

# THE ATOM

Los Alamos Scientific Laboratory

August, 1966



LOS ALAMOS NATIONAL LABORATORY  
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# THE ATOM

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## CONTENTS:

- 1 Apartment Sale
- 3 Short Subjects
- 8 From Hudson Bay's Shores
- 9 Community Transfer
- 12 Barranca Bees
- 14 Simple Method Transfers Heat
- 17 LASL Container Approved
- 20 Spanish Scientist
- 22 The Technical Side
- 23 20 Years Ago/What's Doing
- 24 New Hires

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## about a New Editor

No stranger to the stratagems which must sometimes be employed by those reporters who seek to get the real story, she once plowed through a swamp and on another occasion climbed to the top of a 100-foot tree to photograph research projects.

The young lady described, Virginia S. Lees, will be the new editor of *The Atom* beginning with the September issue. Mrs. Lees, who joined the PUB staff July 26, comes to LASL from a post as assistant agricultural editor at the University of Delaware, Newark. She holds a B.S. cum laude in journalism from Kent State University, Kent, Ohio, and has covered a wide range of news experience.



While at Kent State, she held a variety of posts on the *Daily Kent Stater*, the student newspaper, including editor-in-chief and managing editor. She has also worked on the staffs of the *Fremont News-Messenger*, Fremont, Ohio, as photographer and feature writer; the *B. F. Goodrich Company*, Akron, Ohio, as assistant editor,

sales publications; *The Erie County Reporter*, Huron, Ohio, as co-editor and manager of the award-winning weekly newspaper; and, most recently the College of Agricultural Sciences of the University of Delaware, where she handled a variety of assignments, including publications production, promotion, a weekly news service, and photography.

## COVER PHOTO

A glowing heat pipe under test illuminates its inventor, George Grover, N-5, in this dramatic photograph by *Atom* photographer Bill Jack Rodgers.

*It's Later Than You Think*

# Sale of Apartments Expected in 2 Months

The clock has started running fast on the sale of all the remaining government-owned housing in Los Alamos.

Two important steps have been taken to speed up the housing sales program, which is already moving ahead of schedule:

1.) The AEC announced that the three principal employers (AEC, Zia and LASL) have agreed to remove at once the 12-month limit they had previously put upon the time a family could occupy the Group 11, 12, 13, 14 and 15 quadruplex units (the quads).

2.) The HHFA made public the FHA appraisals on all the remaining apartment-type dwellings in town.

The only way an apartment dweller now can use his priority rights (and get the 25% deduction from the appraisal price) is through a cooperative formed under the rules of the National Housing Act.

Short of waiting for the apartments to go on the open market for sale under sealed bid, there is no way at all for an individual to buy his apartment or apartment building—except as a member of a cooperative.

Only two kitchenette apartment buildings—at 1027 Ninth and 1203 Ninth—are being held back for assignment to summer students. Everything else goes, with the exception of the 231 Denver Steel houses which are not going to be sold but eventually will be removed. The eastern area Denver Steel row is under the process of attrition now—as they are vacated they are not being re-occupied and will be hauled away.

First offerings are expected—probably about October 1—to be made to legally-organized cooperatives which represent a majority of the occupants of the buildings they wish to buy. This is the “first priority” under the existing regulations. As a cooperative group or groups, priority holders, who are simply the bona fide occupants of the units on the date the offering is made, then will have 30 days in which to request priority certification.

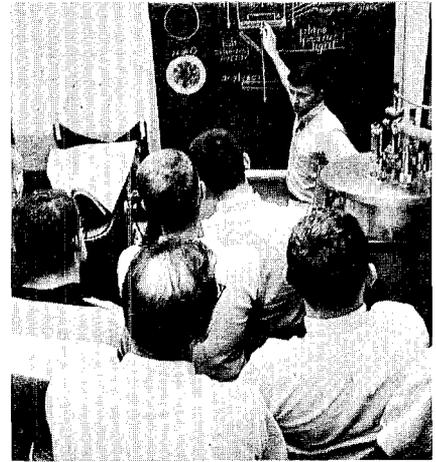
As was the case with the single and duplex units, a specific offer will then be made by HHFA to the individuals certified by the AEC as holding the priorities and they in turn will have a total of 93 days in which to arrange financing and make their down payments—again through a cooperative.

If this offer does not result in a sale, the next offer would be to a cooperative representing less than a majority of the occupants, the second priority group. In either case, all the members of the cooperative have to be certified initially as being project-connected.

If both these steps should fail, the priority system is ended and the buildings go up for sale to the general public (anyone, anywhere) on sealed bids. Lowest acceptable bid is the full appraisal price. High bidder wins. If that step fails to sell the units, presumably the government would have to take another look at the price.

A complication lies in the fact that regulations governing cooperatives require a minimum of five families actually living in the apartment houses concerned. A cooperative wishing to buy a quadruplex

*continued on next page*



Keith J. Carroll, CMF-9, lectures to touring group of New Mexico Academy of Science members.

## Science Academy Conference Here ‘Very Successful’

The second annual summer conference of the New Mexico Academy of Science held at Los Alamos Scientific Laboratory July 22-23 was termed “very successful” by Bob Brownlee, J-15, who was in charge of the activities.

Brownlee said 39 people registered for the conference, the majority from Highlands University and the University of New Mexico as well as representatives from Oklahoma, Oregon and Holloman Air Force Base near Alamogordo.

The registrants were given a tour of the Lab area Friday, visited the museum and heard a talk by John V. Young that evening. Young, who retired last month as head of the Office of Public Relations at LASL, spoke on “The Need to Know.”

In his lecture Young urged the delegates to strive for closer communication with the public. “If the public does not understand the scientists, it is NOT the public’s fault,” Young said, “and it is the scientists who will suffer from the deficiency.”

Saturday’s meeting was a technical session, with lectures presented by five LASL staff members.

# Four on Research, Teaching Leaves

Four LASL staff members, participating in the Laboratory's Professional Research and Teaching Program, will spend the next year at universities and research laboratories in four countries.

Rolf Engleman, GMX-2 chemist, started a year's leave beginning August 1 to do research in molecular spectroscopy at the National Research Council of Canada, in Ottawa. He received his B.S. degree in chemistry at Oklahoma University, Norman, and his Ph.D. in the same field from Cal Tech.

Phil Bendt, CMF-9 staffer, leaves late this month for a 12-month appointment to the University of Oregon, Eugene. He will be visiting professor of physics while there, working with Prof. R. J. Donnelly, new chairman of the Physics Department at Oregon. He'll also do research on superfluid hydrodynamics of liquid helium 2. Bendt received his B.S. degree from MIT and his M.S. and Ph.D. degrees in

physics from Columbia University,

P-12's Allen Blair is now at the Centre d'etudes Nucleaires de Saclay in France, where he'll spend the next year in teaching and research. Blair won his B.S. degree in physics from Hamline University, St. Paul, Minnesota, and his Ph.D. from the University of Pittsburgh. Blair's wife is a native of France.

A LASL staffer since 1955, David A. Liberman of T-4 will leave this month for Bristol, England, to spend a year at the University of Bristol doing work in theoretical

solid state physics. Liberman received his B.S. and Ph.D. from Cal Tech.

The PR&T Leave program was established at LASL in 1957, and in addition to promoting continuing professional growth of the Laboratory's technical staff, serves to spread afield, particularly in academic institutions, some of the knowledge and experience in science which has been developed at LASL. Since the program's inception, 45 LASL staff members have completed leaves under its auspices.



Engleman



Bendt



Blair



Liberman

## Apartment Sale . . .

continued from preceding page

building would have to buy two buildings, or eight units, to meet this minimum requirement. The decision as to whether the "majority" of occupants required on the first priority offering refers to the occupants of one building or two has yet to be made.

There is another complication in the size of the parcels set up by the AEC. All but two of the quadruplex apartment buildings are to be offered as individual buildings, at around \$21,000 each, but the other apartments are being offered in large blocks. These range from a pair of Group 14-B apartment buildings at \$40,900, to 72 Chapel apartment units in seven buildings appraised for a total of \$296,450. The concrete efficiency apartments will be offered in three blocks—one of 84 units at \$188,000;

one consisting of 48 units at \$110,550; and the third, 48 units at \$109,600.

The same deductions offered to purchasers of single and duplex units will apply to the cooperative purchase of apartments—a total of 25% off the appraisal. Tenant improvements do not count. If other financing is not available, the cooperatives can borrow up to 97% of the sale price (75% of the appraisal) on direct government financing under FHA rules. If the cooperatives do not buy the units, other purchasers will have direct government financing available at 90% of the full appraisal if they can meet FHA requirements.

Meanwhile, new leases are being drawn up for the occupants of the quadruplexes who moved in under the 12-month occupancy limitation,

which was set up by the employers in an effort to create a "pool" of temporary housing for new hires and others. These people are being notified that they may continue to occupy the apartments under the rules applying to other government-owned quarters, which means no limit *except* that imposed by the imminence of the sale of the units. Removal of the restriction permits the sale to go ahead at full speed, with no further barriers except those caused by the complexities of the disposal program.

But as the official AEC release said, "Meantime the housing sales program has been substantially accelerated over that originally contemplated." This was an implied warning to all the apartment-house dwellers that it is later than they might think.

# short subjects

**Charles A. Lehman, Sr.**, T-5 staff member, died July 23 in Arlington, Texas of a heart attack. Lehman, who was 42 at the time of his death, had been with LASL since October, 1947. He was stricken while in the Texas city on a business trip and died in a hospital there. Survivors include his wife, Marylee, and three children, Charles A., Jr., 21 (an employee of H-1); Leland S., 19; and Mary Adeline, 16.

Burial was in Guaje Pines Cemetery in Los Alamos.



Laboratory Director **Norris E. Bradbury** and W Division Leader **Harold Agnew** attended a special ceremony at the White House August 1 commemorating the 20th anniversary of the signing of the Atomic Energy Act. They also witnessed the swearing in of two new members of the Atomic Energy Commission, Dr. Samuel Nabrit and Wilfrid Johnson.

Also present at the ceremony were Gen. Leslie R. Groves, who was director of the Manhattan District during the early days of the Los Alamos Laboratory; Dr. I. I. Rabi, Nobel laureate; William L. Laurence, a New York Times reporter who chronicled the Trinity test; and all members of the Joint Congressional Committee on Atomic Energy.

A research reactor has been moved from the University of California at Berkeley to the University of New Mexico, where it is scheduled to be assembled by September 1. The model AGN-201 will be located in the Nuclear Engineering Laboratories building on the Albuquerque campus. UNM will use the reactor in research and teaching in the nuclear engineering division. University of California has replaced this reactor with a larger unit.

**Curt Chezem**, N-2 staff member, leaves this month to spend the coming school year at Texas A and M, College Station, as Visiting Professor of Nuclear Engineering. During this period, he'll be on leave of absence from LASL. Chezem received his B.A. degree in mathematics from the University of Oregon, his M.A. in physics from the same institution, and his Ph.D. in physics from Oregon State College.

**Gerold H. Tenney**, GMX-1 group leader since 1944, has accepted a new assignment in which he will devote full time to specialized nondestructive testing activities. Dana E. Elliott has been appointed acting group leader of GMX-1. Tenney is internationally known as a pioneer in the field of nondestructive testing, particularly industrial radiography. In his new position, he will be attached to the Laboratory director's office.

**William L. Richmond**, former Santa Fe newsman, has joined the staff of the Public Relations Office and will handle press relations. He replaces Peter Mygatt who is with the AEC in Panama.

Richmond, 31, worked on newspapers in Clovis, N.M., and Eugene, Ore., before joining United Press International in 1963. He was with UPI in Albuquerque for six months before transferring to the capitol bureau in Santa Fe. The new PUB staffer is a graduate of Eastern New Mexico University, Portales, with a B.A. degree in journalism.

