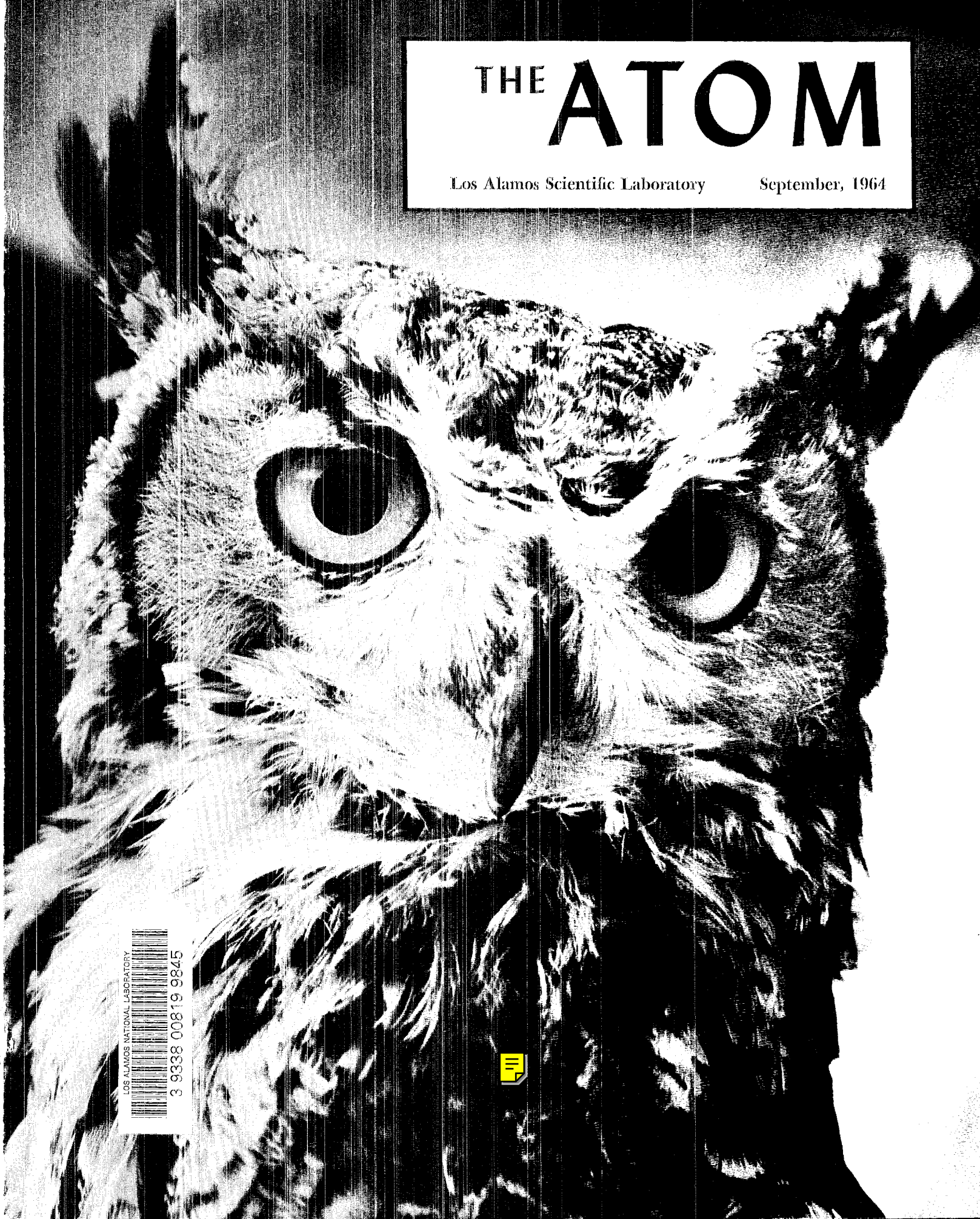
THE ATOM

Los Alamos Scientific Laboratory September, 1964



LOS ALAMOS NATIONAL LABORATORY
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Volume 1 Number 9

Published monthly by the University of California,
Los Alamos Scientific Laboratory, Office of Public Relations,
P.O. Box 1663, Los Alamos, New Mexico, 87544.
Second Class Postage paid at Los Alamos, New Mexico.

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Photography: Bill Regan and Bill Jack Rodgers
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Office: D-413 Administration Building. Telephone: 7-5236.
Printed by The University of New Mexico Printing Plant, Albuquerque.

ON THE COVER: The feathered fellow with the big eyes is one of many attractions for visitors to Ghost Ranch Museum and Beaver National Forest, little more than an hour's drive from Los Alamos. A story about this unusual place starts on page 12. Cover photograph by Bill Regan

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Short Subjects

Hugh C. Paxton, N-2 Group Leader, has been appointed to a special AEC committee that will study a fatal accident involving radiation that occurred July 24 in Rhode Island. Paxton, a nationally-recognized expert in nuclear safety, will work with five other physicists in a review of the mishap, an accidental criticality which fatally injured an operator at a fissionable material scrap-recovery plant at Wood River, R.I.

