

Stresses Weapons Work

Don Cotter: Defense Problems No Simpler

The Chairman of the Military Liaison Committee to ERDA, Don Cotter, recently discussed with LAB NEWS the subject of national defense and, more particularly, DOD views on nuclear weapons.

In his present position (he is also Assistant to the Secretary of Defense for Atomic Energy), Mr. Cotter develops DOD requirements for research, development and production of nuclear weapons. He also assists the Secretary on safety and security matters involving nuclear weapons and policy on their deployment and employment. An alumnus of Sandia, Mr. Cotter has since 1966 held a number of governmental posts: Special Asst. for South East Asia Matters, DDR&E; Deputy Director of Advanced Research Projects Agency; Director of AEC's Division of International Security Affairs; and Special Asst. to the Director of Central Intelligence.

Shortly before he left DOD, Secretary of Defense Schlesinger awarded Mr. Cotter the Distinguished Public Service Medal "for broadening the range of nuclear options, modernizing and improving nuclear forces, and improving their safety and security."

Q. There is some belief that the Soviets are continuing to strengthen their forces, both



DON COTTER, Sandia alumnus

nuclear and non-nuclear. What is your view of this?

A. We know that their overall military capabilities are being enhanced, especially

with respect to theatre forces, both nuclear and conventional. For these forces new and very expensive equipment has been deployed in enough quantity that we believe they are now capable of mounting major military operations with less warning time than heretofore. Not too long ago our planners felt that we would have something on the order of several weeks to respond to any Soviet move—now that response time allowed us is probably like several days.

But we also know that the Soviets are very much deterred by our forward deployed nuclear strike forces. Within DOD, under Dr. Schlesinger and continuing under present Secretary Rumsfeld, we are pursuing a policy of modernization of those nuclear forces to insure that the deterrent value does not erode. The major thrust has been to improve the survivability of our forces, at the same time enhancing non-nuclear capabilities so that the point at which we might have to threaten to use nuclear weapons—the nuclear threshold—is further raised.

Other improvements involve our being confident that theatre nuclear forces can survive a protracted period of conventional or limited nuclear conflict and being able to
(Continued on Page Two)

Four Day Week

Microfilm at Sandia: 1976

Microfilm people never miss a chance to reduce something to a smaller size. That's why National Micrographics Week this year is four days long (April 27-30). It's a good time to look at Sandia's recent progress and future prospects in miniaturized document storage and retrieval.

The biggest new application for microfilm is management (that is, financial and manpower) information, that which each organization and each case manager needs each month. Simply finding a place to store these monthly reports was a problem; locating a specific bit of information hidden in the reams of tab runs was even worse.

Now they're on fiche, a computer-generated form of microfilm which reduces a page to 1/42 of its original size: one 105 mm by 148 mm (roughly 4" by 6") fiche can hold about 200 pages of information. So storage problems are minimal. An index on each fiche helps with access, but finding a specific bit of data within, say, 110 microfiche can still be something of a problem — "That's one area we're working on," says Dennis Rowley of Financial Management Systems Development Division 2625. "We hope to have a better indexing system by this fall."

His supervisor, Karl Waibel, points out that the computer can kick out a specific report upon demand now, "but one of these days we'll have a program which will tell a user where the specific information he or she wants is located in the user's own file of fiche."

Carl Bailey of Computer Graphics Division heads a team of programmers involved in software preparation and new equipment selection.

Larry Garrison is supervisor of General Accounting Section 3251-3. His group is the biggest single user of microfilmed

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LAB NEWS

VOL. 28, NO. 8

APRIL 16, 1976

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



NEW FLAG—Security Inspector Karen Davis (9550) hoists new corporate flag on separate mast atop Bldg. 800. Flag features blue Thunderbird emblem on a field of white.

DON COTTER

employ nuclear weapons with a high degree of discrimination—giving a commander a multitude of options to meet a variety of threats.

Q. Can you comment on Sandia's role?

A. Sandia has a role in both weapon survivability and control. For the former, one possibility under consideration is to be able to disperse our weapons on short warning but still have them under positive control and good security. The Labs' SST (Safe Secure Trailer) might find application in a field transporter. And, of course, Sandia has been and is the principal laboratory in command and control hardware. Both of these technologies give us flexibility, and that's the key element of nuclear doctrine for deterrence.

Q. These considerations seem chiefly to relate to the tactical area. What about strategic nuclear weapons?

A. My opinion is that we're in fairly good shape in the strategic warhead area. DOD asked ERDA to develop a number of strategic options two years ago which resulted in an accelerated full scale test program. The ERDA labs responded magnificently to the request, and this program and its results have expanded our nuclear technology and strategic hedges for the future. We'll have to continue to watch Soviet capabilities in areas like MIRV and their progress in other areas of advanced weapon technology.

Q. What about cruise missiles?

A. Bear in mind that the Soviets have long had cruise missiles for submarines, surface ships and aircraft. We believe that cruise missiles will give us some attractive hedges for the future, particularly in terms of accuracy—but that could be a perishable advantage.

Q. Please comment on the effect terrorism is having within DOD with respect to nuclear weapons.

A. I'd say it's had considerable effect. In a sense, terrorism is one more element that bears on the security and survivability of weapons and because of it we've undertaken a



RAY POWELL, VP-3000, meets Number One during a White House reception for the National Alliance of Businessmen. A member of NAB's national board, Ray met there with other executives to plan ways to carry out the President's campaign to create more jobs. Program aims at the economically disadvantaged, veterans, needy youth and ex-offenders.

major effort. This effort must consider economy in our response—hardening storage sites against attack is expensive. We need other technical alternatives.

Q. Are there specific hardware areas in which you think Sandia has special competence?

A. We've already mentioned the PAL area, but I would also include the technologies associated with power supplies, special purpose parachutes, fuzing—actually all the elements that enable a weapon to stay on-the-shelf without maintenance for prolonged periods—and then work very reliably. That's a very considerable challenge which has been well met. Specifically, the Navy has been most pleased with Sandia's Mk 3 fuzing package (the Mk 3 AF&F System for the Poseidon missile). This resulted in the Navy going back to Sandia for the Trident missile fuzing system.

Q. Sandia has been working with the military on nuclear weapons since the mid-40's. They are our customers. How are we viewed by the services?

A. Generally speaking, the military has been pleased with the services of the ERDA laboratories. Otherwise, they wouldn't have endorsed continuing the status quo on the transfer study (the DOD/ERDA study, now in the White House, on the future of the weapon labs). ERDA's performance over the years convinced DOD people that the present arrangement is a good one.

Q. What about the future? DOD requirements on ERDA? The weapons programs?

A. I should mention first a DOD concern that the weapon labs remain first and foremost weapons oriented and that they not be unduly distracted by non-weapons activities. Talent in a laboratory tends to go to challenge—DOD naturally expects that the best talent will be applied to weapon work. We see this as especially important in relation to Sandia which has been primarily involved in weapons programs, perhaps more now than in the last 10 years, and we are assuming that Sandia will assign first priority to this work. Defense problems overall haven't gotten any simpler, nor do we expect them to.

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.
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ZIP 87115

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Group Will Discuss Smoke Detector Devices

A study of smoke detector systems for use in private residences has been conducted, and an out-of-hours discussion meeting is planned to make this information available to those desiring to form a group interested in obtaining these devices. The formation of a group may permit them to purchase smoke detectors at a discount rate. Interested parties should fill out the form below and forward it to: H.G. Jeblick (9542), Bldg. 802, Rm. 106. If there is sufficient response, notification will be forthcoming as to time and place of the meeting.

SMOKE DETECTOR MEETING

I am interested in attending

Name: _____

Address or Org. and Bldg. No. _____

SLL Alcoholism Program Expanded

"Alcoholism is an illness," says Joe Darginis who has coordinated SLL's alcoholism program part time since August 1972, "and therefore should be associated with our Medical organization."

Joe recently transferred from his technical responsibilities in Exploratory Materials Division to Medical (Division 8214). He is now devoting additional time to the SLL program, and also serving as a consultant to LLL on alcoholism. His new office in Bldg. 911, Rm. 115 (adjacent to Medical), is located in an area conducive to private communication and counseling. He can be reached on ext. 3207.

"Anyone is welcome, supervisors included," Joe says, "to discuss anything relating to alcoholics or alcoholism. The service is extended also to employee family members. Although some employees are referred by others on the Medical staff or by supervision, the program's aim is self-referral. We are not conducting a witch-hunt. Our program is a sincere effort to help people."

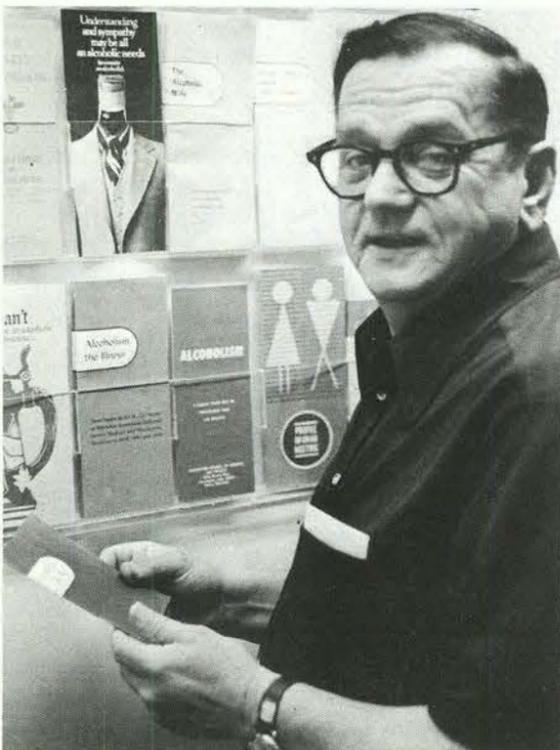
Joe understands alcoholism thoroughly. He has worked with alcoholics for more than seven years in the local community and throughout northern California.

He is familiar with the nearby facilities and human resources that are used to assist him in the effective administration of the program.

"With our success to date," notes Joe, "many other employers are looking to Sandia for guidance with their programs." He adds that, "one important key to success is confidentiality. Current educational efforts are enlightening people, and they are beginning to understand alcoholism as a respectable illness. However, some people still feel a stigma associated with alcoholism, so many employees make arrangements for discussions outside working hours."

And Joe encourages that. His home phone is 447-6872, and he's available for consultations 24 hours a day. Movies, tapes and an extensive amount of literature are also available. Employees may use the tapes at home and Joe will show films to an entire family.

Plans are underway to begin a series of supervisory meetings within the year to establish more alcoholism awareness and a better understanding of the SLL program.