Richmond and his wife, Jean, are native New Mexicans and live in Santa Fe. They are the parents of two children, Kelly, 2, and Sherry, 3 months.

**Al Petschek**, T-12 theoretical physicist, will be on leave of absence from LASL this coming academic year to serve as Professor of Physics at New Mexico Institute of Mining and Technology in Socorro. He is a graduate of MIT with a B.S. in physics, and received his M.S. and Ph.D. degrees from the University of Michigan and University of Rochester, New York, respectively.

(More SHORT SUBJECTS on Page 4)

## more short subjects . . .

**Wilbur K. Brown**, P-3 physicist, is in Roskilde, Denmark, consulting at the Risø Laboratory on the neutron half-life measurement work in progress there. Brown, who previously worked at Risø on this project from 1962 to 1964, was awarded a Sigma Xi \$1000 grant to continue study.

During the three-months' leave of absence from LASL, Brown will also attend the Lysekil Symposium in Sweden on "Why and How Should We Investigate Nuclides Far Off the Stability Line," to be held in late August, where he will deliver a paper, "Neutron Cross-Section Measurements on Radioactive Nuclides Using Neutrons from an Underground Nuclear Explosion," by himself, B. C. Diven, also of P-3, and P. A. Seeger, W-8.

Brown received his B.A. degree in physics, his M.S. in nuclear engineering, and his Ph.D. in nuclear science, all from the University of California, Berkeley.

After a vacation in Scandinavia with his family, Brown will return to Los Alamos next January.

Laboratory Director **Norris Bradbury** is spending approximately six weeks this summer from July 20 to about September 1 at the National Academy of Sciences Summer Study Center, Wood's Hole, Massachusetts, where he is directing an Ocean Surveillance study group which the National Academy of Sciences has assembled for the Navy. Some 20 scientists and engineers drawn from industry, universities, and government are concerned with this high level study of world-wide ocean and undersea research problems.

**Dr. Glenn Whan**, former director of the Los Alamos Graduate Center, is in Lisbon, Portugal, as technical assistance expert for the AEC to the International Atomic Energy Agency.

Dr. Whan is on a year's leave of absence from his post as chairman of the nuclear engineering department at the University of New Mexico.

Replacing Dr. Whan as grad center director is Dr. Richard Houston of UNM.

**Harold L. Freshwater**, Col., USA (Ret.) has been employed as a nuclear engineer in the Quality Assurance Division of the AEC's Albuquerque Operations Office. He joined the U.S. Army in 1941 and has been closely associated with the atomic weapons program at Los Alamos and Albuquerque since 1952.

**The late Herbert E. Ungnade**, who was an organic chemist with GMX-2 Group at his death last August, is one of two scientists, both now deceased, to whom a 1,210-page chemistry reference work just published has been dedicated. Ungnade was an abstractor and editor for the volume, "Organic Electronic Spectral Data, Volume III," published by Interscience Publishers.

**L. Philip Reinig**, head of the Laboratory's Engineering Department, has been appointed engineering advisor to the Disaster and Defense Planning Committee of the County Civil Defense organization. Reinig replaces John Bolton who held the post until his retirement earlier this year, according to Civil Defense Director Robert Y. Porton.

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# Six Retire From LASL During July

LASL's ever-growing retirement roster gained six names during July, headed by a husband-wife team.

Helen and Charles Miller retired July 29. Mrs. Miller was an employee of H-5, having worked there since 1956. Prior to that, since 1952, she was with H-4. Charles, who started out in GMX-2 in 1951, has been with K Division since January of 1956. At retirement, he was a member of K-1. On July 22, they were honored at a farewell dinner party at the Golf Club. The Millers will move to Green Valley,

Arizona, to make their future home.

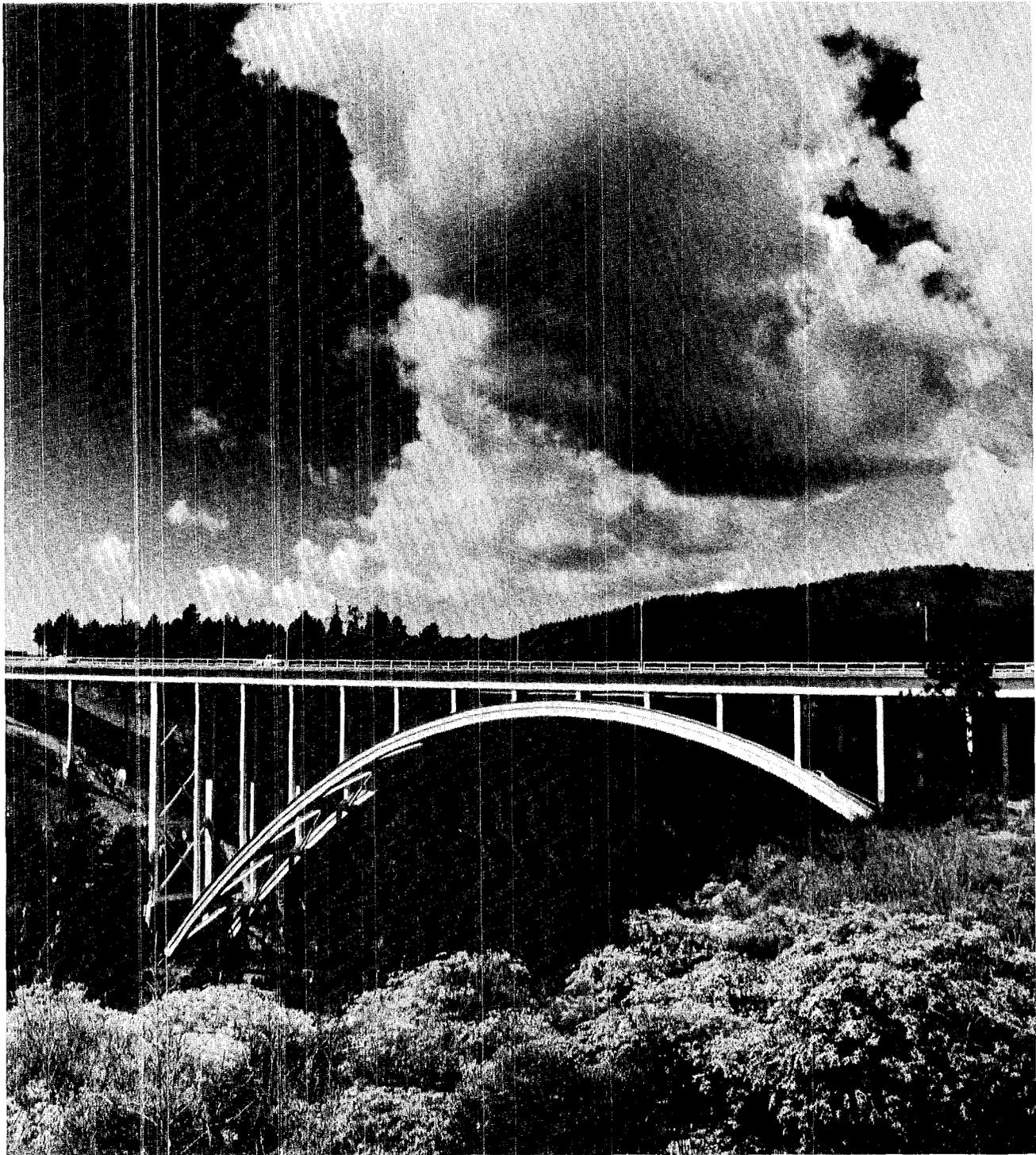
Ralph G. Black, with LASL since January 2, 1946, retired July 22. Eleven of his LASL years were spent with the SD-1 Foundry, and he more recently worked in SD-5. Originally from Monte Vista, Colorado, where he worked at the Schall Iron Works, his plans after retirement are indefinite, but among other things he'll go to California for a while.

Melba Morris became the first person to retire from D-2 on July 29. She worked in the photo lab

from 1945 until 1951, and rehired in 1953 with D-2. A native of Foyil, Oklahoma, she'll go to Las Cruces, N.M., to live with her family.

Horace Phillips hired on with LASL May 1, 1953 and has been working in GMX-7 since that time until his retirement July 29. Before that, he worked six years for the Zia Company.

John V. Young retired July 29 as Public Relations Officer to devote full-time to free-lance writing and photography. He had been with LASL since 1945.



Memories are short and time is fleeting. Bet you did not realize that the South Mesa bridge is fifteen years old this month, its official date of completion being August 20, 1951. Officially, it is 180 feet above the Los Alamos canyon road, and is 819.6 feet long. The clear span of the arch is 426.5 feet. It took a year and two months to build and cost \$850,000. Originally designed for two lanes, it was widened to three at the insistence of the AEC

area manager at the time, Carroll Tyler, who wanted four lanes. He got three wide ones—wide enough to be re-designated as four lanes a year or so ago. At the time it was built, it was the longest and highest steel arch bridge in the state, an honor that since has been taken away by the big span over the Rio Grande gorge north of Taos. Before the bridge was built, all traffic had to wind its way down through the canyon and up the other side.

# A British Mission Member Returns

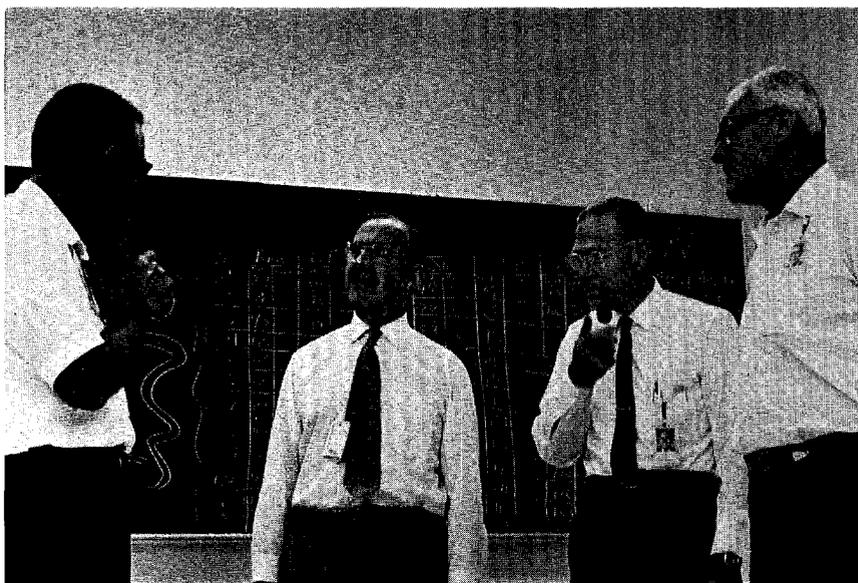
"I'll always remember Trinity as the most fantastic scientific experiment. When it happened, it certainly lived up to all expectations."

So declared Dr. William G. Marley, English physicist, as he recalled the momentous event of 21 years ago during a recent visit to Los Alamos. Dr. Marley, one of 15 people assigned to Los Alamos with the British Mission, was here from October, 1944, until November, 1945. Although he has returned to the United States often in the interim, the recent visit to Los Alamos was his first here since the Manhattan Project days.

The native of Abingdon, England ("it's near Harwell and about the population of Los Alamos") stated he has always been impressed with the research work going on at LASL and a pervading "spirit of extensive scientific cooperation" found here.

Currently head of the Division of Radiological Protection of the Health and Safety Branch, United Kingdom Atomic Energy Authority, Dr. Marley had been in New York prior to visiting Los Alamos, serving as the United Kingdom delegate on the United Nations Scientific Committee on the Effects of Atomic Radiation.