Los Alamos has a new organization just for model railroad enthusiasts. Eleven local residents last month formed the Los Alamos Model Railroad Association and are seeking additional members. At the initial meeting John Pritchard was elected president; Allen Dross, secretary-treasurer; Ed Voorhees, chairman of the planning committee; and Bill Showers, publicity chairman. Prospective members may contact any of the officers. The association, which plans to meet twice a month, is already seeking to acquire a building to house its model railroad equipment.

Berlyn Brixner, GMX-9 Group Leader, will discuss the LASL-developed program for the use of computers in lens design at two meetings in Japan this month. He will speak at the International Commission for Optics topical conference on Photographic and Spectroscopic Optics in Tokyo and Kyoto September 1-8 and at a seminar September 11 and 12 in Tokyo, sponsored by the Optics Section of the Japan Society of Applied Physics and the Japan Optical Engineering Research Association. The computer code was developed for Brixner by John C. Holladay, a former T Division staff member, and Charles Lehman of T-5.

Marvin W. Rowe, former H-4 research assistant, last month was named one of two recipients of the Nininger Meteorite Award. Rowe shared the $1,000 award with Ned Read of Carleton College, Northfield, Minnesota. The award is made each year by the Arizona State University Department of Chemistry for the best research paper on meteorites by pre-doctoral students. Rowe, who is working on his doctorate at the University of Arkansas' Chemistry Department, was with LASL's biomedical research group from December 1959 until December 1962. His award-winning paper, "Gamma Radioactivity and Rare Gasses in Meteorites and Terrestrial Materials," was based in part on work done at LASL.

Two staff members, Norman G. Wilson, K-1, and John Deverall, N-5, were on the August staff of the National Science Foundation Summer Institute for University Engineering Professors at the University of Colorado. The Institute dealt with the technology at the extremes of pressure and temperature. Wilson presented a course on ultra high vacuum techniques; Deverall's course was on high temperature phenomena.

Two Project Sherwood physicists, James Phillips and Franz Jahoda, have gone England to spend a year at the new Culham Laboratory, the United Kingdom Atomic Energy Authority fusion and plasma physics research center. Phillips, P-14 group leader, is taking part in the scientific exchange program. Jahoda, P-15, is on professional research and teaching leave. Both staff members took their families with them to England.

THE LOS ALAMOS FLOTILLA

Helping to Make Boating a Safer Sport

Is the Role of this Local Organization

Friendly advice probably will never replace the life preserver for hauling swamped boatmen out of the drink. Nevertheless, for New Mexico's thousands of weekend sailors, friendly advice can be a life saver in its own right.

Providing advice and good example in order to promote safe boating is a chief purpose of the U.S. Coast Guard Auxiliary. A civilian, volunteer organization, its only chapter, or "flotilla," in New Mexico has its headquarters in Los Alamos.

While given none of the police or military powers of its parent organization, the Auxiliary was created by Congress nearly a quarter century ago to assist the U.S. Coast Guard in some of its civil functions, particularly those concerned with boating safety. Auxiliary flotillas are active across the nation and often are called upon to patrol regattas and assist in locating and helping boatmen in distress.

Membership is generally open to any U.S. citizen over 17 who owns at least 25 per cent interest in a motorboat, yacht, aircraft, or amateur radio station.

Los Alamos Flotilla 58, chartered in 1959, has a membership of 19 from Los Alamos, Santa Fe and Albuquerque. An additional 12 provisional members from Farmington have joined the group temporarily but hope to get a charter of their own after they pass the necessary examinations for full membership.

Horace Noyes, LASL traffic manager, is credited as the man who brought the Coast Guard Auxiliary to New Mexico. A member of the wartime Coast Guard Temporary Reserve when he lived in California, Noyes brought along his en-