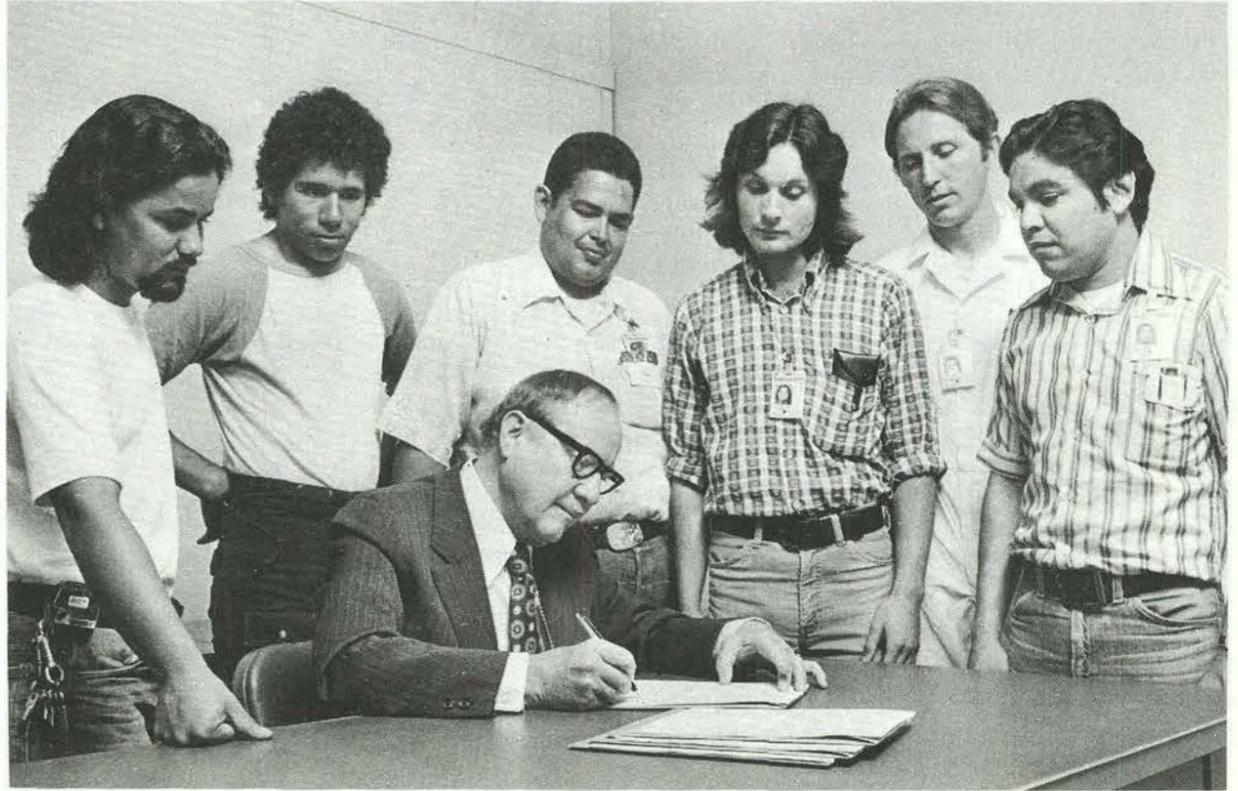
BOOKLET RACK on wall outside Joe Darginis' new office adjacent to Medical offers employees information on alcoholism and associated problems.

LIVERMORE NEWS

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LIVERMORE LABORATORIES

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NEW APPRENTICES—Hilt DeSelm (8200) signs the agreement for six employees entering SLL's plant technician apprenticeship programs, the largest group of new apprentices to join at one time. From left are Marty Gordon, Bob Sandoval, Fred Perez, John Dolce, Steve Halleck and Ray Lopez (all 8257). The structural, mechanical and electronic programs require five years of training for completion, the painter program three years.

Take Note

The recent *Lab News* photo requests for the unclassified Pictorial History of Sandia to be issued this fall applies to Livermore as well as Albuquerque since the publication will cover both locations. We especially need unposed "people pictures" taken in the late 50's and 60's showing SLL employees in activities at work or off the job. Should your office or personal files produce some good possibilities, contact Bruce Hawkinson (8-475-7841) or Lorena Schneider ext. 2952. All photos will be returned, though it may take several months for those chosen for inclusion.

Marlin Pound (8214) was presented the Board Members Award recently by the California Association of Parks and Recreation Commissioners. A Livermore Area Recreation and Parks District trustee, he was cited for "dedicated, faithful and honorable service in planning and development benefitting the community." Marlin also serves on the Board Commissioners Branch of the National Parks and Recreation Association.

Rick Wayne, supervisor of Command and Control Division 8365, was honored as "Boss of the Year" at a recent dinner meeting of the Livermore Valley Charter Chapter of the American Business Women's Association. Of some 25 bosses who attended, eight were Sandia supervisors. During the meeting, the chapter's "Woman of the Year," Nancy Hunt (8430), spoke on the history of ABWA. Jan Vandermolen (8200) serves as chapter president and Glenda Day (8365) as corresponding secretary.

Speakers

Mike Malinowski (8334), "Deuteriding Kinetics of Titanium Thin Films"; Mike Malinowski and Paul Coronado (both 8334), "Helium Release from Uranium Tritide"; Bill Swansiger (8334), "Permeation of Tritium and Deuterium Through 21-6-9 Stainless Steel"; and Al West and Carl Schoenfelder (both 8313), "Tritium Removal: A Preliminary Evaluation of Several Getters," International Conference on Radiation Effects and Tritium Technology for Fusion Reactors, Oct. 1-3, Gatlinburg, Tenn.

Ray Mar (8313), "The Sublimation of Boron—a Reinvestigation," Invited Presentation, Bay Area Conference on High Temperature Science and Technology, Stanford Research Institute, Oct. 15, Palo Alto, Calif.

Bill Wilson (8341), "Theory of Diffusion and Trapping of Hydrogen and Helium in Metals, A Review," International Conference on Fundamental Aspects of Radiation Damage in Metals, Oct. 6-10, Gatlinburg, Tenn.

Pete Witze (8115), "The Measurement of Turbulence Characteristics in an Internal Combustion Engine Cylinder," Automotive Engineering and Manufacturing Meeting, Society of Automotive Engineers, Oct. 13-17, Detroit, Mich.

Al West (8313), "Relative Sputtering Rates and Quantitative Surface Analysis by Auger Spectroscopy," and Pete Mattern (8334), George Thomas (8314), and Walt Bauer (8334), "Hydrogen and Helium Implantation in Vitreous Silica," 22nd National Vacuum Symposium, American Vacuum Society, Oct. 28-31, Philadelphia, Pa.

Sympathy

To Von Madsen (8344) on the death of his mother in Manti, Utah, March 9.

To Bob Carrell (8183) on the death of his father in Minneapolis, Minn., March 28.

To Bob May (8254) on the death of his mother-in-law in Loup City, Neb., March 23.

To Gerry Strandin (8324) on the death of his father in Seattle, Wash., March 25.

Continued from Page One

Microfilm at Sandia: 1976

management information. Their vault in Bldg. 802 used to have documents crammed into every available cranny, especially near the end of a fiscal year. "Now we keep only the current month as paper; all the earlier records are on fiche in cartridges," says Larry. One month's worth of paper makes a ceiling-high stack; on fiche it takes seven cartridges — about two handfuls.

How well does it work? "I fought it at first," says Dick Siebenforcher (3251-3), "but it's great. Not only is there room to move around here in the vault, but we find information faster than I ever thought possible. I spend a couple of days a month indexing, but even so it's a time-saver."

They use the viewer that a panel of Sandians chose as best of the ones available. Gene Igel of Optics Division 2541 worried about optical quality: "Too many viewers couldn't produce sharp quality over the whole screen, or they went out of focus after shifting from one frame to another. This one doesn't."

The viewer provides good information accessibility too. Push a button to get any of 30 fiche in a cartridge; push another couple to view any of the 200 or more frames (pages) on the fiche.

(Viewers in general have been hot items according to Joe Sieglitz, 3281-1. "We've placed over 150 in Labs' organizations in just the last six months," says Joe.)

Fiche come into the world in Jack Wesbrook's Scientific Computer Operations Division 2631. "They're part of our COM (Computer Output Microfilm) program," says Jack, "and their popularity keeps growing. Altogether the various fiche applications include some two hundred thousand pages per month."

"So we're running both of our COM generators around the clock seven days a week," says Roger Campbell, supervisor of Computer Operations Section 2631-1. "The granddaddy, our Datagraphics 4020, is used mostly for plotting work. The 4460 primarily outputs alphanumeric info although it has a graphics capability; it's the one that does the management information fiche. But we also use it for dozens of other fiche applications, each one demanding a different series of settings. Our operators have to know computers as well as photography (COM is a photographic process). It's a difficult job. We're looking forward to a new machine next fall. It will be high precision and high volume, and it should solve some of the problems we have now in turning out consistently high quality fiche."

The original fiche from the COM recorders usually have to be duplicated for distribution. That's when Ed Hirt, supervisor of the Microfilming Section in Mike Michnovicz's Micrographics Division 9632, gets into the fiche act. His people operate the newest piece of fiche hardware — a high speed, high volume duplicator capable of reproducing and collating up to 2000 fiche per hour.

"In addition to the growing management information fiche, there's the Library — one



MICROFICHE MERRY-GO-ROUND is admired by several of the principals in Sandia's microfilm story. From left, Mike Rex (3251), Karl Waibel (2625), Al McGuckin (3250), Ed Hirt (9632), and Roger Campbell (2631). The "merry-go-round" is the collator end of a high-volume fiche duplicator.

of our biggest customers," says Ed. "They now have some 300,000 fiche which contain source documents. You tell them which document you need and you'll get your very own copy — on fiche.

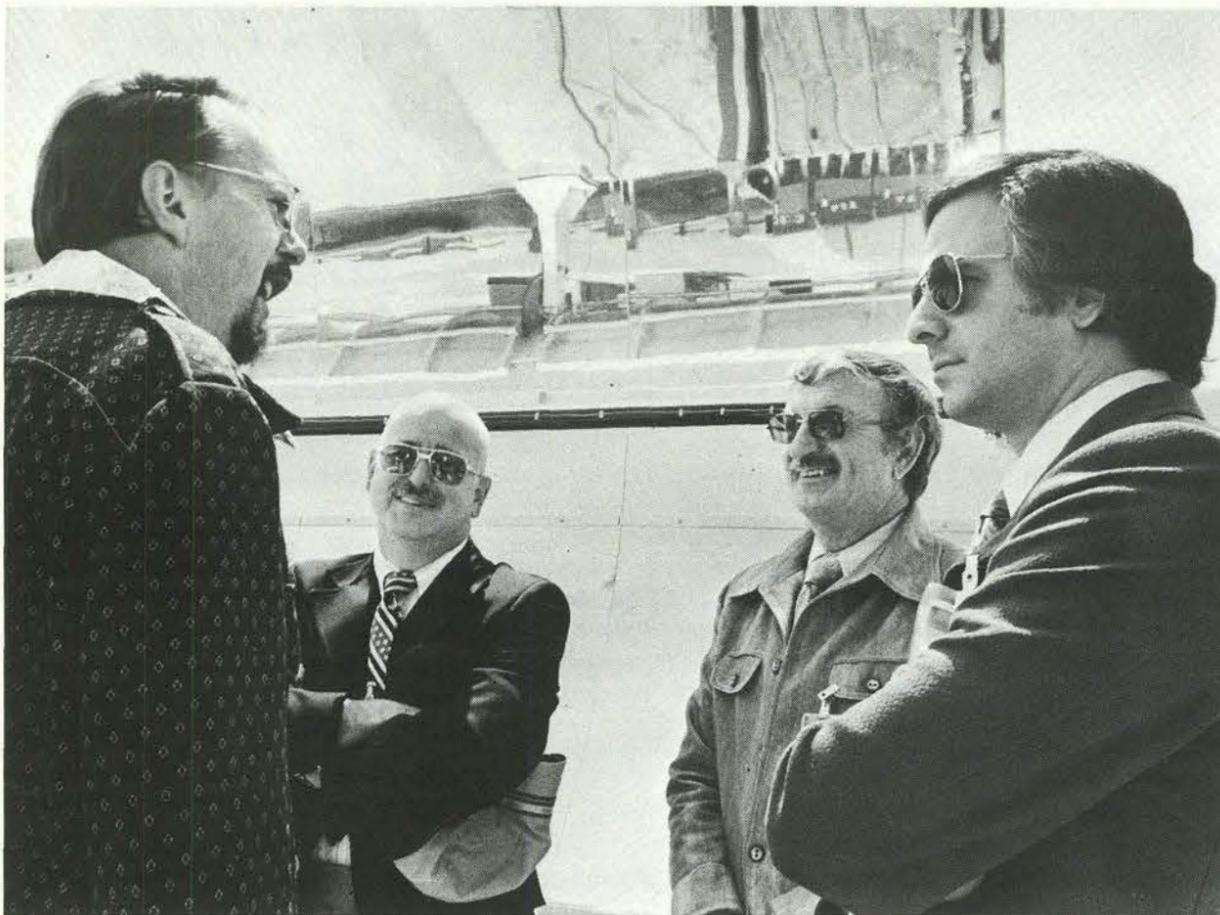
"But the biggest user of microfilm remains the drawing system: drawings themselves on aperture cards, drawing information on microfilm reels. We process 20,000 aperture cards a month."