Dr. Marley, who was the guest of H Division Leader Dr. Thomas L. Shipman, noted there are many



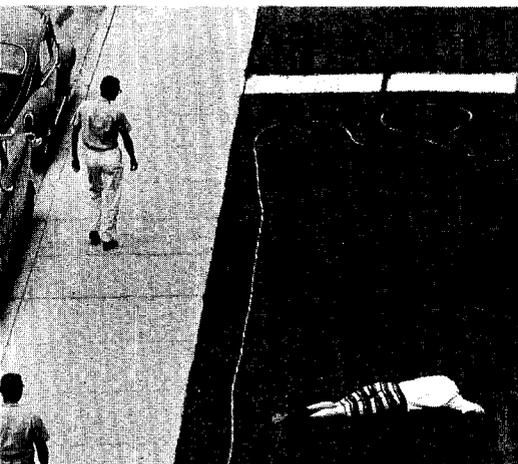
Dr. William G. Marley greeted old friend Darol Froman, retired LASL Technical Associate Director, (with pipe) and toured occupational health facilities with Edwin C. Hyatt (left) and Dr. Thomas L. Shipman (right).

problems here similar to those in the United Kingdom, and he feels it invaluable to compare notes with scientists doing like work. Marley's duties concern relations with eight major operating plants in England, dealing specifically in operating standards and problems of health and safety; with research programs; and with making periodic reviews of the health and safety work of the Authority.

In spite of all the many changes

that have occurred at Los Alamos during the 20-odd years since he had seen it, Dr. Marley, a pleasant, gentle-mannered man, found "the informality of Los Alamos remains the same." And, with a twinkle in his eyes, he seemed quite pleased to note that "the Jemez Mountains are still here, too!"

During his visit Marley renewed acquaintances with Director Norris E. Bradbury, Associate P Division Leader Jim Tuck, and others.



## SIESTA TIME

A summer visitor (not a LASL employe) takes five on the lawn and attracts attention.

# From Hudson Bay's Shores To Rarotonga



Carco is a familiar sight over White Rock, Los Alamos' booming residential suburb.

That the world's shortest airline is also one of the safest is testified to by an AEC Award of Honor recently presented to Carco Air Service in recognition of its accident-free performance from 1951 through 1965.

Not all of the 83,620 flights, carrying 391,271 passengers a total of 17,309,469 miles in the period covered by the award, were between Los Alamos and Albuquerque, however. The airline, under contract to the AEC since 1948, not only serves as the town's only commercial air connection with the outside world, but it also provides the Laboratory with special passenger and cargo service to points elsewhere in the United States and even overseas.

A few weeks ago Carco flew several LASL passengers to Fort Churchill on the shores of Hudson Bay and back. In May, 1964, Carco assisted LASL's solar eclipse expedition on Rarotonga in the Cook Islands. The nearest a commercial airliner flies to Rarotonga—where LASL scientists carried out a series of rocket launchings for atmospheric studies of the eclipse — is American Samoa, 800 miles from Rarotonga. A weekly flight of an "island-hopping" DC-3 to Rarotonga was not sufficient for the requirements of the scientists.

So a Carco plane flew out to the Islands from Albuquerque and airlifted the personnel and equipment—in two shuttle trips—from American Samoa to Rarotonga. Then, at the end of the tests, Carco hauled the scientists and their equipment back to American Samoa for a commercial flight home.

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HAROLD ARGO, P-4, photographed the arrival of a Carco C-54 on Rarotonga last year.

## Carco . . .

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Clark Carr, president of Carco, has been flying since 1927, and began commercial flight operations in 1928. In mid-1939, Carr joined with the late William P. Cutter in the formation of Cutter-Carr Flying Service.

In 1947, he proposed the establishment of the Los Alamos air service. In September of that year Carr formed Carco Air Service and started his contract with the AEC in 1948.

Since 1947, Carco has flown more than 175,000 hours, transported more than 100,000,000 passenger miles and has moved by air more than 7,500,000 tons of freight.

Carco has been labeled the "world's shortest scheduled airline," and the airline which carries "more brains per mile" than any other. It has hauled world-renowned scientists, politicians, royalty, government leaders and top military men in the past two decades.

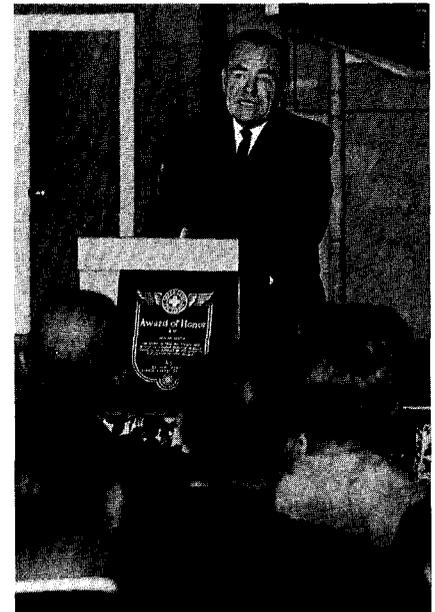
It has also been called the only way you can fly by Carr.

Carco has always placed heavy emphasis on safety, the firm's president said. He noted the filing of flight plans is mandatory and that flights between The Hill and Albuquerque are under continuous Carco radio control.

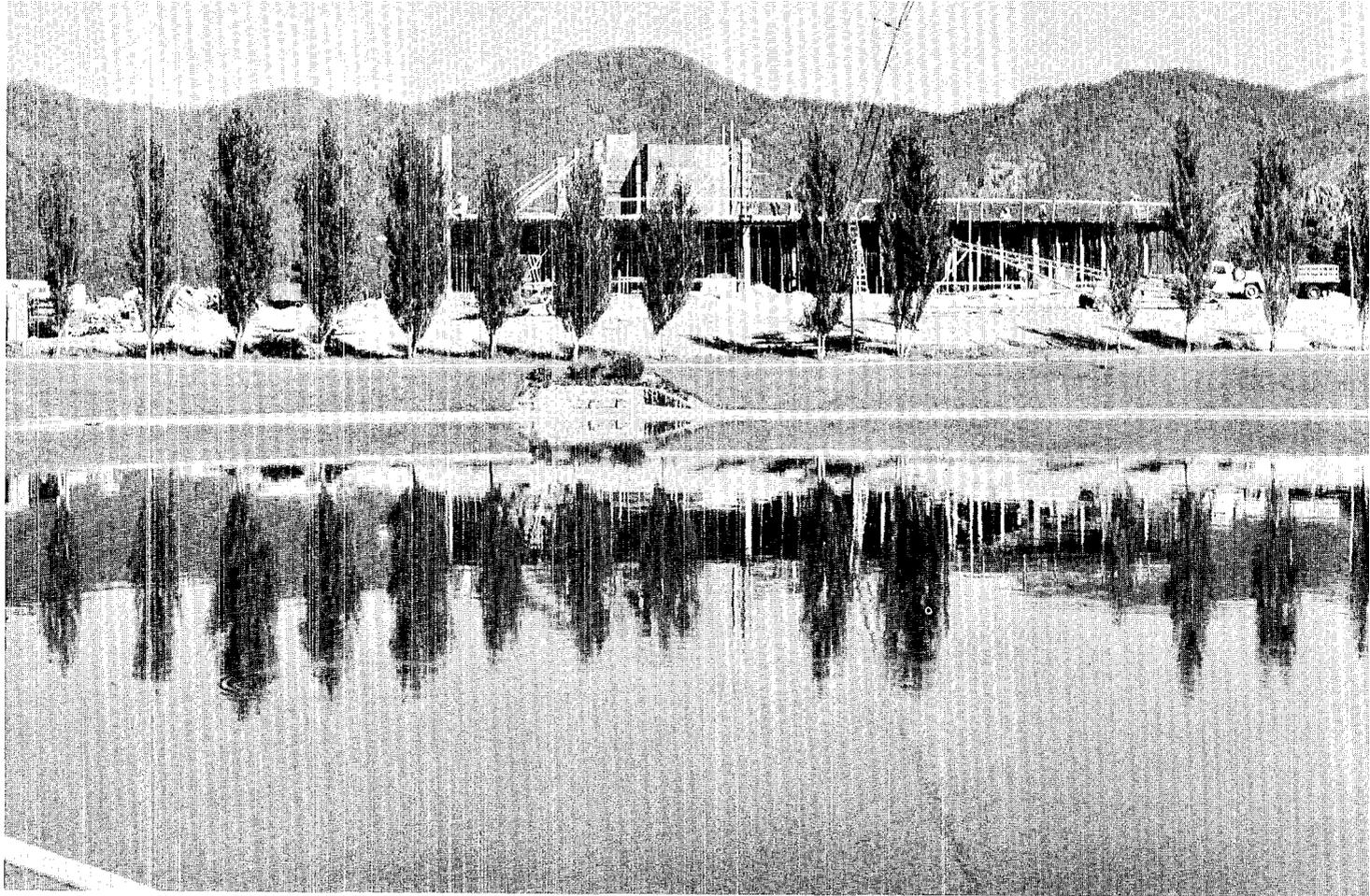
Also each of Carco's pilots must have a minimum of 4,000 flying hours, as stipulated in the AEC contract. However, Carco's pilots have rung up a total of 374,915 hours with an average of 15,621 hours per pilot, Carr said.

Carco operates 17 aircraft for the AEC, including an AEC-owned Douglas C-54 and seven AEC-owned C-47's.

The latest addition to Carco's fleet are two Douglas C-47's obtained from the U.S. Air Force in 1964 to meet the increased airlift requirement in the Las Vegas, Nevada, area. Other Carco planes are a D-18 twin-engine Beechcraft, five twin-engine Beechcraft Bonanzas and three single-engine Bonanzas.



Carco's Award of Honor shines from rostrum as Clark Carr expresses appreciation for safety recognition.



Construction of the new Los Alamos County Municipal Building, adjacent to Ashley Pond, is proceeding rapidly.

# TRANSFER-- new look for THE HILL

The program to transfer the community of Los Alamos from federal to local government is proceeding about as expected, according to AEC Deputy Area Manager Herman Roser.

With few exceptions—mainly in the areas of police and health—the tentative deadlines laid down by the AEC in a community-wide conference in November, 1964, have been met.

Reflecting on progress made to date, Roser noted that the necessary preliminary steps for the transfer were accomplished in 1965 and added a number of giant steps to transfer the community have already been taken.

The municipal operations of Los Alamos have been placed under contract with the county by the AEC, Roser said, and the operation of the utilities were placed under contract on July 1 of this year.

The actual transfer to the county of the municipal operations and utilities is set for July 1, 1967. However it is felt the county can receive valuable experience by operating the county's affairs under contract before actually assuming full responsibility.

Roser said the facilities were being operated by the

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Widening and improving of Trinity Drive, which was part of the disposal package, is essentially complete.

## Transfer . . .

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county under short term contract at this time—instead of by transfer of title—because under the law the AEC's 10-year period of financial assistance to the county starts when title is transferred. And the type of financial support now being given under section 81 of the Community Transfer Act has to stop at that point.

It was initially expected the operations of the police and health departments would be placed under contract with the county on July 1, 1966. But it was later decided to hold off on this and the operating of the police and health departments will be assumed by the county on July 1, 1967.

"This was mainly because they are federal employees," Roser said, "and it is not as easy to work out the transfer as it is when non-federal employees are involved." The county and the AEC agreed to this delay, he added.

