easel, folding gate; also hand mower, trailer hitch. Moss, 298-2643.

DEEP FREEZE, Wards 25 cu. ft. chest type, less than 1 yr. old, $175. Hollingsworth, 298-8283.

GARAGE SALE March 30-31: much stuff incl. Sears mobile dishwasher not 2 years old at $125. 6409 Ponderosa NE. Tischhauser, 293-9768.

TRANSPORTATION

RALEIGH 5-spd. bike, S/A hub, 21" man's frame, thornproofs, pkg. rack, $50. Lipkin, 296-1840 after 5.

'73 STARCRAFT Stardust 8, $400 equity, take over payments. Perez, 898-3002.

HONDA SL70, dirt & street, new gears, desert footpegs, plastic fenders, new motocross handlebars, 90 mpg at 25 mph, $270. Silva, 255-3723.

1/3 INTEREST in 18' 140 hp I/O Starcraft boat; other owners Sandians. Tucker, 255-5335 after 5.

'72 FORD-DELTA motorhome, 19', self-contained, 12 mpg, make offer. Gustin, 256-3807.

'67 AUSTIN Cooper S, 1293cc, rebuilt for rally, 25 mpg, new radials, PB, R&H, spare parts, $1700. Stevens, 299-6086.

LADY'S BIKE, 26 in., single speed, coaster brake, $30. Meyer, 296-9066.

'64 DODGE 4-dr. sedan, 318 cu., AT, PS, AC, one owner, comp. maint. record, $400. Caskey, 296-6372.

'69 GRAN PRIX, low mileage, deluxe trim, $1585. Reynolds, 821-4992.

BIKES, girls' 24", $10 each; unicycle, nearly new, $25; chest of drawers, $15; elec. corn popper, $5. Campbell, 255-9659.

'66 TOYOTA 4WD Land Cruiser, $1000; Jacobsen reel mower, $20. Bushnell, 298-9631 after 5:15.

360 YAMAHA MX, 207 lb., $950; push mower with catcher, $5; bathroom sink, $2. Watterberg, 294-6759.

'68 4WD SCOUT, AC, new battery, carpeted, V-8. Scully, 299-1083.

69 BENELLI, 360cc, adult ridden, 6000 miles, $350. Cyrus, 898-4038

'72 CHEVY window sports van, AT, power, aux. gas tank, custom features, sleeps five, commutes eight. Schubeck, 266-2780.

'64 FORD Galaxie 500, runs, best offer. Thompson, 296-1688 after 5.

FOR RENT

3-BEDROOM Hoffman brick, hardwood floors, sprinklers front & back, avail. April 1, $225/mo., water paid. Smoll, 299-0023.

3-BEDROOM, NE heights, garage, covered patio, walled yard, first & last plus $100 damage deposit. Shaut, 299-8569.

OR LEASE: 3-bedroom near schools, large yard, $190/month, first & last plus $100 damage deposit, avail. April 1. Bartlett, 299-4861.

NEW 2-BEDROOM, 2 bath, furnished, ref. air, dbl. garage, overlooks Elephant Butte Lake, monthly or weekly. Gallo, 255-2488.

WANTED

OLD OR UNUSUAL cartridges, all types. Edgerly, 898-2983.

BABYSITTING, my home, experienced, NE hts., summer school vacation, 1 or 2 children, will fix lunch, refs. Gail, 298-6527.

SHOP MANUAL for '65 Olds F-85 (or adj. yrs.). Damerow, 298-7286.

FARM ACREAGE, large house & well, less than 50 miles from Labs. Williams, 296-7169.

BASKETBALL BACKBOARD & pole assy., reasonable, will remove and haul. Hymer, 298-2232.

FRONT WHEEL, rim hub, etc. for 350 Honda or trade for 18 in. back wheel rim hub etc. for Suzuki. Sarkis, 877-4146.

CAMPER SHELL for Datsun pickup. Womelsduff, 266-9739.

USED ENCYCLOPEDIAS, inexpensive; used electric adding machine. McBride, 299-4347.

REAL ESTATE

TWO 1-ACRE plus lots, La Cueva area in Jemez, $4000 each or both for $7500. Tobyas, 877-0354 after 6.

4-BEDROOM, 2-1/2 baths, storage, extras, country but close, 2.66 acres, appraised $72,500. Barker, 299-1483.

LOST & FOUND

LOST — lady's Rx glasses, black rim, lt. brown case; med. blue raincoat; lady's turquoise pin; Ford car keys, ignition & trunk.

FOUND — gold hoop earring; house & car keys on ring with leather tab; ear muffs; book "Contes Modernes."

AUSTRIA • DENNY • TALENT SHOW • MELODRAMA • EASTER EGG ROLL

FRIDAY	SATURDAY
29 — HAPPY HOUR STUFFED BREAST OF CHICKEN Adults. $2.50 Under 12 1.50 BOB BANKS TRIO TALENT SHOW (See Below) Lounge Denny	30 — TEEN GO-GO SMILING JACK SABASTIAN Q LEE (See Below) 7:30 - 10:30
5 — HAPPY HOUR FRENCH BUFFET Adults . . . . . $2.65 Under 12 . . . . . 1.65 SOL CHAVEZ Lounge Barbara	6 — FAMILY VAUDEVILLE *Curse You, Jack Dalton* *80 Steps to Jonah* (See Below) Food . . . . . 6 p.m. Show . . . . . 7 p.m. MEMBERS FREE

BOO, HISS — *Curse You, Jack Dalton,* melodrama classic, presented live and in color by Old Town Studio, marks Family Vaudeville Night on the 6th. Then comes *80 Steps to Jonah* with Wayne (Figgy) Newton, Mickey Rooney, and Jo Van Fleet. It's warm, inspiring; bring Kleenex. And there's John Wayne as juvenile lead in a *3 Musketeers* serial.

PROMENADE — Swing your partner at C-Club's newest event — square dancing. Bob Berry will do the calling. Lots of opportunity for amateurs to learn from the pros. It's at 7:30 on the 10th and again on the 24th. Call Jo Merillat at 242-4873 or Marge Lovato at 299-1375 for more info on this one.

STAGESTRUCK — Talent Night tonight is your chance. Prizes to winners; Denny to accompany.

GREAT EGGSPECTATIONS — Coming up: Easter Egg Roll for Little Ones (6 and under) on the 13th; a Dickens movie on the 17th. More later.

HOURS — Happy ones are Monday through Thursday from 4:30 to 6:30, beginning Monday.

FASHIONS — "Spring on Parade" is the title of the fashion show at 1:30 on the 9th. Ms. R.L. Coats is the coordinator, Ms. J.A. source of the styles. Reservations: Ms. R.C. Gauerke.

NO R.S.V.P. NEEDED when you're invited to an event at the C-Club. But Patty Coleman (4731) and Jim McIntire (1239) send one, just in case.

FELIX PADILLA

NOW — Pick up tickets for your teeners for the Go-Go tomorrow night, 7:30 to 10:30. Or accompany them there then. Or they'll miss Smiling Jack and MC/DJ Sabastian Q. Lee.

TRAVEL — Sign up for the Austria trip by May 1 and you'll get to go. Sign up by April 26 (8 p.m.) and you might get to go free — if your name is drawn.

DEADLINE APPROACHETH — Colorado River trip #1 is now July 4-11; #2 is now July 10-17. There's some room on #1, lots on #2. Bus to Lee's Ferry, raft to Temple Bar, bus back to Albuquerque, remember the Grand Canyon forever. $325; for more info call the Club Office. Deadline is March 31.

MORE INFO — 265-6791.