"Then there's the growing use of microfilm to store organization files," adds Mike. "The stuff brought to us is filmed with the manpower available in the division. We do have portable microfilm cameras to loan out for self-service work. In all phases of our micrographics work we attempt to maintain the highest quality practical."

Current prime mover on the Sandia microfilm scene is Alva McGuckin, assigned to the Accounting Department 3250. His assignment is to do whatever needs to be done to keep Sandia from foundering in a sea of paper. "I'm a newcomer to the field," says Al, "especially when you compare me to the pioneers like Mike and Ed and their use of microfilm for drawings, or to Gino Carli and his group's work with interactive graphics . . . but that's another story. I guess I've got the enthusiasm of any recent convert — I've read and visited and used and discussed microfilm all over the country. Here I plan and plead and reason — and we're moving ahead. We're doing all right now, but wait till next year: we'll be pushing the state-of-the-art in microfilm usage." • bh



JOY STICK, a radio-controlled model aircraft, sports an 8-foot wingspan and is here held aloft by ground crewmen Jim Baremore (2117), Dennis Mitchell (2513) and Pete Rand (5813). The three were participating in the recent RC Fun Fly down in Clovis; Jim was one of the winners in the expert class.



ROBERT HIRSCH, new ERDA AA for Solar, Geothermal and Advanced Energy (right), during a visit to Sandia last week talks with Glen Brandvold (5710), Jim Scott (5700) and Cliff Selvage (8180) during a technical briefing.

Robert Hirsch, New ERDA AA, Visits Sandia

Robert Hirsch, who was sworn in March 30 as ERDA's Assistant Administrator for Solar, Geothermal and Advanced Energy, visited Sandia Laboratories last week.

He attended technical briefings and toured Sandia's solar projects and ion implantation areas. He also held a brief press conference with local news media representatives at Sandia's Exhibit Center.

As Assistant Administrator, Mr. Hirsch is responsible for ERDA programs conducted through four divisions: Solar Energy, Geothermal Energy, Magnetic Fusion and Physical Research.

He has described solar energy and magnetic fusion as two of the three technologies (along with the nuclear breeder reactor) "that may be our only choices for long-term survival."

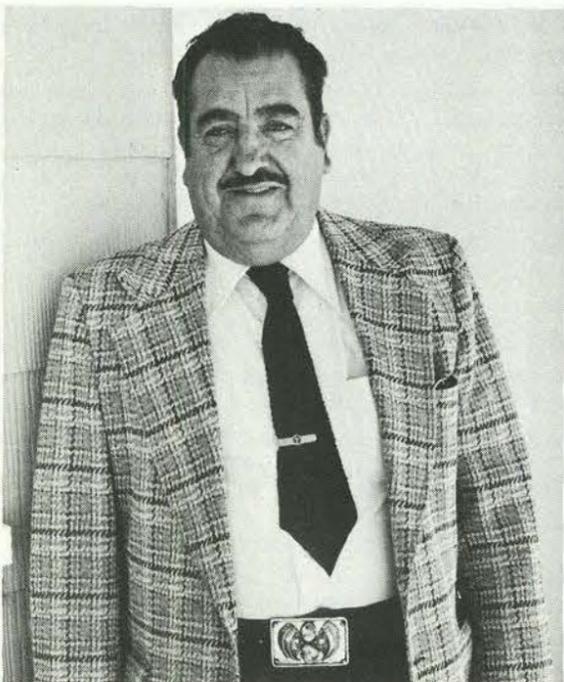
After receiving degrees in mechanical and nuclear engineering, Mr. Hirsch worked in various aspects of fission reactor R&D until 1960, when he decided to change to work in fusion power research and development.

He gained his PhD in '64 in plasma physics and did experimental fusion plasma physics work at the ITT Industrial Laboratories until 1968 when he joined the AEC as a staff physicist. In 1972 he was appointed director of the magnetic confinement fusion program.

Mr. Hirsch received the ERDA Special Achievement Award in 1976; he is a Fellow of the American Association for the Advancement of Science and a member of the American Physical Society.

From '71-'73 he served as Vice Chairman and then as Chairman of the Fusion Technical Group in the American Nuclear Society, and he was a Director of ANS from mid-'75 to early 1976. Mr. Hirsch served on the AEC Laser-Fusion Coordinating Committee in '72 and in '73 he was appointed U.S. representative to the IAEA International Fusion Research Council. In 1973 he became head of the U.S. membership of the U.S.-U.S.S.R. Joint Fusion Power Coordinating Committee. He holds 12 patents and has a number of technical publications.

Retiring



Pete Vigil (9721)



Stan Harvey (3251)

Speakers

M.L. Knotek (5155), "Surface Studies of Solid Electrolytes;" J.P. Brainard (2352), "High-Voltage Breakdown Between Electrode Surfaces in Vacuum Induced by Ionic Bombardment of the Cathode Electrode"; S.J. Niemczyk (5151), "SCF-Xa-SW Ionization Energies for Two Different Chalcogen Coverages of Ni(001)"; L.C. Beavis, W.G. Perkins and J.A. Foesch (all 2353), "Ion Microprobe Studies of Hydride Thin Films"; R.A. Anderson (5814), "Flashover of Conical Insulators Subjected to Nanosecond Risetime Pulses"; S.M. Myers and J.A. Borders (both 5111), "Ion Backscattering Study of ARAZ Reactions," 7th Conference on Surface Studies, March 9-12, LASL.

R.T. Dillon (5441) and J.P. Brannen (5413), "Germination and Recovery of Dry Heat Inactivated *Bacillus subtilis* var *niger* Spores," SW Regional Tri-State ASM Meeting, March 11-13, El Paso, Texas.

J.E. Uhl and J.E. Houston (both 5114), "Instrumental Approaches to Dynamic Background Subtraction"; H.H. Madden (5114), "Near-Threshold Ion Energies in Electron Stimulated Desorption"; C.T. Fuller (5111), "A Sputtered Ion Source for the Lintott Ion Accelerator"; R.A. Anderson (5814), "Plasma Generation during Surface Flashover in Vacuum"; R.A. Kant (UNM/5111), S.T. Picraux and S.M. Myers (both 5111), "AlSb Precipitation and (Irradiation-Induced) Dissolution in Sb-Implanted Al,"; M.L. Knotek (5155), "Surface Studies of the Photocatalytic Properties of TiO₂"; S.J. Niemczyk (5151), "The SCF-Xa-SW Method and Dissociation: Can We Use this Method to Describe Reactions?"; J.A. Borders (5111) and J.B. Snelling (5133), "Ion Backscattering Studies of Thin-Film Solar Energy Materials"; W.J. McCabe, F. Castillo and D.J. Sharp (all 2143), "Vacuum Deposition of Mobile Ion Free Aluminum and Aluminum Alloy Films for High Stability MOS Gate Structures"; E.E. Komarek (2151), "RF Sputtering of Thin Permalloy Films for Magnetic Bubble Memory Applications," N.M. Chapter of the AVS meeting, March 15-17, Albuquerque.

L.F. Shampine (5122), "Stiffness and Non-Stiff Differential Equation Solvers II: Detecting Stiffness with Runge-Kutta Methods"; H.A. Watts (2642), "Numerical Solution of Two-Point Boundary-Value Problems by Initial-Value Methods," American Mathematical Society, March 15-20, Urbana, Ill.

C.W. Frank (5811), Invited paper, "The Use of Excimer Fluorescence as a Probe of Polymer Conformation and Dynamics," Stanford University, Feb. 13.

C.E. Albright (3623), "Welding at Sandia," local chapter of American Welding Society, March 4.

L.S. Nelson (5443), "Burning Metal Droplets," NMIMT, March 1.

J.S. Philbin (5421), "Nuclear Power: Why Do We Need It and How Safe Is It?" Sperry Research Center Colloquium, March 9, Sudbury, Mass.; and Sandia HS, March 30.

N.J. Magnani (5831), "Stress Corrosion Cracking," NMIMT, March 12.

E.L. Patterson and R.A. Berber (both 5212), "High Energy HF Pulsed Lasers"; R.E. Palmer (5216), T.D. Padrick (5215) and E.D. Jones (5214), "High Power Atomic Iodine Photodissociation Lasers," SPIE/SPSE Technical Symposium, March 22-23, Reston, Va.

S.L. Pohlman (5831), "Prevention of Galvanic Corrosion and Electrochemical Behavior of Selected Structural Material," 1976 NACE Technical Program at Corrosion/76, March 22-26, Houston, Texas.

W.D. Weart (1140), "Radioactive Waste Disposal Pilot Plant Concept for a New Mexico Site"; R.W. Lynch, R.G. Dosch, B.T. Kenna, E.J. Nowak (all 5824), and J.K. Johnstone (5846), "The Sandia Solidification Process — A Broad Range Aqueous Waste Solidification Method," (paper presented by W.D. Weart), International Symposium on the Management of Radioactive Wastes from the Nuclear Fuel Cycle, March 22-26, Vienna, Austria.