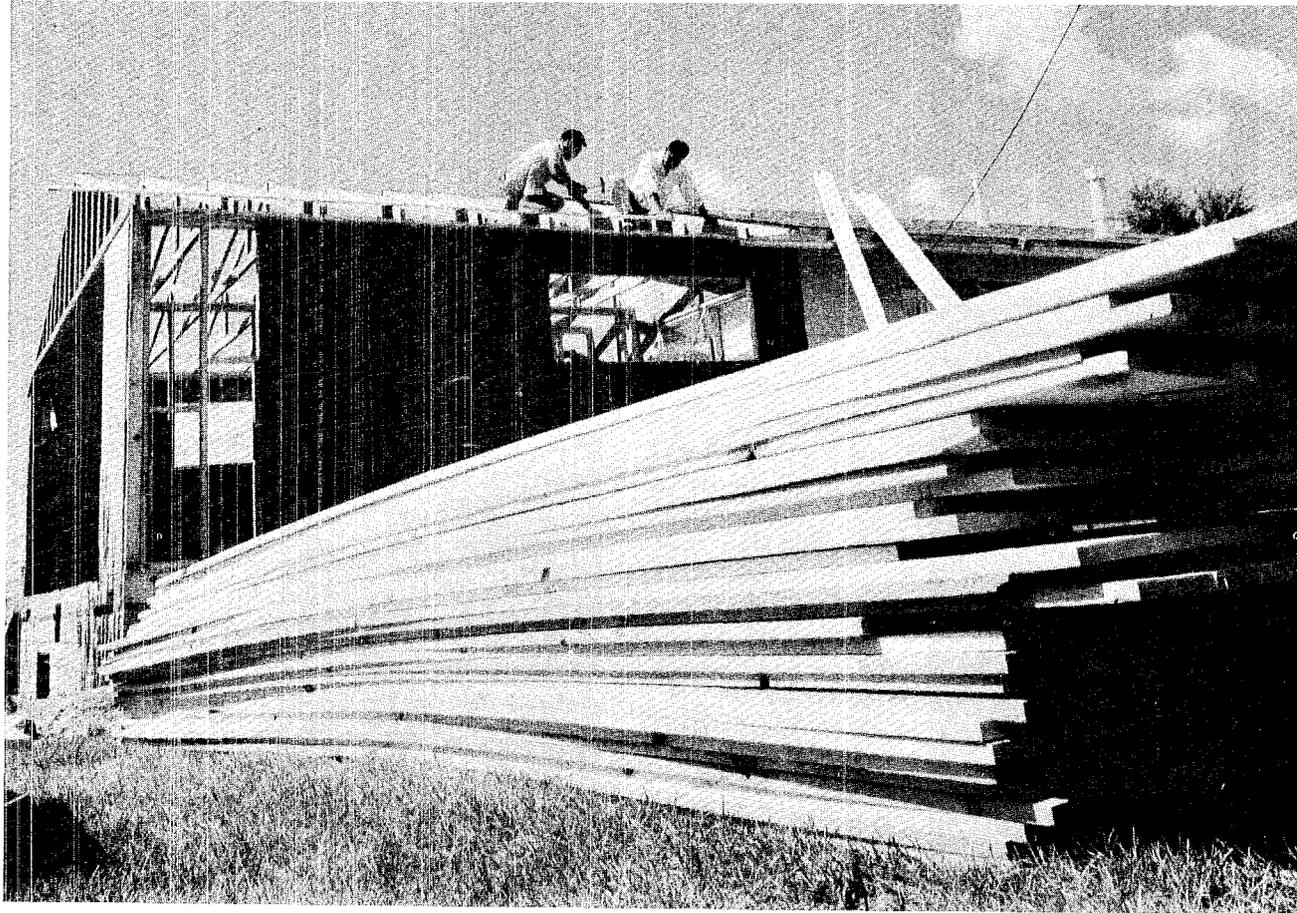
Vacancies occurring within the police department now are being filled as "county employees" and not as federal employees.

The operation of the schools was transferred to the Los Alamos County Board of Education Trustees on July 1. There are some construction projects currently being completed on the schools, Roser said, and on these the transfer will be held up until the project is completed. However this should not require more than 30 days and all the schools will be transferred by the start of the 1966-67 school year.

The first real estate sale was made late last year. As of the end of July, a total of 1,175 residential sales had been made. These included 945 residential single family, 153 non-split duplexes, 50 split duplexes and 27 vacant lots without buildings. To date every occupant has exercised his priority.

No sales have been made for commercial establishments or for non-profit organizations such as churches, Roser said.

In regard to removal of the Sundt apartments, Roser said all were vacated by December, 1965. All have been sold—the last sale was held last month—and many have been removed. He said he expected



Spring weather and pride of ownership have created a rash of home modernization work on The Hill.



Charles C. Campbell, area manager for the AEC in Los Alamos, signed the papers last month transferring the schools to the county. Looking on is Robert G. Shreffler, W-DO, school board president.

all would be removed from the sites by the end of the current calendar year.

The AEC has initiated a "non-assignment" policy to the Denver Steel houses in the Eastern area. The first 6 of the 50 in the area will go to the Navajo Tribal Council which claimed them as another federal agency. These will be moved to Gallup for use by the Navajo tribe. Other government agencies are also expected to claim the Denver Steels for their use.

Roser emphasized the disposal of the Denver Steel houses was being conducted on an attrition basis and no one was being ejected from his home.

The construction authorized under the disposal act is in the final phases, Roser said, and most of the projects are being completed now. He listed these as: (1) School expansion in final phase; (2) Both Trinity and Diamond Drive widening projects are essentially complete; (3) County Municipal Building under construction; (4) The last portion of the utilities rehabilitation project is under contract and is expected to be completed within 12 months.



honey on the hill

# Barranca Bees

## Intrigue

## Touring Tots

Bee keeping is a honey of a hobby for Dan Jones, GMX-3. Here he removes brood frame from hive to show visitors from Mrs. Bertram Heil's Barranca Mesa Brownie troop.

"Nurse bees" care for eggs (in open holes) and larvae (in sealed holes) on the brood frame.





(Above) Smoker is used to quiet the bees. Before their visit, the Brownies had made head protectors by decorating paper sacks.

Photo Story By  
**BILL JACK RODGERS**

(Below) Extracted honey comes from this kind of frame which fits into a large "super."



# Simple Method Transfers Heat From Here . . . To There

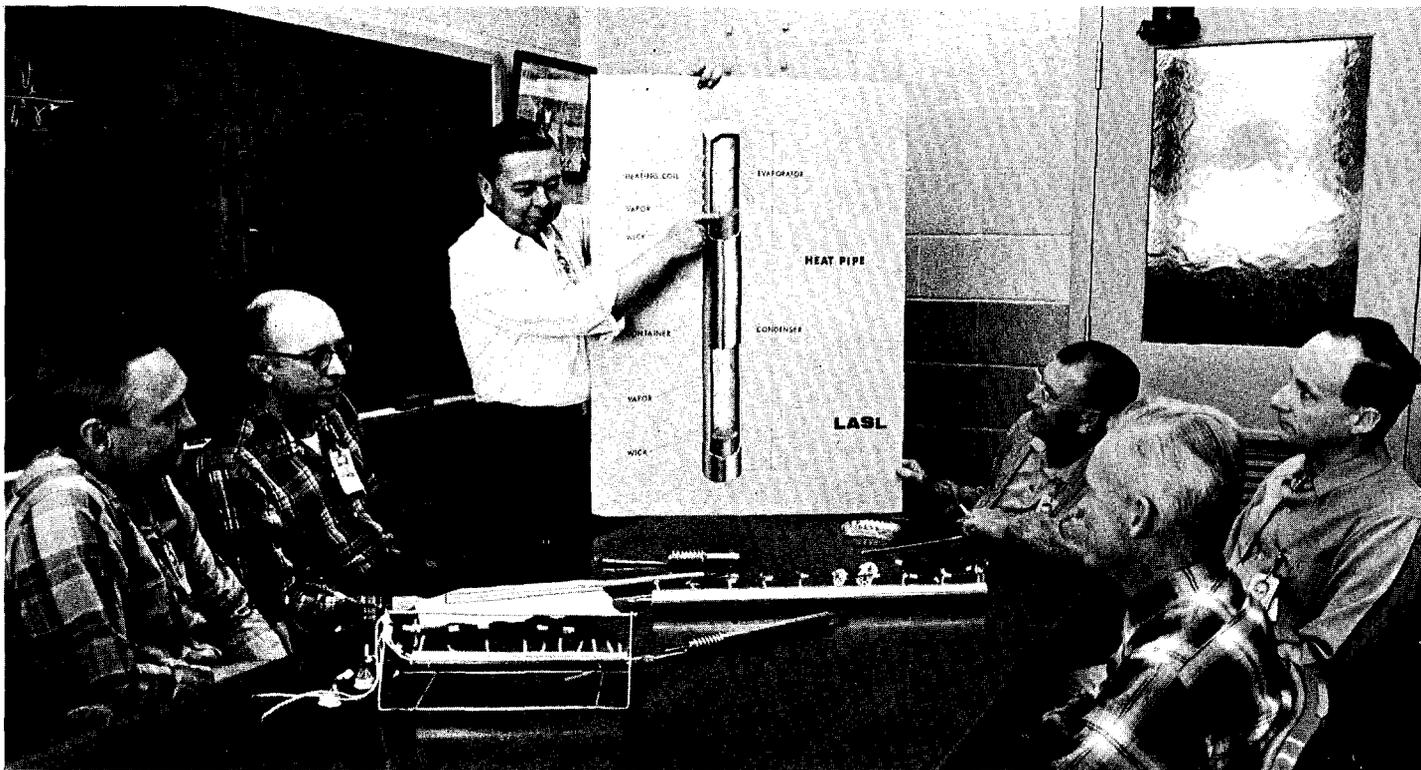
LASL's newest contribution to space research is a novel device which promises a simple, lightweight way both to heat and cool space vehicles. The device, known as a heat pipe, is the invention of N-5 Group Leader George Grover.

The need to effectively move heat from one place to another is known to all of us. We most frequently think of it in terms of personal comfort, e. g., heating our homes in winter and cooling them in summer. But we are also aware that an automobile engine must have some means of dissipating excess heat, lest a disastrous failure, such as a cracked block, occur.

These are but two familiar examples of the need—either for necessity or convenience—to control and move heat. More frequently than not, the production of heat is accomplished by the need to move it.

The most common method of moving heat is to circulate a fluid—either liquid or gaseous—through a hot zone to a cooler region. The fluid picks up heat in the hot zone and deposits it in the cooler area. Normally, the fluid is circulated by pumps as, for example, the water pump in an automobile engine, but there are some applications where gravity can provide the pumping action.

A space vehicle or satellite, however, presents some special problems when it comes to controlling



N-5's heat pipe experimenters, Joseph Kemme, William Ranken, Ernest Salmi, George Grover, George F. Erickson and John Deverall check cutaway drawing of pipe with components.

or transporting heat. For example, any surface facing the sun can reach uncomfortably high temperatures, while those facing away from it radiate heat. This can set up a large temperature differential that can easily cause failure of electronic components within the satellite.

One way of preventing this temperature differential is to have the satellite rotate regularly, thus presenting different surfaces to the sun's heating at standard intervals. Unfortunately, however, for many space experiments satellites must maintain a fixed orientation with respect to the sun.

Pumps can be used to distribute heat around a satellite, but there is a concern about the reliability of such systems. The probability of failure of the pumps must be extremely low.

This is where the heat pipe comes in. It has no moving parts. Instead of pumps, capillary action is used to move a working fluid from one place to another. The action is extremely simple but at the same time very effective.

A sievelike layer of porous ceramic or several layers of porous ceramic or several layers of fine wire screen covers the entire surface of the heat pipe. This porous layer is filled with a working fluid which has a substantial vapor pressure at the desired operating temperature.

When heat is applied to one portion of the heat pipe, vaporization of the working fluid occurs. The

vapor fills the entire pipe, condensing on any cooler walls where the latent heat of vaporization is released. Normally, the pressure drop which drives the vapor to the non-heated sections of the pipe is very small and only a very small difference in wall temperature exists between the heated and cooled portions of the heat pipe. Thus the heat is moved with only a very small temperature drop—essentially isothermally.

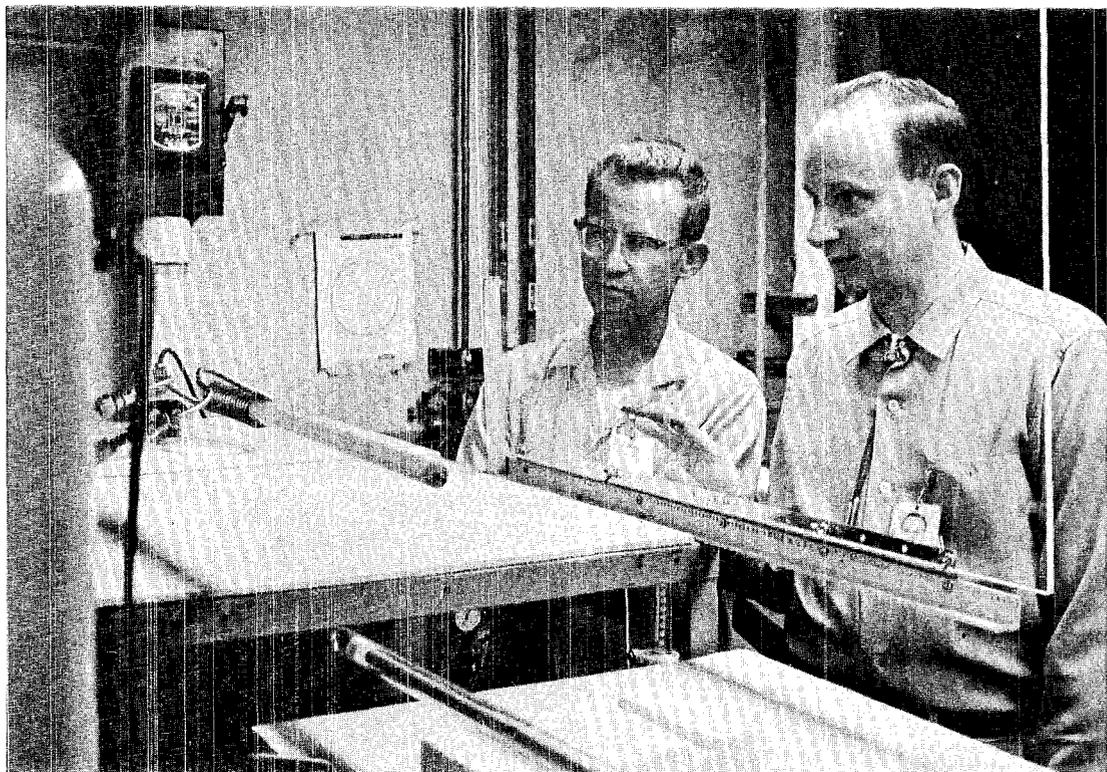
Capillary action forces the working fluid which condenses into the porous layer on the internal wall to move back into the heated region of the pipe where it once again evaporates and begins a new cycle. No mechanical pumps or gravity forces are needed. Yet we have a system of simple construction that transfers heat most effectively.

With the proper working fluid, the heat pipe will work at any temperature from far below freezing to above 3500°F. Water works very well at room temperature, but at very high temperatures molten metals must be used.

Although the most obvious space application of heat pipes is the control of heating within satellites, they also appear useful for electric power generation in space.

In this application, heat pipes would be used to transfer thermal energy from a heat source such as a reactor or highly radioactive isotope to thermio-

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Edward Keddy and George Erickson survey experimental setup from protection of safety shield.

# Heat Pipes . . .

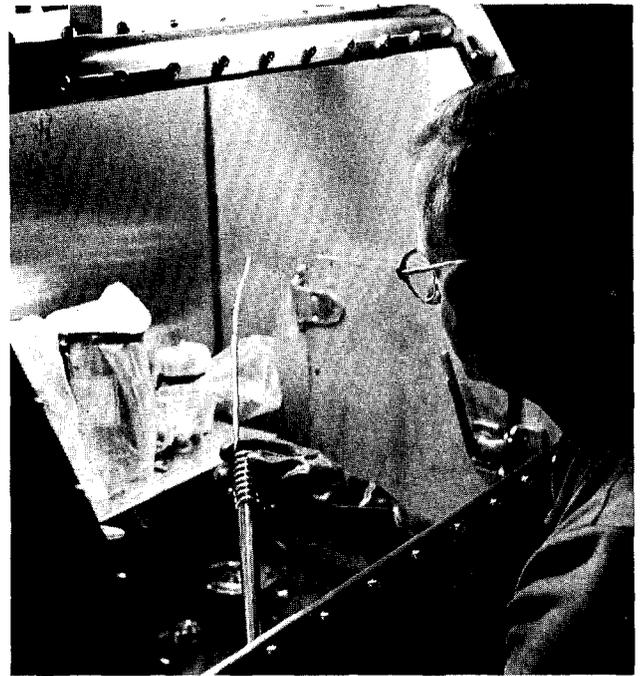
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nic devices for direct conversion into electricity.

Because the heat pipe is theoretically not dependent on gravity, it should be able to operate efficiently in the weightless environment of space. A program to determine the operational characteristics of heat pipes in orbit is now underway. Hopefully, they will be tested for both applications: low temperature pipes for environmental control and high temperature (1000 to 3500°F.) pipes for power generation. Radio Corporation of America is now developing a heat pipe for the latter application which uses molten lithium as the working fluid.

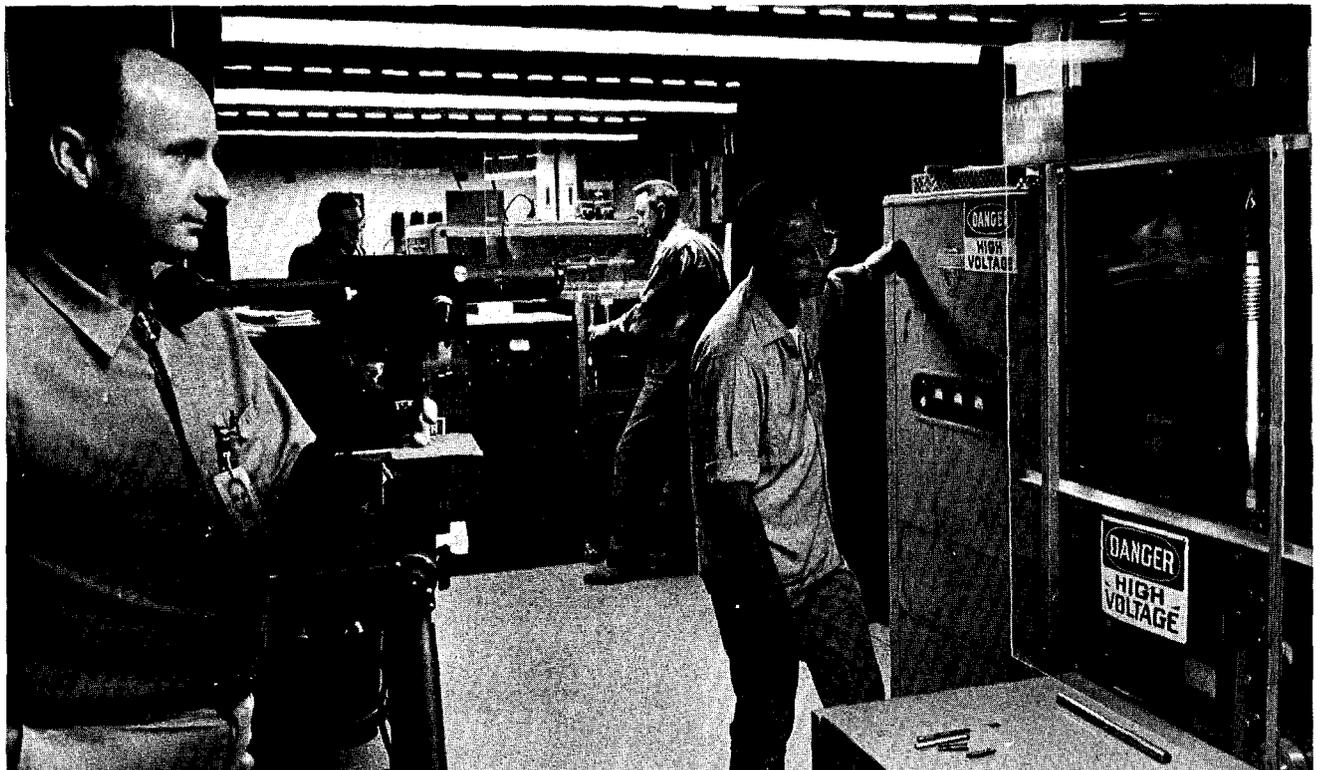
High temperature heat pipes have been undergoing extensive testing and evaluation in the laboratory. Operational lifetimes of many thousands of hours have been established, using water at room temperature and lithium at temperatures up to 2200°F. A heat pipe using silver has been operated for 1000 hours at 3500°F.

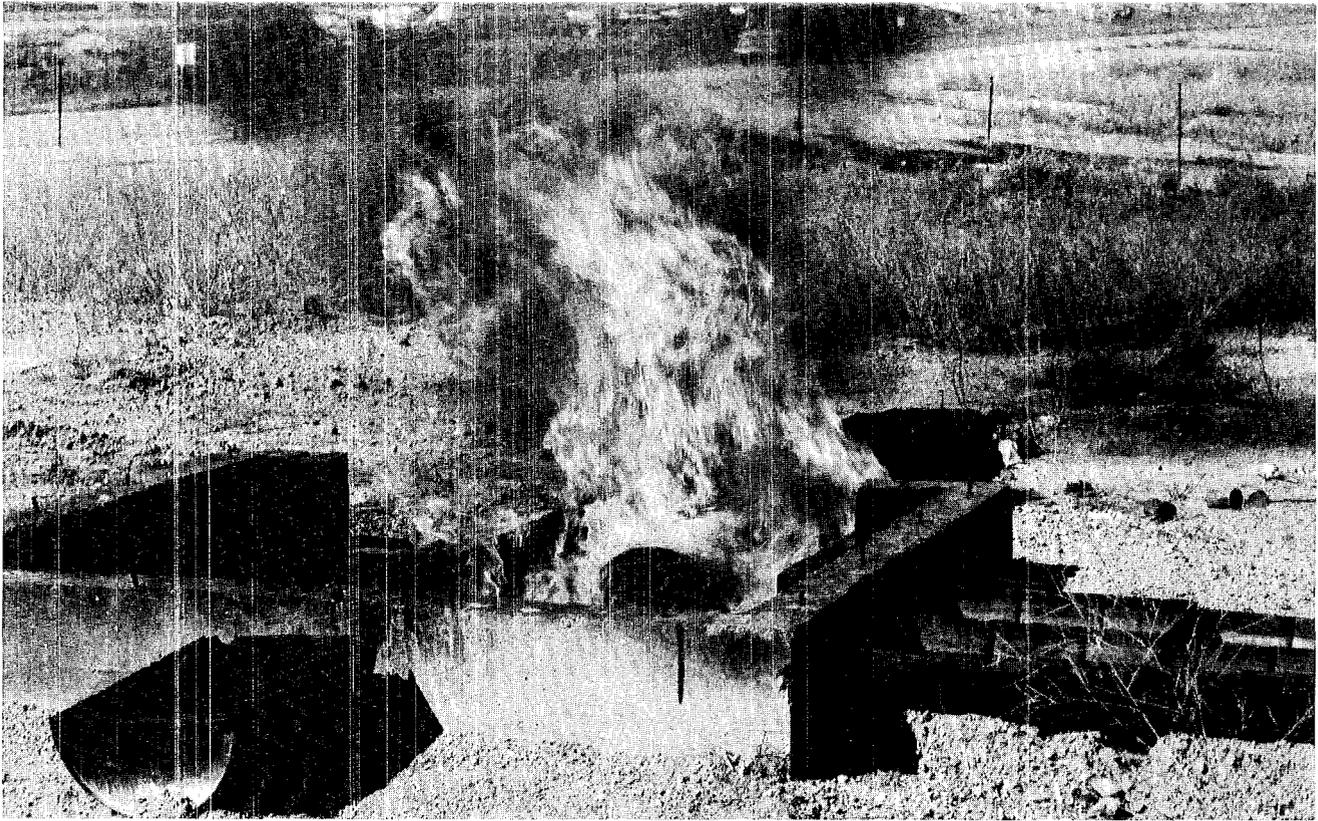
Heat pipes are but the most recent LASL contribution to space research. The Laboratory is the leader in nuclear rocket research; it has had numerous radiation detection devices aboard Ranger satellite probes; it is responsible for the nuclear detection instrumentation aboard six Vela sentry satellites; and it has probed the northern lights.