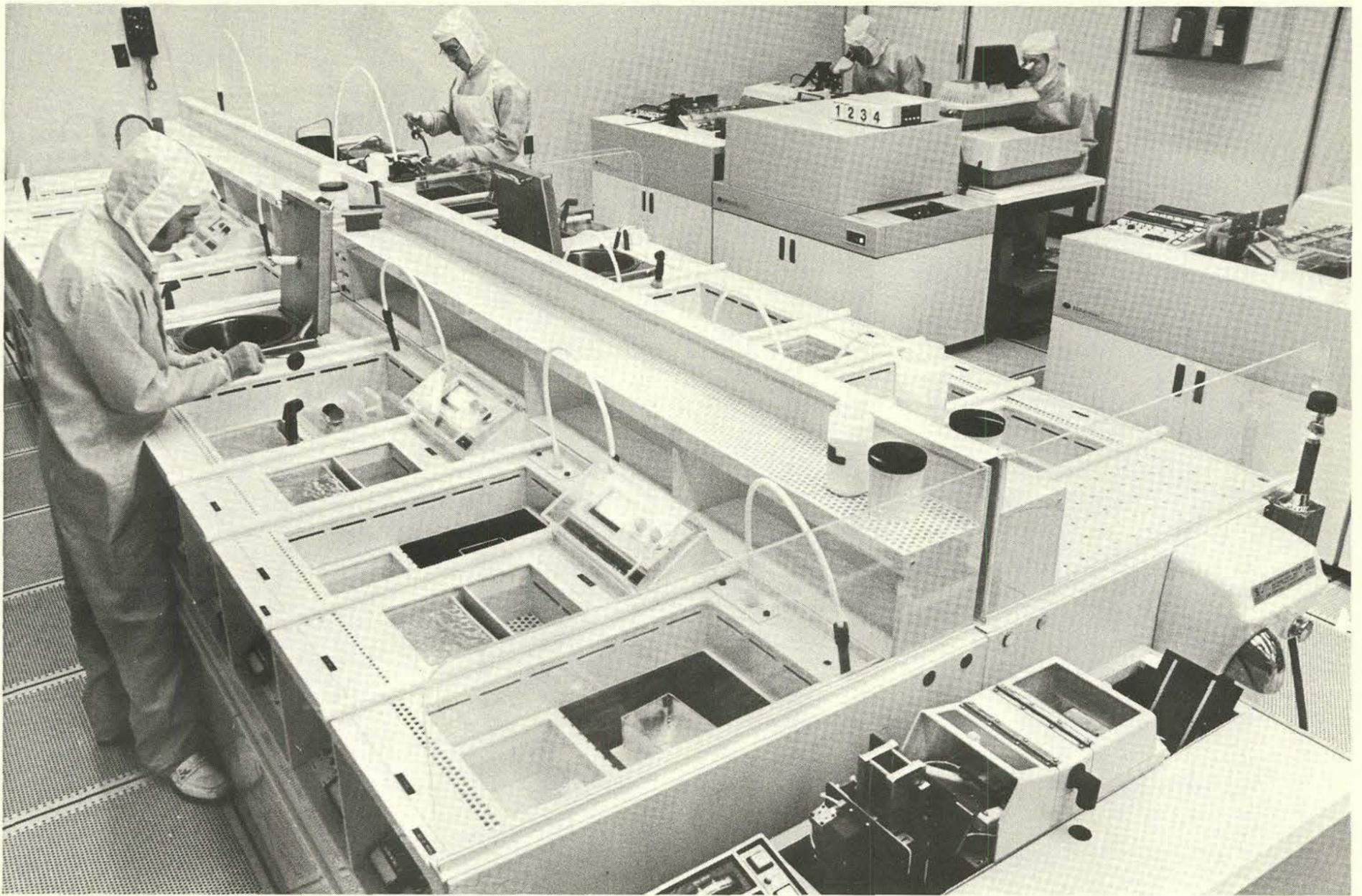
R.A. Schmidt (5163), "Fracture Toughness of Rock Materials with Application to In Situ Fragmentation of Oil Shale Beds," Symposium on Alternate Fuel Resources, March 25-27, Santa Maria, Calif.

D. Emin (5151), "Calculations of the Thermoelectric Power," International Topical Conference on Structure and Excitations of Amorphous Solids, March 25-27, Williamsburg, Va.

R.E. Nickell (5431), "Software Validation and Certification," Second National Symposium on Computerized Structural Analysis and Design, March 29-31, Washington, D.C.

Congratulations

To Mr. and Mrs. Jerry Hochrein (1327), a daughter, Lisa Marie, March 19.



LARGE CLEAN ROOM area contains cleaning and photoresist equipment. In foreground are the cleaning and rinsing areas. Final rinse of the silicon wafers is performed using high-purity (18 megohm) de-ionized water. In background are

the automatic machines which coat the wafers with the photosensitive photoresist material and the UV exposure stations which print IC patterns on the wafers.

Advanced Processes and Products

New IC Lab Operating in Bldg. 870

Integrated Circuit Process Department 2140 under Bob Gregory is now operating in Bldg. 870. Modifications are complete in the building with a state-of-the-art clean room installed. In this super-clean environment the department is fabricating some of the most advanced radiation-hardened integrated circuits (IC) in the country.

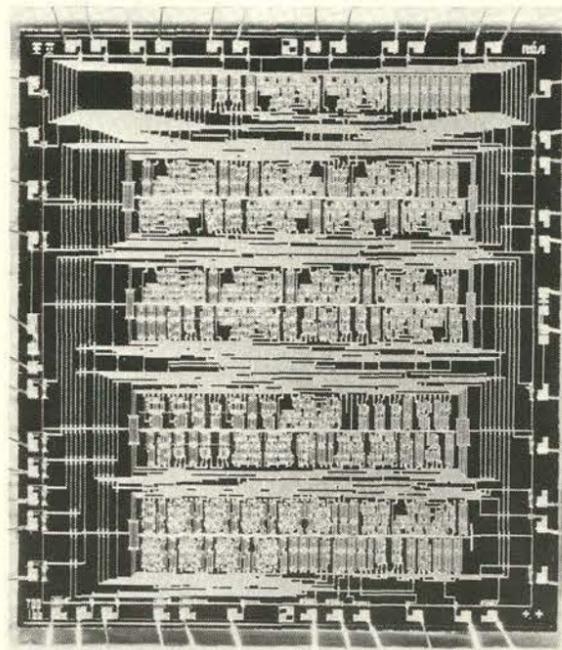
"Since its development in 1962," Bob says, "the IC has made a difference in the way we live — the proliferation of pocket calculators, for instance — and the IC has become important to Sandia. Within the same power and weight restrictions as before, the IC makes possible many more functions and enables great sophistication in systems, and at high reliability. For instance, one Sandia component functioning as a complex microcomputer requires a volume of only 0.2 inches in diameter and one and one-half inches in length. We are designing and building a better product."

Purpose of the new lab in Bldg. 870 is to perfect process development for radiation-hardened, high-reliability integrated circuits for Sandia's systems development efforts plus providing quick "turn-around" of prototype devices. In addition, the labs are fabricating high efficiency solar cells for use in multiple-sun environments as part of Sandia's photovoltaic — direct conversion of sunlight to electricity — energy development program.

"We are working with conventional IC processing equipment," Bob says, "so that our designs and processes can be transferred to the semiconductor industry."

Development of an IC is a complex, painstaking process. Average time required is four months from computer-aided design and layout through generation of photo masks, processing and testing.

End product is a tiny device averaging about 1/4-inch square and about 20 one-thousandths inch thick which contains from



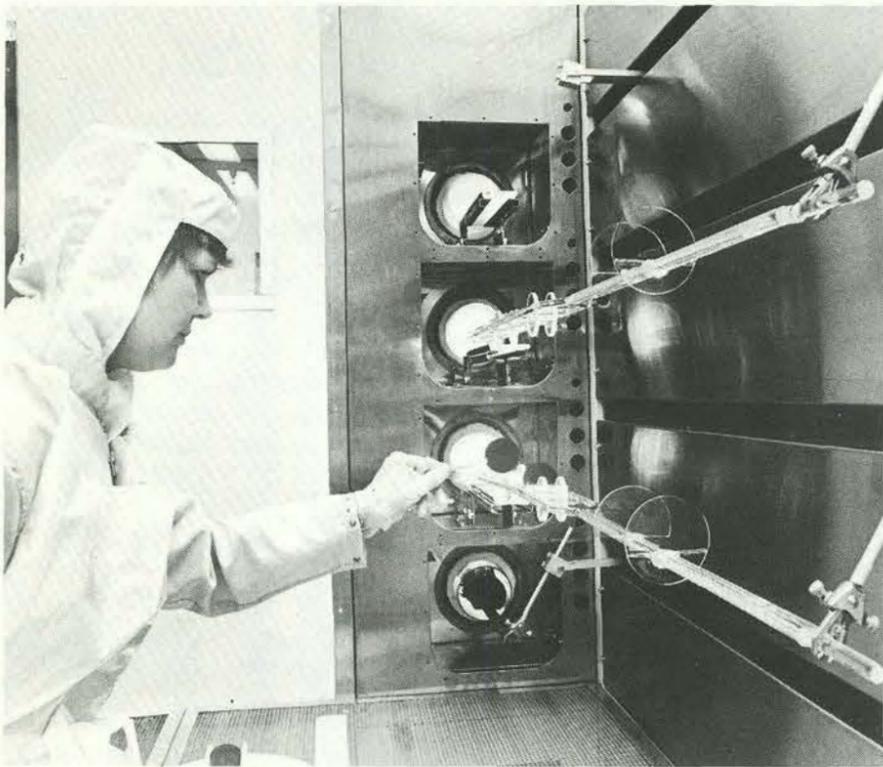
INTEGRATED CIRCUIT, an advanced electronic timer, is about 1/4-in. square, contains 1129 transistors and about 14 inches of 10-micron-wide aluminum interconnect. To process, it takes seven working days from bare wafer to final device. More than 150 separate steps are required in 60 major process sequences. New lab in Bldg. 870 can produce prototypes of these sophisticated designs.

1200 to 2500 active transistors, diodes and resistors with the required interconnections. It is built layer-by-layer by thermal oxidation, diffusion of controlled impurities, ion implantation and metal deposition. Extreme cleanliness is required — any stray particle of dust could wreck weeks of work.

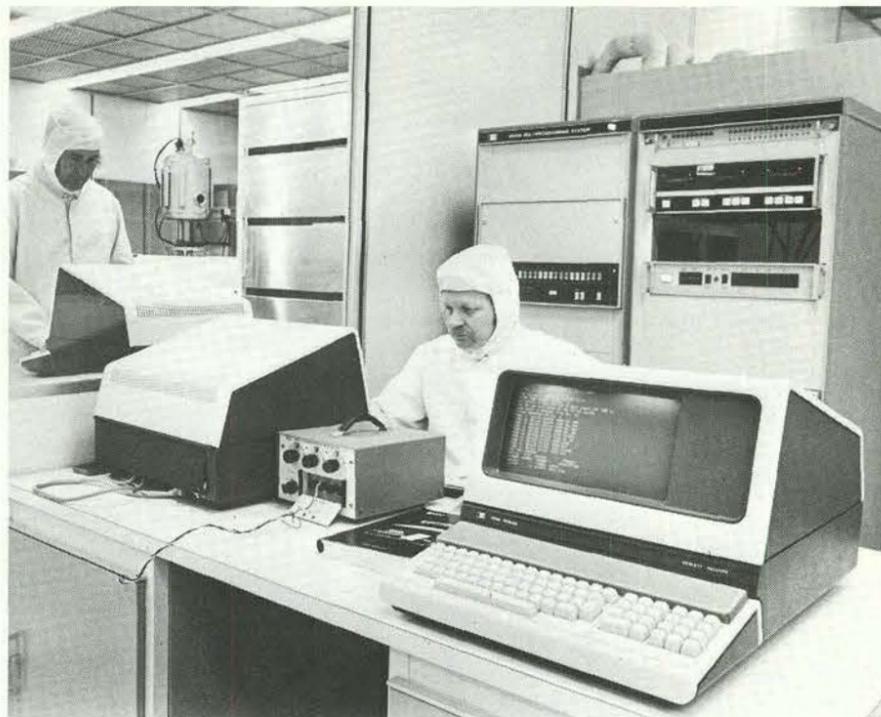
The IC's are produced in batches of 25 round silicon wafers two inches in diameter. Each wafer contains from 50 to 100 individual integrated circuits. Bob anticipates that the lab will produce about 100 wafers per week of process development experiments and another 100 wafers of prototype IC's. Painstaking as the work may be, the acceptance rate for the IC's contained on each wafer after packaging and testing is only 10 to 20 percent. Still, the final product is well-characterized and highly reliable, and, considering the factors involved, the price is reasonable. Bob estimates that the production cost of each wafer will average about \$130.