A. G. Vaughan, N-5 technician, assembles heat pipe in dry box.

George Erickson (left) prepares to examine glowing heat pipe through pyrometer. Two different heat pipes were in operation.





During the series of fire tests on the container, the highest temperature attained without vermiculite was 304°C.

# LASL Container

## Approved

# For Fissile Material

## Transport

Did you know a container to ship fissile radioactive material can be bought at the corner hardware store?

Well not exactly the container, but the parts to assemble the container can be purchased. And for a price of only about \$50.

The container—which has been approved by the Interstate Commerce Commission and the Bureau of Explosives—was a joint effort of two LASL men and is the first of its kind. Horace Noyes, SP-DO traffic manager, was responsible for the design, testing and development of the container. Dave Smith, N-2, calculated the permissible quantities that could be placed in cartons for shipment.

The problem of transporting radioactive materials arose in the 1940's and was mainly in the area of radioactive isotopes transportation. There was little thought given

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## Container . . .

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at this time to regular transporting of fissile radioactive materials because of the restricted application of the field of atomic energy.

Shipping these fissile materials (primarily uranium 233, uranium 235 and plutonium 239) is different than moving other radioactive materials because these materials have the potential of forming a critical configuration. Packaging of other radioactive materials requires only appropriate containment and shielding.

Prior to the development of the Noyes-Smith container, fissile materials could only be shipped under specified conditions such as special courier or special use of a vehicle.

"A huge van could be tied up with a small package of the material," Noyes said.

LASL received a special permit from the ICC to ship fissile materials in controlled quantities by normal transportation means. Initially LASL was the only AEC contractor or licensee permitted to do this and the search began for an inexpensive container which would be acceptable as a standard specification container for shipping these materials.

The Noyes-Smith container was initially tested in 1963, with additional tests in 1965, and approved this year by the Bureau of Explosives, AEC and the ICC.

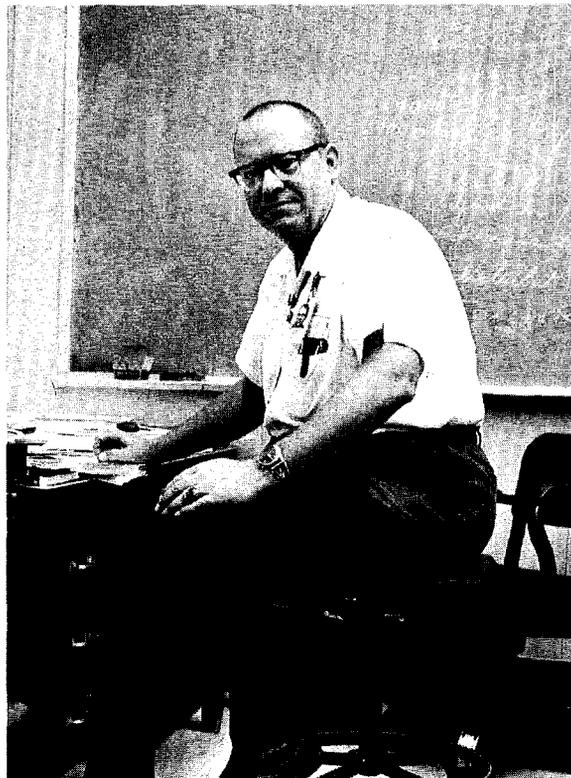
It consists of a 55-gallon steel drum with removable head and an inner container 30 inches long. The cylindrical inner container has a diameter of  $5\frac{1}{4}$  inches with a minimum wall thickness of  $\frac{1}{4}$ -inch.

The inner container is also equipped with four steel spacer rods which provide snug positioning within the steel drum. The void between the inner container and the steel drum is tamped full of vermiculite (expanded mica). Then the fissile material is placed inside the inner container for ship-



Horace Noyes, above, shows approved containers.

Dave Smith, below, calculated permissible quantities.



ment and the outer steel drum is sealed with a bolt-locking ring clamp and a tamper-proof seal.

In 1963, the Supply and Property Department of LASL conducted a series of drop and fire tests on the container. As explained in a report on the tests, the purpose was to develop "an internationally acceptable container for shipment of fissile materials, in nuclearly safe quantities, for shipment via normal transport methods, considering normal transport hazards but with a safety factor of more than 5."

The assembled, sealed container was placed in leaded gasoline for the fire test, which lasted 33 minutes. Temperature indicators sandwiched between two steel plates placed in the inner container showed the highest temperature attained with vermiculite omitted was 304°C.

There was no failure of any portion of the container as a result of the fire test.

In the drop tests, the container was dropped from heights of 4 to 30 feet. The drops were made on a 1¼-inch-thick steel plate secured to a 2-foot-thick concrete slab. The container also passed the drop tests satisfactorily. There were no ruptures of the container and the seals remained intact.

A report on these 1963 tests said: "It is impressive to note that one container withstood all three drop series from 4, 10, and 30 feet."

A representative of the Bureau of Explosives—which is an independent agency sponsored by the American Association of Railroads—witnessed the drop tests. The bureau, which publishes the ICC regulations for transporting dangerous articles, later approved the containers.

Shortly afterwards LASL submitted a proposal to the ICC, Bureau of Explosives and the AEC for the adoption of the container specifications in tariffs.

At this time the AEC raised the question as to variance in displacement of the inner container and

possible loss of spacing if loaded to 100 pounds net weight within the pipe section. The tests had been accomplished with 70 pounds of lead simulating a loaded container.

Therefore, in 1965 Noyes conducted an additional series of tests with weights up to 150 pounds. These again proved the integrity of the package under full loading and severe impacts beyond normal transport accident conditions, even when performed consecutively on one container at twice the scope of accepted criteria.

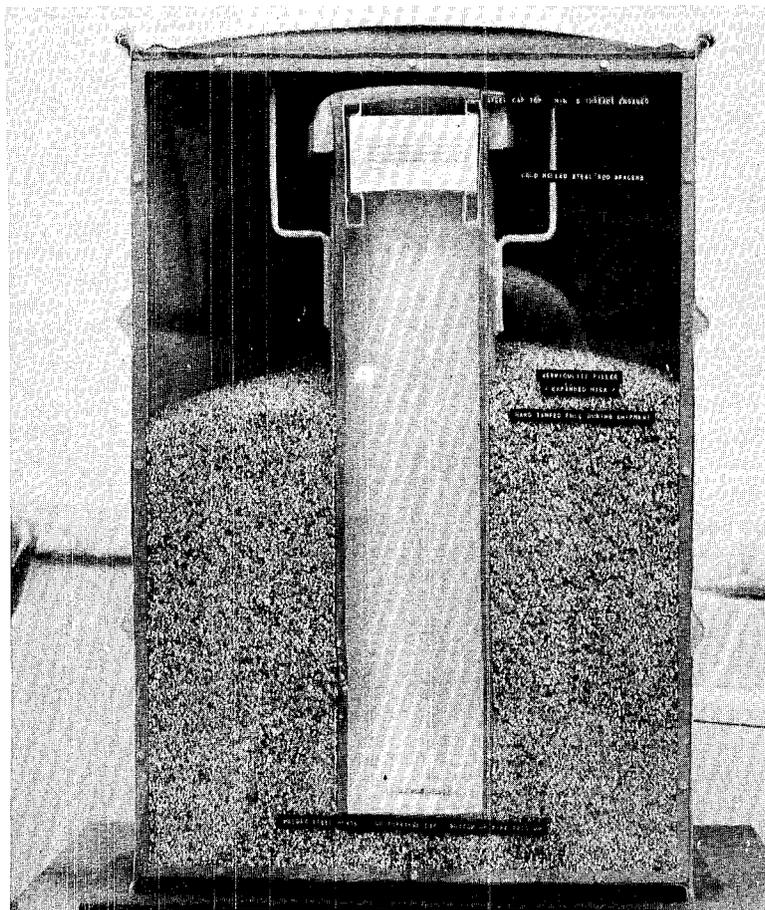
These further tests included drops up to 150 feet for LASL in-

formation. The containers still did not rupture.

Thus, after three years of design, development and tests, the containers were approved effective July 12.

"This is the first fully approved specification container for fissile material," Noyes said. "The good part is that all the materials used in constructing the container are stock items available at most large hardware stores. It can be built for an estimated cost of \$50 to \$60 and is re-usable."

Noyes also pointed out that there are no patents on the container nor any restrictions as to use.



A cut-away view of the container showing the inner container, steel spacer rods and vermiculite filler. This cut-away container is on display at the science museum.

# Spanish Scientist Studies Soil Analysis Methods

By BILL RICHMOND

An unfortunate accident high above the southern coast of Spain early this year has resulted in an international cooperative effort to study soils and vegetation on a unique scale.

Further, one fringe benefit may be improved agricultural practices for the villagers of Palomares, Spain.

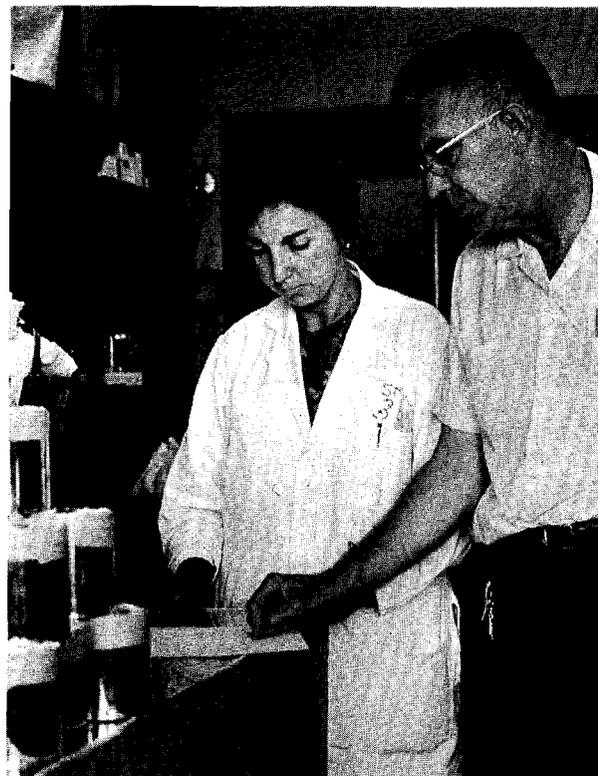
A Spanish scientist has been working at Los Alamos Scientific Laboratory since early July learning techniques and methods which have been developed here for analysis of plutonium in soils and vegetation.

The scientist is Dr. Maria Concepcion Alvarez Ramis, called "Conchita" by her fellow workers at the H-Division facility at TA-50. Dr. Alvarez has a doctorate in biology from the University of Madrid and is associated with the Junta de Energia Nuclear in Spain. This is the Spanish committee for nuclear energy, similar to the Atomic Energy Commission in this country.

The story of Dr. Alvarez' visit to this country goes back more than six months. On Jan. 17, 1966, a KC-135 tanker and a loaded B-52 bomber of the U.S. Air Force exploded during a refueling operation high in the sky over Palomares.

Two hydrogen bombs fell intact—one on land and the other in the Mediterranean. Both were later recovered. However as a result of the accident plutonium and uranium of two others were scattered in the fields near the farming community.

Eric B. Fowler, alternate group leader of H-7 who has been working closely with Dr. Alvarez, said that at the time of the accident the U.S. Army and Air Force cleaned up the "really hot soils." An estimated 1,600 tons of soil were sealed in 55-gallon steel drums and shipped to the AEC's burial ground near Savannah River, South Carolina.



Dr. Alvarez and Eric Fowler, alternate group leader of H-7, check the soil samples received from the village of Palomares, Spain.

Shortly after the accident a program was established for the Spanish scientists to conduct a series of studies. These studies are to include (1) urinalysis of some of the persons in the area, (2) whole body counting of certain persons closest to the point of impact, and, (3) a soil, vegetation and water surveillance program.

It is the latter study which concerns Dr. Alvarez.

The Junta de Energia Nuclear asked that someone from their laboratory be allowed to visit LASL and observe how soil and vegetation tests are conducted here.

This was Dr. Alvarez who is well qualified for the responsibility. She is primarily concerned with problems of radioactive contamination in her country and --with her staff--monitors rivers, uranium mines, animals and plants for contamination.

Dr. Alvarez, who speaks halting English but is easily understood, noted that Spain has the largest uranium mines in Europe. "And there has never been a case of illness or death in Spain because of exposure," she adds.

Four boxes of soil and vegetation samples and one box of urine samples were shipped to LASL from Palomares. An equal number of samples were kept in Spain. Dr. Alvarez will work at Los Alamos on the samples here and when she returns to Spain will work on the replicates in Madrid. She will also instruct her staff members in Spain on methods of conducting the tests.

In addition to analyzing the soil for plutonium and uranium, there are a number of benefits expected to be realized from these tests. The Palomares area is very dry and farming is by irrigation. The tests will include a complete chemical analysis of the soil which may suggest methods to improve its productivity.

The principal crops of the area are beans, tomatoes, potatoes, corn and alfalfa, Dr. Alvarez says. The tomatoes and beans are the money crop while the rest is consumed locally.

"The tomatoes are to be planted around Palomares in August and harvested in November or December," Fowler pointed out. "These tomatoes will go into the market so it is important to make sure they are acceptable."

Dr. Alvarez added that this is a small-plot farming area and the villagers are dependent on the cash crops for income. She said she would make tests on samples of the fruit and vegetables in September or October before they were placed on the market.

Soil and vegetation tests are part of the regular program at TA-50, Fowler said. It includes (1) research into the uptake of nuclides by plants, (2) fixation of radioactive nuclides in soils and (3) translocation of radioactive nuclides into sources of ground water.

While awaiting the arrival of the samples--which were delayed by customs and the airline strike--the



Dr. Maria Concepcion Alvarez Ramis ("Conchita") conducts one of numerous tests which were run on soil from her native country of Spain.

Waste Treatment Group tried to reproduce what possibly happened that day at Palomares by "spiking the soil." That is, quantities of plutonium and uranium were injected into soil samples which had been obtained earlier from the Palomares area.

Dr. Alvarez has been in a number of European countries and believes, not unexpectedly, that LASL has better instrumentation and more facilities than she had found elsewhere. But considering the length of time Los Alamos has been engaged in studies of atomic energy and its by-products, this is not surprising.

Contrary to a belief held by many, native New Mexicans REALLY speak the language of Castilian Spanish, Dr. Alvarez says. "They speak the Spanish of 100 or 200 years ago," she said, "but it is the true Castilian Spanish."

She said she had no trouble in conversing with the native New Mexicans who speak the language of her ancestors--people who owned this territory when Los Alamos was just another mesa.

# The Technical Side

## **Symposium on Organic Scintillators, Argonne National Laboratory, Argonne, Ill., June 20-22:**

"The Synthesis and Evaluation of some New Trans-1, 2-Diarylethylenes as Liquid Scintillators" by G. H. Daub, UNM, F. N. Hayes, H-4, J. L. Schornick, D. W. Holty, and L. G. Ionescu, all UNM.

## **Gordon Research Conference in Nuclear Chemistry, New London, N.H., June 20-24:**

"Determination of Small Nuclear-State Widths in the Continuum" by Peter Fessenden, P-12. (Invited Paper)

## **American Society for Testing Material Meeting, ASME, Atlantic City, N.J., June 26-30:**

"Hydrogen Disposal at Nuclear Rocket Development Station" by F. J. Edeskuty, CMF-9. (Invited paper)

## **Third International Congress of Radiation Research, Cortina d'Ampezzo, Belluno, Italy, June 26-July 3:**

"Heritable Radiation Effects on Mouse Body and Organ Weights, Fat Deposition, Cellular Enzymes, and Blood" by R. R. J. Chaffee, Univ. of Missouri, and J. F. Spaulding, H-4.

"Behavioral Evaluation of Rhesus Monkeys Exposed to Gamma Radiation" by D. N. Farrer, Holloman, and J. F. Spaulding, H-4.

## **Presentation at Gordon Research Conference on High-Temperature Chemistry, Tilton, N.H., July 24-29:**

"A Monte Carlo Computer Analysis of Pressure Gradients Within a Knudsen Cell" by J. W. Ward, CMF-5.

"Preliminary Results on the Vapor Pressure of Uranium" by W. M. Olson, CMF-5.

## **Eleventh Annual Meeting, Health Physics Society, Houston, Texas, June 27-30:**

"Effect of Reactivity Addition Rate and of Weak Neutron Source on the Fission Yield of Uranium Solutions" by D. E. Hankins, H-1.

"Effect of Ferric Ferrocyanide (Prussian Blue) on the Retention of Cesium-137 by Rats" by C. R. Richmond and D. E. Bunde, both H-4.

"Radiation Survey of a Nuclear Rocket-Engine Critical Assembly" by R. A. Pederson, H-1.

"Program and Procedures for Control of Radioactive Wastes at Los Alamos" by L. A. Emelity and C. W. Christenson, both H-7.

"The Response of Selected Neutron Monitoring Instruments to Several Types of Neutron Sources" by D. E. Hankins, H-1.

"Criticality Accidents" by H. C. Paxton, N-2. (Invited Paper)

"Some (Second) Thoughts on Tritium Contamination" by D. O. Coffin, W-3.

## **Fluorine Symposium of the Inorganic Division of the American Chemical Society, Ann Arbor, Mich., June 27-28:**

"Fluorides of the Actinides" by L. B. Asprey, CMF-4. (Invited Paper)

## **Seventh General Assembly, International Congress and Symposium, Moscow, USSR, July 12-19:**

"The Crystal Structure of  $Pu_2Zn_9$ " by A. C. Larson and D. T. Cromer, both CMF-5.

## **Presentation at Lens Design Conference, University of Rochester, Rochester, N.Y., July 5-8:**

"Treatment of Singularities Which Occur in the Lens Design Problem" by C. A. Lehman, T-5.

## **Space Science Seminar, George C. Marshall Space Flight Center, Huntsville, Ala., July 21:**

"The Interaction of a Nuclear Explosion at High Altitude With the Earth's Magnetic Field" by H. W. Hoerlin, J-10. (Invited paper)

## **Conference on Recent Progress in Nuclear Physics with Tandems, Heidelberg, Germany, July 18-21:**

"Studies of (d, pf) and (t, pf) Reactions on Plutonium Isotopes" by H. C. Britt, P-DOR, Ross W. Newsome, Jr. and R. H. Stokes, both P-12.

"(t, He<sup>4</sup>) Reaction on Some Medium-Mass Nuclei" by A. G. Blair and D. D. Armstrong, both P-12.

## **Colloquium talks, Kernforschungszentrum, Karlsruhe, Germany, July 22, and at CEN de Saclay, Saclay, France, July 25:**

"Studies of Transition States in Fissioning Nuclei Using Direct Reaction Correlations" by H. C. Britt, P-DOR.

## **Second Annual Summer Conference, New Mexico Academy of Science, LASL, July 22-23:**

"Radiation Performance Tests on Monkeys and Genetic Effects in Mice" by J. F. Spaulding, H-4.

"Synthetic Polynucleotides and Their Use as Biological Information Transfer Templates" by F. N. Hayes, H-4.

"Biochemical Events Typical of Specific Segments of the Cellular Life Cycle" by D. F. Petersen, H-4.

"The Destruction of Superfluidity in Liquid Helium" by W. E. Keller, CMF-9.

"The Need to Know" by J. V. Young, PUB—Evening Lecture.

"Cryogenic Aspects of the Rover Program" by F. J. Edeskuty, CMF-9.

## **International Symposium on the "Alkali Metals," University of Nottingham, England, July 19-21:**

"Determination of the Solubility of Oxygen in Sodium Using the Vacuum Distillation Analytical Technique" by V. J. Rutkauskas, K-2.

Seminar, University of Colorado, Boulder, Col., July 29:

"LALA-A Numerical Calculation Used for Determining Fields and Frequencies for Cylindrically Symmetric Linear Accelerator Cavities" by H. C. Hoyt, T-5. (Invited Paper)

American Astronomical Society Meeting, Ithaca, N.Y., July 25-28:

"Diminution of Cometary Heads During Perihelion Passage" by W. F. Huebner, T-D0.

## What's Doing

All times listed are Mountain Daylight time

**OUTDOOR ASSOCIATION:** No charge, open to the public. Contact leader for information regarding specific hikes.

Sunday, August 14, Spirit Lake from Santa Fe Ski Basin, 10 miles, 2500 feet—Mike Williams, leader.

Thursday, August 18, night hike—Ken Ewing, leader.

Saturday and Sunday, August 20-21, Phantom Terrace. Exploratory Colorado, two-day, some backpack—Liz Gittings, leader.

Thursday, August 25, night hike—Liz Gittings, leader.

Saturday, August 27, Truchas Peaks from Trampas Lakes—Bob Skaggs, leader.

Tuesday, August 30, night hike—Mike Williams, leader.

Thursday, September 1, meeting at home of Terry Gibbs, 350 Camino Encantado.

Thursday, September 8, night hike—Bob Skaggs, leader.

Saturday, September 10, unnamed lake, near Hopewell (exploratory)—Marlene McKee, leader.

**SANTA FE OPERA:** Tickets available at Los Alamos Building & Loan, Monday, Wednesday and Friday, 10 a.m. to 1 p.m. Curtain time 9:30 p.m. MDT.

Wednesday, August 17—"Tosca."

Thursday, August 18—"Cinderella."

Friday, August 19—"Wozzeck."

Saturday, August 20—"Rigoletto."

Wednesday, August 24—"Wozzeck."

Thursday, August 25—"Tosca."

Friday, August 26—"Cinderella."

Saturday, August 27—"Rigoletto."

**LOS ALAMOS COUNTY FAIR:** Saturday and Sunday, August 27 and 28—Rodeo, Parade, Exhibits, Dance, Horse Show, and Barbeque.

**GEOLOGICAL SOCIETY:** No charge, open to the public. Contact leader for information about field trips.

Saturday & Sunday, August 13 & 14, Field Trip—four areas near Salida, Colorado—Terry Wallace, leader.

Tuesday, August 16, meeting at 7 p.m. at the High School Little Theater—speaker and exhibit of rockhound finds and lapidary work—Leonard Treiman, program chairman.



### Man Loses To Horse By 58 Minutes

The 14-mile Frijoles Canyon Trail race between a man and a horse was won by the horse, Thunder, who covered the distance in an hour and 26 minutes. The man, Jacob J. Wechsler, M-4 technician who had once beaten a horse in a shorter race, came in 58 minutes behind Thunder. The contest over the rugged terrain was not without its mishaps. Wechsler fell into a creek within two miles of the finish line—the stone bridge near Frijoles Lodge—and both contestants encountered a bull along the route.

### President Signs Atomic Control Bill

President Truman yesterday signed the Atomic Control Bill, which provides for a 5-man civilian commission with almost complete authority over domestic development of Atomic Energy. It will be the commission's responsibility to channel atomic force into peacetime uses for benefit of the United States and mankind as a whole.