Not up to full production yet, the lab is undergoing a "shakedown" period. Intensive training is being given to new employees in the organization. Although the equipment for the new lab was operating before in various locations at Sandia, the enlarged facilities and new installations require additional training of personnel.

"Our goal is not high volume production," Bob says, "but the development of advanced processes and early prototype products. We want to provide rapid access to the best of modern silicon technology to our systems people at Sandia." • dg



ELAINE HURLEY (2141) prepares a glass boat load of silicon wafers for high temperature diffusion inside a diffusion furnace, one of 17 in the lab. Temperatures range from 400° to 1200° C.



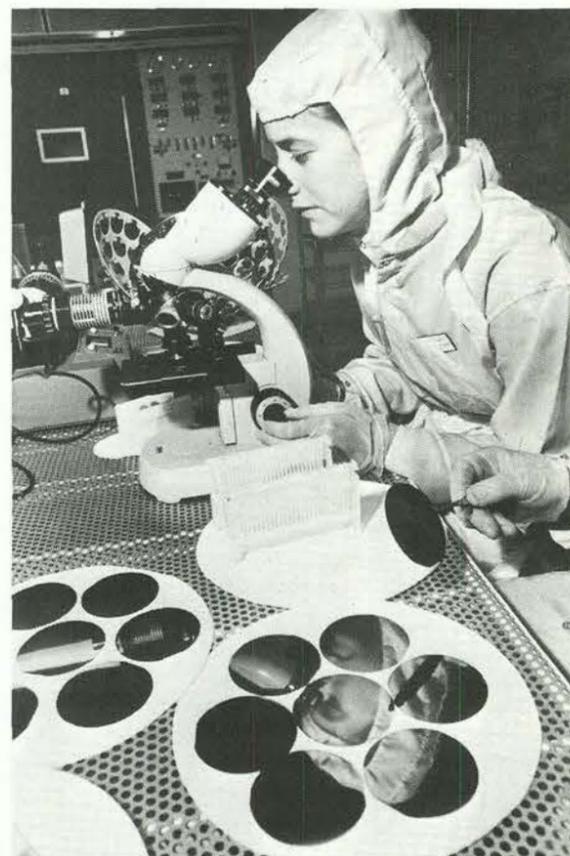
COMPUTER SYSTEM controls all of the operations of the 17 diffusion furnaces in the clean room. The lab is designed to operate with no paper (thus, no paper lint)—all process information is stored in the computer memory for display on CTR screens. At left is Henry White (2142). Leo Doyle (2142), right, developed the IC process control software for the computers.



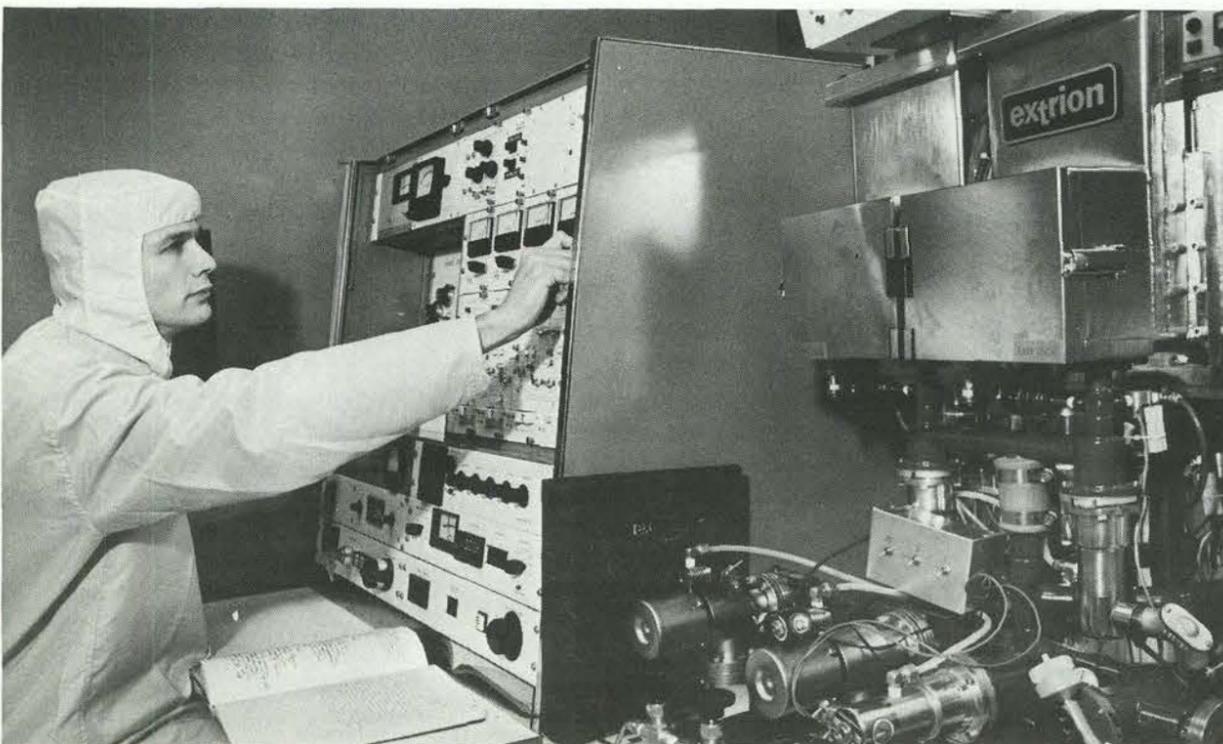
CHARLIE BARNES (2141) solves one last water leak under the floor of new clean room area in Bldg. 870. Filtered air flows constantly from ceiling to floor to provide super clean environment for the fabrication of IC devices.



JEFF TINGLEY (2141) prepares planetary wafer fixture for deposition of aluminum on the wafers by evaporation inside a vacuum system.



MELAINE TUCK (2141) views photolithographic patterns on silicon wafers through a microscope. Below, she places in-process silicon wafers in a dry nitrogen storage cabinet. The dust/lint protective clothing is worn by all employees working in the clean room area.



RALPH BENEDICT (2141) adjusts the implantation voltage on the Extrion 200 kv ion implanter. Boron, arsenic or phosphorus may be introduced into the silicon wafers with this machine.



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. Is Sandia planning on adding some kind of inflation rider to its retirement plan?

A. Thanks for your question on the Sandia Retirement Income Plan. To specifically answer your question — Sandia is not planning on adding an "inflation rider" to its retirement plan. Benefits under the Plan are based on the average of an employee's highest five-year earnings. These earnings are almost always the employee's final five-year earnings which has the effect of providing a retirement income adjusted for inflation at the point of retirement.

In addition, Sandia did, effective January 1, 1974, adjust the retirement benefits of its retirees based on the length of time they had been retired. This adjustment was an attempt to recognize the erosion of purchasing power that our retirees had experienced due to increases in the cost of living. This adjustment followed the practice of our parent company, Western Electric.

It must also be recognized that Social Security has a built-in automatic cost-of-living adjustment. In total, we feel that there has been considerable recognition of cost-of-living factors. In addition, the elimination of employee contributions to the Plan on July 1, 1975, makes it possible for employees to supplement their Plan benefits through personal investments if they choose to do so.

R.J. Edelman — 4200

Q. Why does it take approx. two weeks for an order to be placed, after the P.O. is sent out by the order analyst? It seems that small (less than \$500) orders could be placed much faster.

A. In a two-week sample of Purchase Orders under \$500, the average length of time between the requisition date and the mailing date of the order was six working days. On the average, two and one-half of these six working days were spent in processing the requisition to Purchasing. There are, of course, orders which take longer to place. Delays are caused by such things as special approvals, shipping an item to a supplier for

evaluation prior to placing a repair order, and suppliers delaying their response to a request for duplication.

Purchasing will continue in its efforts to ensure timely receipt of material and services. When a particularly critical need arises, the requestor should ask the cognizant Purchase Analyst to follow the requisition through approval channels and accounting classification, request the Buyer to telephone the order to the supplier, and to expedite supplier performance.

L.S. Conterno - 3700

Q. Why isn't an alternate attendant available in the stockroom whenever the regular attendant is on vacation or off ill?

A. Currently no employees are available to fill in when the regular stockkeeper is on vacation or absent due to sickness.

Storerooms are maintained on a self-service basis with using employees assuming some responsibility for withdrawing only needed quantities and attempting to use and leave the storeroom in an orderly manner for the next user.

If problems are encountered in the future during a stockkeeper's absence, please call F.A. Baczek, extension 7566.

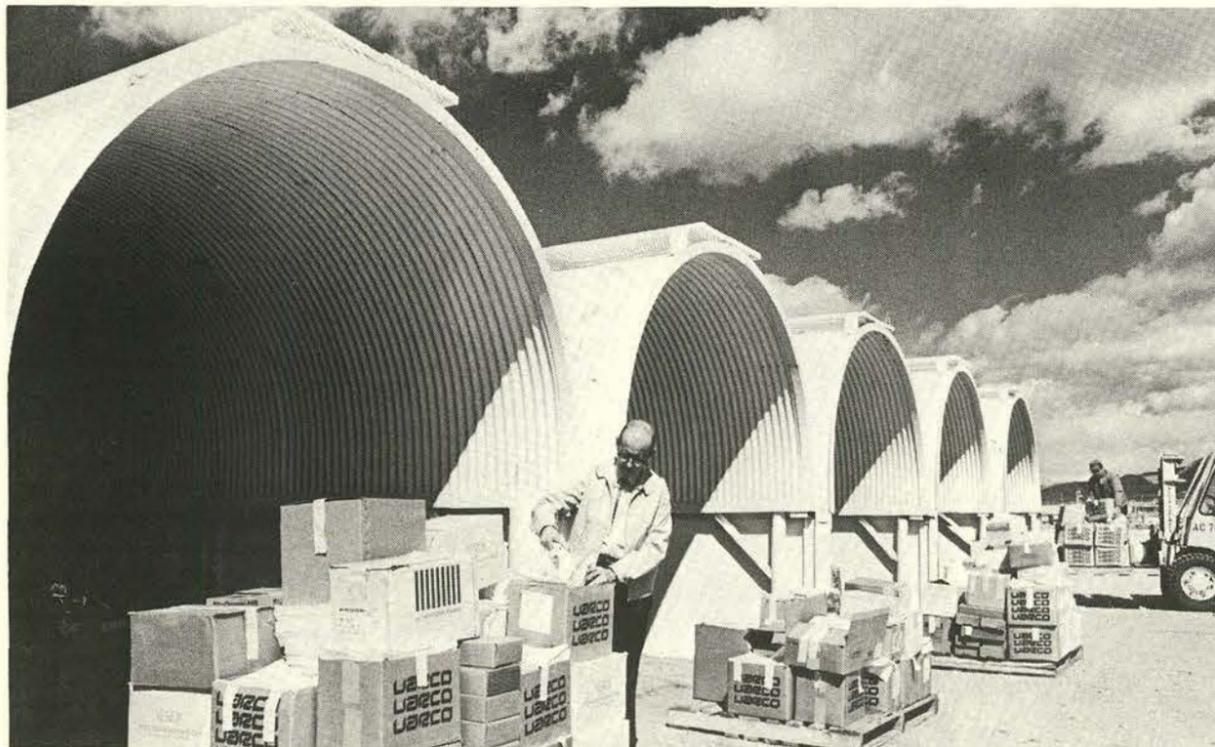
L.S. Conterno — 3700

Q. What will be the date of the next SLA Family Day, and will the parents of employees be allowed to attend?

A. Family Day will be held this year October 16, as part of SLA's Bicentennial observance. Sandia Livermore will hold Family Day on May 8.

Families of employees, including parents and other relatives, will be welcome. If possible, provisions will also be made to allow employees to bring special guests who are not relatives.

K.A. Smith — 3100



ARE WE STILL collecting scrap paper? You bet says Russ Leahy as he and Luis Sandoval (both 3283) ponder a two-weeks collection in the salvage yard. Russ calculates that more than 70 tons of scrap paper were collected and sold during the first quarter of the year. Scrap boxes are located throughout Labs.

Take Note

"The 1976 Wilderness Symposium is not a sit-up-on-your-rear, listen-to-the-experts type of convention. Rather it's a smorgasboard of wilderness topics under different formats—slide shows, practice sessions, demonstrations, discussions, etc." The invitation to attend the Symposium April 24-25 at Sandia School (from which we quote) is refreshing enough to attract even the inveterate pavement lover. Good place to get introduced to wilderness—places, issues, activities. More info from the Bishops at 266-0735.

* * *

The "Critical Materials Problems in Energy Production" lecture series continues every Thursday at UNM's Kiva.

Speakers next week, April 22, are Dr. R.G. Hickman, LLL, who will discuss "Solar Energy Materials Problems" at 3:30 p.m. At 5 p.m. Gene Zerlaut, Desert Sunshine, Phoenix, will present "Solar Energy Collectors."

On April 29 at 3:30 p.m., Prof. Maria Telkes, University of Delaware, will discuss "Solar Energy Storage" and at 5 p.m. Dr. B. Rossing, Westinghouse Research Laboratory, will present "Magnetohydrodynamics."

Interested Sandians are invited. For more information, contact George Samara (5130), 4-2945.

* * *

"Homespun Fashions" is the attraction at the May 3 meeting of the Sandians (here referring to the wives' club). The women have made and will model their creations. It's at Karen Longcope's home, 7509 Lamplighter Lane NE, at 7:30 p.m.

* * *

The public is invited to the finals of a speech contest of Toastmistress Council IV at 10 a.m. Saturday, April 24, at the Quality Inn. Toastmistress is seeking new members, according to Ann McIntyre (1333), Council chairman. Other Sandians participating include Cora Callender (9422), Bertha Grant (9553) and Marcella Samuelson (9723). For more information, call Marcella, 4-9278.

* * *

John Grisson (2152) is the newly elected president of the New Mexico Chapter of the International Society for Hybrid Microelectronics. R.A. Colclaser (UNM) is vice president and Ken Payne (2153) is secretary/correspondent. Dick Knutson (2152), immediate past president, is the new treasurer.

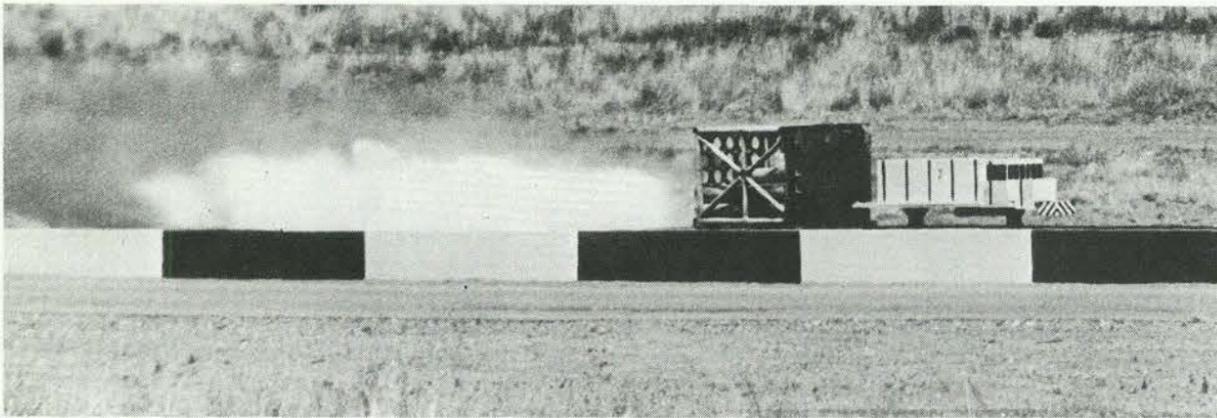
* * *

Retirees: The South Highway 10/14 Village Project has a book sale stand outside the technical area in Bldg. 814 (near LAB NEWS and Benefits offices). Book donations will also be accepted in the LAB NEWS office.

Sympathy

To John Hoice (2122) on the death of his wife in Albuquerque, March 14.

To Ira Honeycutt (3613) on the death of his father-in-law in Albuquerque, April 5.



AT 80 MPH, one-eighth scale model locomotive is pushed by rocket sled to impact into a model nuclear fuel shipping cask in Area III. Shipping cask was bent, but survived intact. Test is part of a Sandia program which will climax next fall with full scale train/truck collisions under controlled laboratory conditions.

Train/Truck Collisions

High Speed Crashes Set

Three full scale destructive tests of locomotives and trucks will climax a current test program being conducted by Sandia Labs for ERDA's Transportation Branch, Division of Environmental Control Technology.

The safety of ERDA's nuclear fuel shipping casks under extreme accident conditions is the crux of the test program. These tests will demonstrate the validity of ERDA's analytical and scale modeling techniques for assessing the safety of hazardous material packaging systems under extra-severe environments.

Prior to the full scale destructive tests, Sandia is conducting a series of one-eighth scale model tests in Area III using the Labs' centrifuge and sled track facilities. All of the scale model hardware is fabricated in Sandia's Development Laboratories 3600. The work is coordinated by Leo Dunn (9414).

The Regulatory Assistance Division 5432 under Ken Cole is managing the program. Richard Yoshimura of the division is project leader. Richard reports that two of the scale-model tests have been successfully conducted in Area III, and another is set for next month. The events simulated are a grade crossing collision of a high-speed locomotive with a truck carrying a large shipping cask, a rail car derailment test and a truck crash test. Final model testing will simulate runaway tractor-trailers carrying a spent reactor fuel cask crashing into a solid barrier. Then, in mid-summer, two full scale tests will be conducted in Area III running a used tractor-trailer at 60 and 80 mph down the sled track into a concrete barrier. Bill Kampfe of Coyote Test and Track Division 9335 is test engineer for the sled track events.

Next fall, two tests involving full scale locomotives and rail car equipment will be conducted at the Transportation Test Center, Pueblo, Colo., a Department of Transportation facility operated by the Federal Railroad Administration.

In the first test, the locomotive will collide at a grade crossing with a truck carrying a large nuclear fuel shipping cask. The second will be a high-speed derailment, collision and fire involving a special rail car carrying a spent reactor fuel cask. Speeds of the vehicles will be in the 70-80 mph range.

Richard emphasizes that these will be controlled laboratory tests duplicating extra severe conditions. The severe accidents, although realistic, have been found through risk assessment studies to have an extremely low probability of occurrence.

A major part of Sandia's efforts in the

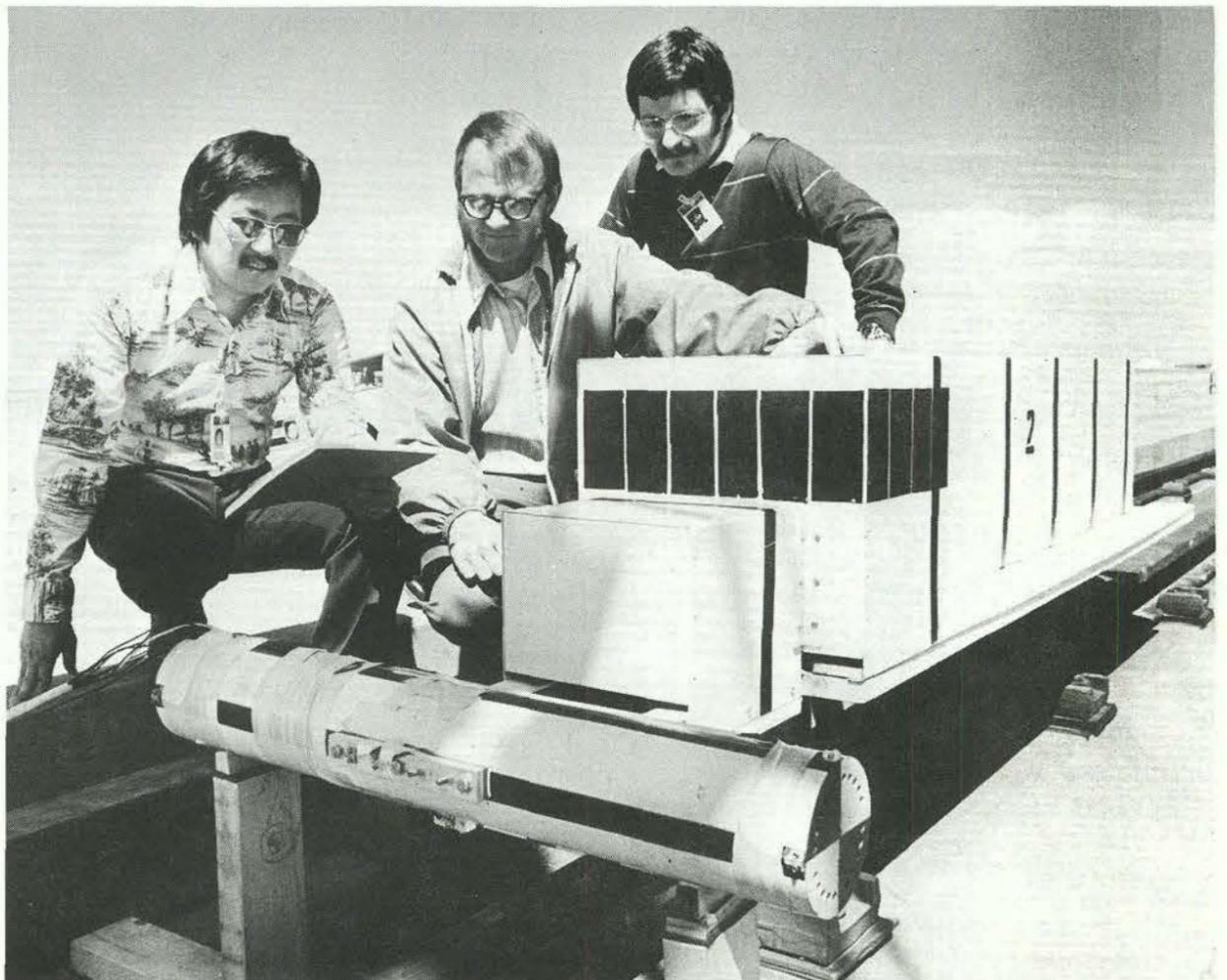
program will go into the analytical understanding of the dynamic loads involved and refining computer prediction codes. Analysts are Mike Huerta and Al Dennis of Applied Mechanics Division II 1282. Also helping in the structural analysis is Mike Stone of Design Technology Division 5431. Bob Nilson (1284) is performing rail cask thermal analysis.