### Water Boiler Early Step Toward Power Production

Los Alamos scientists have developed an instrument which is an early step toward that dream of using atomic energy for peacetime power production. The instrument is the "Water Boiler," a unique type of neutron chain reactor.

According to L. D. P. King, one of the original group who built it, the Water Boiler's unique features are its small size and the fact that it does not use normal uranium as do the other piles now in existence. In the Los Alamos device, "enriched uranium" is used.

### Los Alamos Called The Most Important Small Town

Los Alamos is called "the most important small town in America" in an article written for The Nation magazine by Alden Stevens. Stevens wrote: "The little town on the Pajarito Plateau has time now to build permanent houses, to put in a more reliable water supply, to build a broader and shorter highway to Santa Fe. It will be a calmer and more settled place—but it will always be the town that changed everything, the town that invented and fabricated the Atomic Bomb, the place that taught individualistic scientists to work together to take an active part in the management of the world."

### Scientists Gather For Physics Parley

62 of the nation's leading physicists will be in Los Alamos this week for a 5-day conference dealing with basic nuclear physics for the Los Alamos Scientific Laboratory. For many of the scientists, the conference marks a return to the project where they helped develop the first atomic bomb. Early arrivals were Enrico Fermi, Edward Teller, C. O. Critchfield, G. R. Zacharias, E. P. Wigner, and J. R. Oppenheimer, who was the Laboratory's first director.

# new hires

Jane C. Roberson, Los Alamos, T-7 (Rehire).

Alan J. Keeler, Espanola, N.M., SP-3 (Short Term).

Mary A. Cherrhomes, Los Alamos, PER-3 (Rehire).

Donald J. Liska, Seattle, Wash., MP-2.

Walter F. Stewart, Las Cruces, N.M., GMX-3.

Leo M. Kelly, Albuquerque, N.M., MP-3 (Rehire).

Reid E. Zirkle, Klamath Falls, Oregon, ENG-3.

Mary E. Pretzel, Los Alamos, CMB-3.

Paul F. Mullaney, Olean, N.Y., H-4.

Kenneth D. Munkres, Stanford, Calif., H-4.

John C. Martin, Stillwater, Okla., P-DOR.

Bobby L. Hartway, Boulder, Colorado, ENG-1.

Betty J. Chastain, Los Alamos, ENG-5.

Jose M. Valdez, Los Alamos, ENG-5.

Lillian J. Heeley, Santa Fe, ENG-5 (Casual-Rehire).

Donelle C. Hawthorne, Santa Fe, ENG-5.

Richard L. Kennedy, Los Alamos, ENG-5.

Jessie M. Delph, Santa Fe, ENG-5.

Betty S. Welch, Los Alamos, ENG-5.

Maudie H. Holt, Los Alamos, ENG-5.

Helen M. Holleman, Los Alamos, ENG-5.

Carmel A. Quintana, Los Alamos, ENG-5.

Patsy G. Johns, Los Alamos, ENG-5 (Rehire).

Kenneth P. Kraker, Los Alamos, ENG-5.

Margie M. Myers, Los Alamos, ENG-5 (Rehire).

Burton J. Montague, Los Alamos, ENG-5.

Earl F. Wise, Los Alamos, ENG-5.

Juanita Y. Fausson, Los Alamos, ENG-5 (Rehire-Casual).

Nadine L. Whittemore, Los Alamos, ENG-5 (Casual).

Fabiola D. Teter, Los Alamos, ENG-5.

William E. Cramer, Los Alamos, ENG-5.

Marguerita H. Cislighi, Los Alamos, ENG-5 (Rehire).

Dolly M. McClellan, Los Alamos, D-2.

Charles F. Hammer, Alamogordo, N.M., P-16.

Rudolf P. Severns, Hollywood, Calif., MP-2.

Millard T. Butler, Dorris, Calif., H-4.

Marion H. Davis, Los Alamos, CMB-7.

Reva M. Castleberry, Los Alamos, H-1.

Jimmy D. Laux, Muleshoe, Texas, GMX-3.

Manuel F. Romero, Santa Fe, SP-4.

John A. Sullivan, Ft. Collins, Colorado, K-3 (Rehire).

Phillip G. Young, Jr., Canberra, Australia, P-12.

Ruth G. Mullins, Los Alamos, J-1 (Rehire-Casual).

Daniel S. Metzger, Columbus, Ohio, J-14 (Rehire).

Phyllis L. Neal, Los Alamos, M&R.

Robert E. Gillis, Greenfield, Mass., MP-3.

Sue L. Wilkerson, Espanola, M&R.

Norris T. Bell, Klamath Falls, Oregon, GMX-11.

Donald R. Surette, Gastonia, N.C., GMX-11.

Harlan W. Wellnitz, Milwaukee, Wisc., WSD.

James E. Swansen, Klamath Falls, Oregon, K-1.

Ronald L. Hoffmaster, Klamath Falls, Oregon, GMX-3.

Gordon B. Newstrom, Klamath Falls, Oregon, P-1.

Patricia A. Bramlett, Los Alamos, W-1.

Harry G. Hecht, Lubbock, Texas, CMF-2.

John H. Acomb, Sandusky, Ohio, J-14.

Paul Medina, Chimayo, SD-1.

Francis K. Saffle, Las Vegas, Nev., J-5.

Joseph DuPuy Spencer, Las Vegas, Nev., J-17.

Robert A. Spotts, Las Vegas, Nev., J-9.

Willie M. Helm, Los Alamos, ENG-5.

John A. Gill, Las Vegas, Nev., J-9.

Delmar L. Carter, Las Vegas, Nev., J-9.

Charles E. Daugherty, Las Vegas, Nev., J-9.

Fredrick A. Siedentopf, Las Vegas, Nev., J-9.

John F. O'Sullivan, Las Vegas, Nev., J-9.

James A. Maston, Las Vegas, Nev., J-9.

Richard O. Placak, Las Vegas, Nev., J-9.

Robert J. Kruger, Las Vegas, Nev., J-9.

Thomas S. Baldwin, Las Vegas, Nev., J-9.

Eugene Joseph Walter, Las Vegas, Nev., J-9.

Deloss L. La Fon, Las Vegas, Nev., J-9.

Donald Frank Lawrence, Las Vegas, Nev., J-9.

John W. McPherson, Las Vegas, Nev., J-9.

Herman V. Washington, Las Vegas, Nev., J-9.

Eugene A. Skweir, Las Vegas, Nev., J-9.

Everett D. Holmes, Jr., Newark, N.J., ENG-1.

Martin D. Torrey, Burlington, Mass., W-4 (Rehire).

William L. Hendry, III, Cambridge, Mass., T-1.

Diane E. Hanson, Espanola, ENG-3 (Casual).

Leslie W. Mitchell, Dallas, Texas, P-1.

Margaret M. Putnam, Los Alamos, H-DO (Casual).

Ara D. Chaffee, Albuquerque, N.M., ENG-1.

Donald M. Kerr, Jr., Ithaca, N.Y., J-10.

David A. Depatie, Amherst, Mass., CMF-9.

James H. Smith, Orchard Park, N.Y., GMX-1.

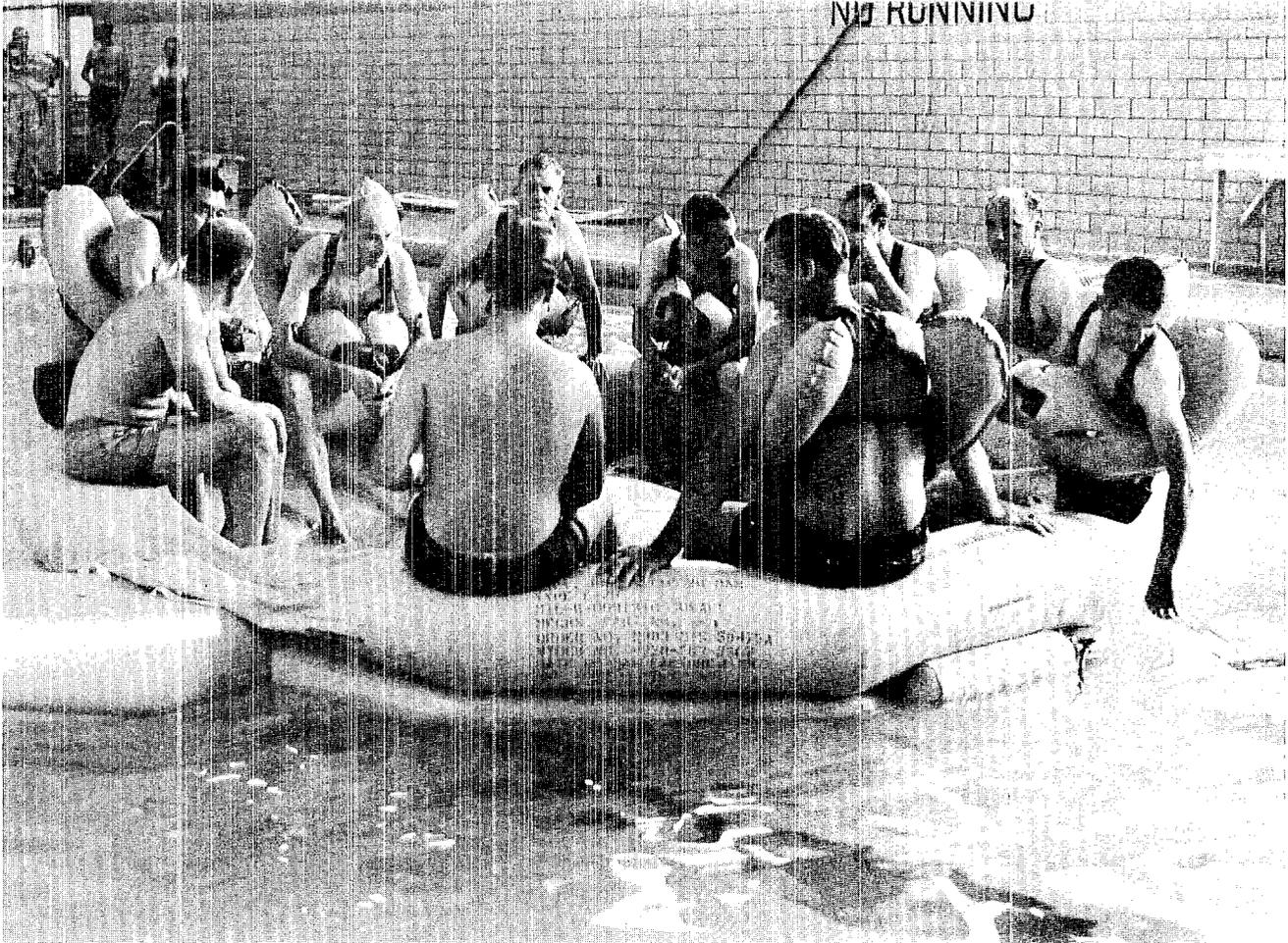
David Fine, Las Vegas, Nev., J-9.

Phillip D. Miller, University Park, Pa., J-8.

John K. West, Oak Ridge, Tenn., CMB-3.

Donald R. Schuyler, II, Idaho Falls, Ida., GMX-1.

# Rub A-Dub-Dub



**LASL MEN IN A TUB**—in this case an inflated life raft—were fulfilling an Air Force requirement for scientific crew members of diagnostic aircraft to be annually indoctrinated in survival and emergency techniques. The course, given for the first time at Los Alamos, consisted of lectures and training movies in the HRL Auditorium and more practical aspects such as boarding a life raft and use of exposure suits. Lt. Edward Kenealy was instructor. Nick Meena, J-1, coordinated the program attended by 51 pupils.

## Back Cover

Ornithologists insist on calling them turkey vultures, but to most people the big, black carrion eaters that gather every night at Bandelier National Monument are simply buzzards. For no reason known to anyone, these eagle-size scavengers have selected a couple of trees in the picnic area in Frijoles canyon for their evening roost, making picnicking under those trees somewhat hazardous.

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