Instrumentation Applications Division III 9483 under Bill Hereford is instrumenting the tests.

Harold Rarrick of Test Operations Control Division 9411 is test project manager.

Extensive photometric and documentary film coverage is being made of the model and full scale tests. Terry Leighley of Photometrics Division 9412 is responsible for the engineering film coverage while Chuck Cockelreas (3153) is handling the documentary films for public release.

A number of agencies are participating in the program including ERDA, Nuclear Regulatory Commission, Department of Transportation and Association of American Railroads. • dg



MODEL LOCOMOTIVE and nuclear fuel shipping cask are inspected before 80 mph impact test by Richard Yoshimura (5423), Bill Kampfe (9335) and Mike Stone (5431). Model cask weighed 140 lbs.; model locomotive, 800 lbs.

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S.R. Dolce (1111), "Reading Dielectric Track Detectors Using Transmitted Particles," Vol. 23, No. 1, IEEE Transactions on NUCLEAR SCIENCE.

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R.E. Palmer (5216) and T.D. Padrick (5215), "Relative Yield and Rate Constants for Deactivation of Electronically Excited Iodine Atoms," Vol. 64, No. 5, THE JOURNAL OF CHEMICAL PHYSICS.

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G.A. Samara (5130), et al, "Important Generalization Concerning the Role of Competing Forces in Displacive Phase Transitions," Vol. 33, No. 26 (1975), PHYSICAL REVIEW LETTERS.

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M.J. Forrestal and W.K. Tucker (both 5233), "Impulse Loading of Finite Cylindrical Shells," Vol. 13, No. 10 (1975), AIAA JOURNAL.

T. Caffey (2542), "Two-Way Communication with an Earth Penetrator," Vol. 11, No. 4, (1976), RADIO SCIENCE.

P.H. Holloway (5825), "Thickness Determination of Ultra-Thin Films by Auger Electron Spectroscopy," Vol. 12, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

J.W. Poukey (5241), "Two-Dimensional Ion Effects in Relativistic Diodes," Vol. 12, No. 6, THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY.

J. A. Borders (5111), "Ion Backscattering Study of CU₂S Formation on Single Crystal CDS," Vol. 123, No. 1, JOURNAL OF THE ELECTROCHEMICAL SOCIETY.

YWCA in Forefront of Women's Movement

In the shifting social values of the late 20th century, the self-image of women continually blurs and reshapes itself. Homemaking or career? Intellectual accomplishment or child rearing? Or both?

There is an agency in Albuquerque that has an answer: "Each to her own full potential."

Speaker is Margaret Lembo, executive director of the Albuquerque YWCA. Occasion is the introduction of National YWCA Week April 18-24.

"What is women's lib?" Ms. Lembo asks. "I can tell you that the YWCA has been in the forefront of those causes that are important to women. Since 1855, the 'YW' has pioneered the changing of child labor laws, minimum wages for women, occupational training (the YW opened the first school for practical nursing anywhere in 1893 after pioneering courses in domestic science), and in other so-called 'shocking' areas at the time — providing residences and care for unwed mothers, education in social hygiene, open discussion of sex, advocacy of racial equality and the list goes on."

In Albuquerque the YW provides recreation, skills education and personal development activities for more than 1500 adult members and 1000 youth members (under age 17). The agency maintains seven program centers with headquarters at the YWCA building downtown at 316 Fourth SW. Each week's program includes dozens of classes — among them are culinary skills, sewing, fabric crafts, costume design, physical fitness, basic auto mechanics, oil painting, yoga and flower arranging. Even belly dancing. Most of the 100 instructors are professionals helped by a cadre of trained volunteers.

Much emphasis at the YW is placed on periodic but continuing programs such as "Women in Search" which provide discussion workshops on far-ranging subjects. Topics include "Women Alone", "Budgeting Time and Money", "Assertiveness", "Job and Educational Opportunities" plus a continuing discussion of women and current events. The YW also sponsors a community-wide Town Hall lecture series featuring well-known people — Olivia DeHavilland was a recent speaker.

A group of senior citizens meets five days a week at the downtown YW for lunch. In the summer, the YW runs a day camp in the Manzano Mountains near Tijeras for youngsters. A new program is just starting which provides after school care for elementary school children of parents who work, a program which is destined to grow as did the New Futures High School for pregnant teenagers, operated by the YWCA and APS for six years. APS is now taking over total responsibility for the school with the help of an advisory board drawn primarily for YWCA membership.

"In all of our programs," Ms. Lembo says, "the approach is the same. We stress individual development to full potential."

The 1976 YWCA budget totals \$167,500. The United Way provides \$90,000 of this. Sandians support the YW through contributions to the ECP plan.

No expansion of permanent YWCA facilities is planned in the near future. Instead, as Ms. Lembo says, the YW will rent more facilities for small satellite centers hoping to expand programs in the north and south valley areas of the city.



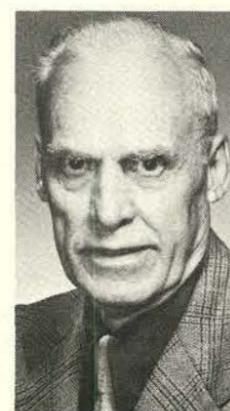
LONG RANGE PLANNING committee of the YWCA meets above to discuss expansion of programs in the north and south valley areas of the city. At left is Margaret Lembo, executive director. The YW will concentrate on program development rather than addition of new facilities.



OF THE HUNDRED classes conducted weekly by the YWCA, belly dancing is one of the more popular. Nancy Cochrell, right, is class instructor at the downtown YWCA.

"The YWCA is an autonomous women's movement," Ms. Lembo says, "continuously sharpening its sensitivity to the needs of women in today's world — women of diverse cultural, ethnic and economic backgrounds; women who want "Freedom to Be — Power to Move," the theme of national YWCA week." • dg

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LAB NEWS
APRIL 16, 1976**



Death

Hugh Smith of Instrument Repair, Calibration, Electronic Inspection and Testing Division 3617 died suddenly April 1. He was 62.

He had worked at Sandia Labs 22 years.

Survivors include his widow and a son.



MAORI HAKA, N.Z.



WHEN MAORI warriors in New Zealand want to scare rival warriors, they give 'em this routine. (Actually this trio was caught as they observed the planeload of American tourists coming down the ramp.) Ed Neidel (2316) tells us the Maoris were just one of many spectaculars on a month-long trip

that took the Neidels, Carnicoms, Donohoes, Rainharts and Biggses (Sandians all) to Tahiti, Australia, Tasmania, New Zealand, the Fiji Islands and Hawaii. That's Ed and wife Lucille enjoying a cruise up a lazy fiord. In the other boat we see the Carnicoms, Roberta Rainhart and the Biggses.

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

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 Deadline: Friday noon prior to week of publication unless changed by holiday.

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2. One ad per issue per category.
3. Must be submitted in writing.
4. Use home telephone numbers.
5. For Sandia Laboratories and ERDA 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

BROYHILL bdr. set w/triple dresser, mirror, headboard & frame w/Beautyrest mattress and box springs, \$350. Evans, 299-7105.

NORITAKE CHINA, 12 place settings w/all extras; golf clubs, 1 set Man's Dave Hill, Ram, 1 set Woman's Wilson Patty Berg; 8' brown naugahyde sofa w/loose cushions. Dalby, 298-2403 after 5:30.

'72 JAYCO Jayeagle hard-top tent trailer, sleeps 8, many extras, \$1800. Garrison, 881-1851.

WATER TUBES, heavy vinyl for anchoring tarps, swimming pool covers; three 8', two 20', \$5 each. Rainhart, 821-3690.

RIMS for Ford pickup: 15", \$5; two 16", \$8 ea.; Chevy pickup rims: two 16.5", \$3 ea.; used beige carpet, small to large pieces (14 x 16). Mattox, 296-4149.

5-LIGHT FIXTURE for dining room or entryway ceiling, black enamel & clear bead roping, 17½" high, \$30. Keeling, 296-9729.

CENTURY DINING SET, contemporary, distressed wood finish, 6 chairs, 86" extended, matching buffet, \$900. Seward, 256-1612.

ELECTRIC FIREPLACE w/blower, 20,000 BTU, 220, Pennington, 1004 San Pedro SE or 256-9506 after 5.

PAIR ventilated alum. awnings, white, 6½' long; 18.67 sq. yds. acrilan carpeting, white w/green scroll pattern, high/low loop; Yield House lamp/magazine table in pine. Bliss, 881-0272.

CRAVEN luggage rack & tote box & saddle bags, \$150. Anthes, 877-7805.

FOUR matched F78-15 Goodyear tires, 4000 miles w/ or wo/rims, fits Ford or Dodge, \$75. Schulze, 898-2880.

MIXMASTER, Sunbeam deluxe, turquoise, \$25. Rainhart, 821-3690.

THREE new C-78-15 tires & rims for Chevy van, \$40 ea. or make offer. Anderson, 293-7700.

KENMORE washer, 3 cycle, 5-temp. settings, \$35. Young, 256-9158.

SINGLE rollaway bed & mattress. Pitti, 256-1629.

MICROMETERS, calipers, ridge reamer, brake cylinder holm, 3-arm puller, 2-arm puller. Russell, 294-1035 after 5:30.

BIRDCAGE w/stand, cover & seed catcher & other accessories, \$6.75; child carrier for bicycle, \$3. Robertson, 299-7561.

HEATH KIT VTVM Model V7A, AC/DC volts & ohms, \$15. Henry, 266-6467.

CAMPER SHELL, off short bed Chevy pickup, paneled inside, for a side-step or fleet side, \$175. Carroll, 266-8926.

120 BASS accordion w/case; sewing machine. Johnson, 344-9369.

KEESCHOND PUPPIES, AKC reg., 60% pet store price; Sears 8" table saw w/joiner. Rose, 298-4849 after Sunday.

MAYTAG washer, \$30; Motorola TV & stand, needs work, \$20. Wilkinson, 299-8327.

CERAMIC PLANTER w/artificial split leaf philodendron; arrangement in planter is ceiling high, about half price \$23. Workhoven, 281-3246.

CAMPING: igloo ice chest, Coleman stove, port. shower stall, tent, tent heater, folding table, 30/30 rifle, 12G double barrel shotgun. Lurette, 299-9273.

'72 MARLETT mobile home, 14x70, completely furnished & set up in Coronado Village, Fletcher, 898-0481 or 298-2142.

70 X 14 MOBILE HOME, 1½ bath, 2 bdr., AC, deluxe refrig & dbl. oven, heavy duty Sears washer & dryer, storm windows, \$8800. Perryman, 294-7040.

PUPPIES, mother reg. poodle, father unknown. Self, 296-4137.

PACKARD PIANO, completely refinished case & matching swivel seat, regularly tuned and played, \$475. Bonzon, 296-3022.

WINE Grape vines, 6 Calif. varieties, \$1.50 ea. Luna, 4809 Northridge Ct. NE, 296-5123.

LAWNMOWER, rotary, 3.5 hp, \$45 or best offer. Binder, 299-2937.

3½ HP rotary mower; twin size mattress, boxsprings & headboard; 19 cu. ft. Maytag upright freezer, needs compressor. Bell, 296-4478.

CHILD's spring action horse, 40" x 22½" base, saddle height is 24", fully assembled, brand new. Schalles, 281-3035 after 5.

7.50 X 16 8-PLY NYLON truck tires, 1/16" tread left, \$5 ea. or swap pr. for case of Coors. Stephenson, 299-3914.

LIMED OAK dining table, 4 captain chairs, corner table, 2 straight chairs; roaster rotisserie broiler; Munsey toaster grill. Sadler, 898-5374.

REAL ESTATE

COCHITI PROPERTY, 60 x 105, valued at \$7000, \$3000 and take over \$50/mo. payments (total \$1450), will consider contract. McMaster, 296-7881.

80 ACRES, 1/2 woody, 1/2 meadow land. Baca, 869-6637 after 4:30.

LARGE 3-bdr., 1-3/4 baths, den, fp, dining room, pitched roof, 2-car garage, immediate possession, moderate equity, down payment negotiable. Herder, 821-5707 or 292-1452.

GLENWOOD HILLS, 3-bdr., all brick home, view of city & Mts., financing available, 12812 Cedarbrook NE. Sinnott, 299-1300.

FOR RENT

2-BDR. DUPLEX, avail. June 1, private patio, maintained lawn, fireplace, new stove & refrig., dishwasher, disposal, garage w/auto. door, no pets or children. Konnick, 3801 Thaxton SE, 266-7113.

NW VALLEY 4-bdr., lg., modern, 2 baths, stove, refrig., fenced, near schools, bus, shopping, \$250. Gallegos, 344-3290.

NEARLY NEW 3-bdr., 1-3/4 bath, fp, near Winrock/Coronado, \$325/mo., first-last d.d. Brown, 299-5360.

WANTED

SERVICE/SHOP MANUAL for '69 Cadillac. Miller, 255-1324.

RIMS for Chevy pickup, 15", 6-hole. Mattox, 296-4149.

'67 CADILLAC motor repair manual. Dunn, 298-4185.

'72 or later Blazer Bronco or Toyota Jeep, will trade classic year restored T-Bird. Chacon, 292-1050.

'71 FORD truck shop manual. Ashland, 299-3267.

4-BARREL intake manifold & carburetor for 340 Dodge. Prevender, 299-5253.

TENT TRAILER in good condition, not more than 5½' wide when folded up. Hall, 298-8617.

CO2 BB or pellet handgun; bench grinder. Chandler, 296-3323.

CAR POOL VACANCY: Constitution / Carlisle / Washington NE area; share driving or ride only. Christy, 256-0711 after 5:30.

SHARE YOUR HOME w/-Japanese college student 3 wks. starting July 28. Group of 35 visiting city. Hashimoto, 255-8097.

TRANSPORTATION

'69 FORD VAN converted to camper, 55,000 miles. Miller, 281-3189.

'72 CAMERO, 3-spd. 307, V8, new tires, one owner. Jarrell, 883-2660.

'59 MGA, wire wheels, low on gas, \$2000. Bryan, 294-0045 after 5.

125cc PUCH dirt bike, extra sprocket for trials, 99 hrs., \$495; 125cc Honda trail bike, \$595. Lassiter, 298-2461.

'73 CHEVY NOVA, 6-cyl., std., new shocks, '76 plates, \$305 below book price. Chaves, 831-2296.

'70 SUZUKI TC 90, low mileage, kick change street trail. Melville, 296-3378 after 5.

'69 YAMAHA 125 Enduro, \$150. Coalson, 298-0061.

'70 VOLKSWAGEN 9-pass., brown/white two-tone. Polard, 294-4201.

10-SPEED BICYCLE, \$55. Davis, 821-8388 after 5:30.

'41 CHEVY 4-dr. master deluxe,

\$275 or best offer. Armijo, 268-7645.

'71 PLYMOUTH 2-dr. V8, AT, wide tires, mag wheels, \$1000. Garcia, 299-6996.

'75 YAMAHA RD-350, windshield fairing, crash bars, bags, rack, backrest, helmet box, 600 miles, make offer. Campbell, 268-5750.

23 MPG CAMPER: '63 VW bus, rebuilt engine, camping accessories, new tires, \$700. Caruthers, 821-4035.

'71 DATSUN pickup, low mileage, HD bumper, outside mirrors, R&H, \$1800. Lewis, 296-7896.

'64 FORD F-100 pickup, LWB, 4-spd. std., new tires, \$695. Ryanczak, 293-0326.

'74 COURIER, AC, insulated camper shell, 13,000 miles, \$2795. Gonzales, 242-6264 after 4:30.

'54 CHRYSLER New Yorker deluxe, original throughout, 67,000 miles, new tires, \$795. Williams, 281-5586.

GIRLS 3-spd. Sears Spyder 24" bike; Boys' Huffy Dragster 20" bike. Bartel, 296-5270.

'72 HARLEY Davidson Sportster, XLCH, 16,000 miles, 1000cc, 63hp, 6"-extended fork, king-queen seat, extras, \$2300. Weber, 266-9100.

'68 FIREBIRD convertible, PS, PB, AC, steel radials, Falacy, 881-1802 after April 18.

'75 HONDA CVCC 4-spd. sedan, AM radio, stratified charge engine, \$2475. Schubeck, 294-5666.

'67 GALAXIE 500, 4-dr., PS, AC, \$875; '74 Suzuki TM75, helmet, bumper rack, \$275. Brewster, 298-6166.

PALOMINO GELDING, 3 yr-old, green broke, 15 hands, good conformation, PHBA reg., 7/8 Quarter horse. Stearns, 281-3872.

LOST AND FOUND

LOST—Heishi earring, radiation alarm warning, plastic bag containing 500 stainless steel rings, Rx sunglasses, blue Pentel -7 mechanical pencil. LOST AND FOUND, Bldg. 832, 264-1657.

FOUND—Book, ladies' sunglasses. LOST AND FOUND, Bldg. 832, 264-1657.

SEAFOOD • HAITI • VODOO • JEANNE RICH • DENNY • LESSONS • FIESTA • TIM • PAUL

FRIDAY	SATURDAY
16 — HAPPY HOUR SEAFOOD BUFFET Adults \$3.25 Under 12 1.92 <i>Tim & Paul</i> JEANNE RICH & FRIENDS	17 — EASTER EGG ROLL & HUNT 10 a.m. MEXICAN FIESTA Cocktails @ 6 Dinner @ 6:30
23 — HAPPY HOUR SPAGHETTI BUFFET Adults \$2.25 Under 12 1.25 THE VIKINGS <i>Denny In Lounge</i>	24 — SWIM LESSON SIGN-UP 9 - 12 TEEN DANCE 7:30 - 10:30 Mbrs 25¢ Guests 50¢

THINGS — go better yet with rum-and-Coke. Or something else liquid. Or solid, like shrimp creole, whitefish, other good things. Or listenable, like Tim & Paul. Or danceable, like Jeane Rich & Friends. Find them all at tonight's Happy Hour.

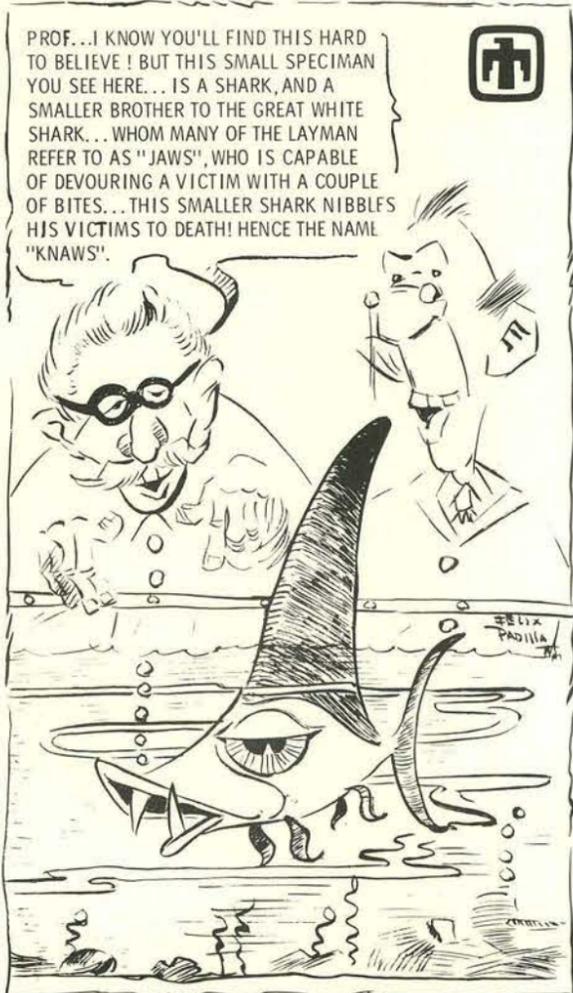
ALWAYS — another Friday coming up. On the 23rd it's Italian spaghetti and meat sauce and, from 7 to 10, The Vikings. Climax of this international evening is cosmopolitan Denny, bon vivant extraordinaire.

LOOK — look! See the eggs. Run, Dick. Run, Jane. Find the eggs. Win Jane. Win, Dick. Roll the eggs. Roll, Dick. Roll, Jane. (Roll, Jordan.) Start at 10 tomorrow. Be a member. Be six or littler.

DARKEST — soul in town belongs to the Club Calendar writer who promised Dance Lessons through the 22nd. Disregard. Lessons end on the 15th.

JUST — a last minute reminder to be at the Mexican Fiesta in time for cocktails tomorrow night. Because else you'll miss out on the free hors d'oeuvres spread and the freeing (of inhibitions) hot chili that accompanies.

BÉFORE — your kids can learn swimming, diving, water safety, etc., they have to be signed up by a parent in person with a checkbook on the 24th at the Club in



FIESTA TIME tomorrow night. Gabby (4311) and Pauline Gabaldon polish some Mexican polka steps as Denny Gallegos (3735) strums. Mexican foods, strolling mariachis, and The Progressions will do good things for Pan-American relations.

the morning from 9 to 12. (Guinness Book of Records — what's the longest string of prepositional phrases before that one?)

THEY — are going to do it again. Un huh. The singles will gather after work on the 30th in the El Dorado Room for music and more. 50¢ at the door — open to all Sandians and ERDAns. Bring a guest if you like.

GO — Teen, Go! Dance the evening away with Ironhorse. (Ironhorse? Maybe a steam engine?)

TOTALLY — Baca Night on the 1st

when the Baca Family Band meets Elfego Baca (he of the anti-Texan persuasion). Show and movie good for all ages — so is the food.

BLACK — Magic, Voodoo (Who do?) (You do.), all the other romantic aspects of the Caribbean are yours on the luxury liner Cruise Nov. 26-Dec. 4. Fly to Miami; cruise to Haiti, Puerto Rico, Virgin Islands, Dominican Republic. Or sign up for Greece — soon. Las Vegas packages available too. Details at the Club.

MORE INFO 265-6791.

Supervisory Appointment

HOWARD ROMME to supervisor of External Budget Information Division 3243, effective March 16. During his 17 years at Sandia Howard has worked in cost accounting, auditing, systems and procedures and, since 1969, he has been with the budgeting organization. He was supervisor of Mountain Bell's data processing division before coming to the Labs.

Howard earned a BBA degree from UNM and was a communications officer in the Navy for three years. He is a past president of the Albuquerque Chapter of the National Accountants Association. Off the job Howard enjoys backpacking and fishing; he ties his own flies. Howard and his wife Maurine have two children—a son in graduate school at the University of Wyoming and a married daughter living in Albuquerque. They have one grandchild. The Rommes live at 11709 Holiday Ave. NE.



Howard Romme (3243)