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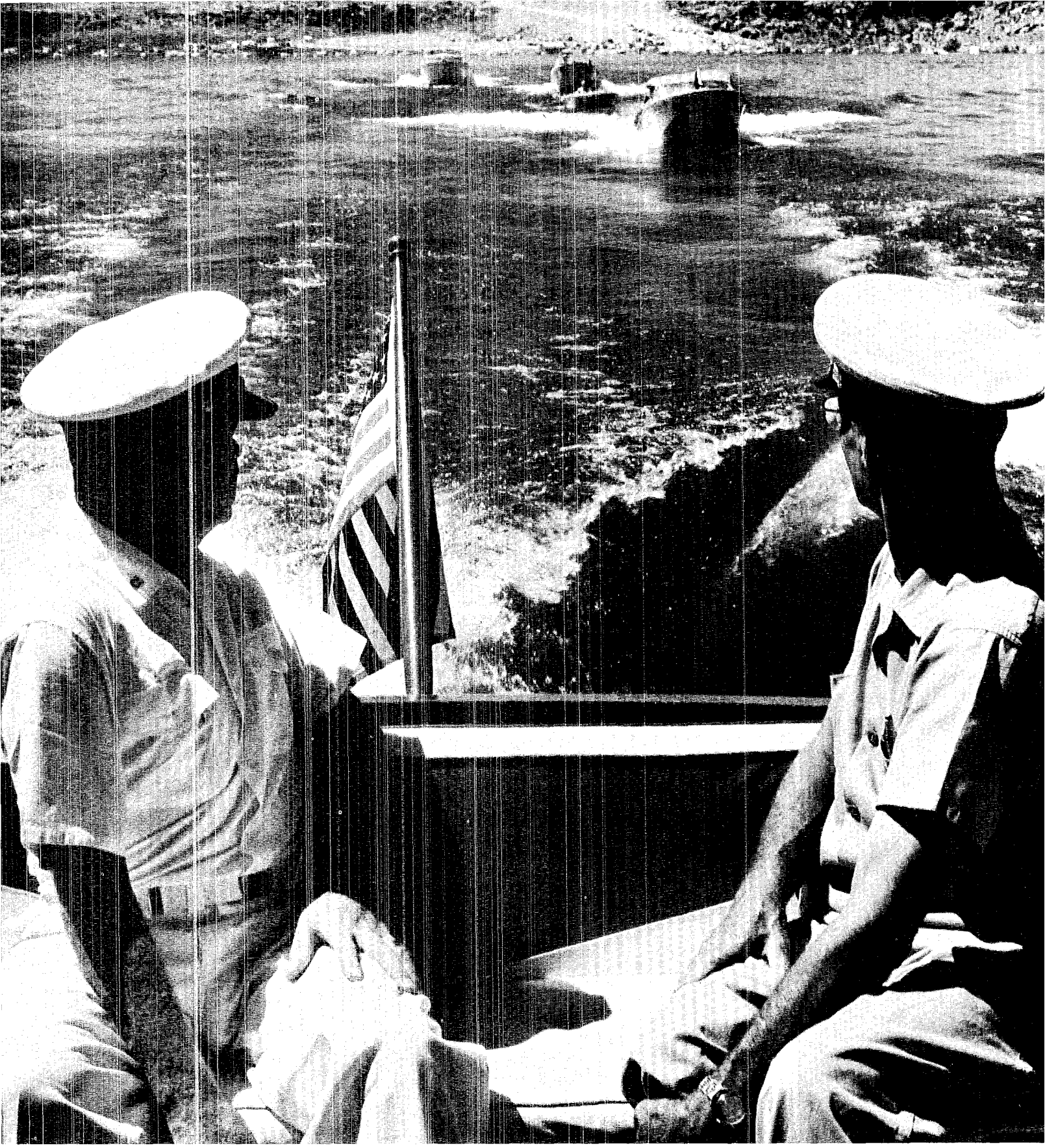
Horace Noyes, with clipboard, and Harry Standring conduct a courtesy inspection for a boatman at Navajo Lake. Inspections like this are performed by the Coast Guard Auxiliary strictly as a service to boat owners and are one of the Auxiliary's most important volunteer activities.



Observing part of the Auxiliary "fleet" from the stern of Horace Noyes' boat Sea Wyf II, are Noyes, left, and Harry Standring.

Coast Guard Auxiliary...

continued from page 2

thusiasm for boating when he moved to Los Alamos in 1952.

Boating was then just a fledgling in New Mexico but Noyes recalls he was appalled by the disregard for safety he saw on the lakes in the state. As the number of boating enthusiasts—and boating accidents—grew, Noyes resolved to do what he could to make the sport safer.

With the help of Harry Standring, a Los Alamos landlubber until he found that "boating is the only real way to relax," Noyes rounded up the necessary boatmen with the necessary ten boats to form a flotilla. Upon receiving their charter, the new auxiliarists elected Noyes to be Flotilla Commander. He held that post until this year when Newt Green of Santa Fe succeeded him.

Mrs. Noyes and Mrs. Standring joined the Auxiliary along with their husbands. Dan Bannerman is another Los Alamos member and one of the Santa Fe members is Omar Gallagher, who works with LASL's Engineering Department.

Flotilla members work in close cooperation with the State Park and Recreation Commission in their voluntary efforts of promoting boating safety. They seldom miss a summer weekend at one of the more boat-populated lakes in the state. But it's not an all-work-no-play group, the auxiliarists point out. They enjoy boating and camping and meet many new friends at lakes. While they're there, though, they do whatever they can to assist other boaters.

On request, qualified examiners of the flotilla conduct courtesy inspections of boats. Following a standard check list provided by the Coast Guard, they inspect several nautical devices like lights, life preservers and fire extinguishers, and look at legal as well as safety requirements.

The examination is unofficial and can be performed only if the boat owner requests it. No violation report is made to the Coast Guard or any other agency. Major violations are found on more than half the boats they inspect, but it's the boats they don't inspect that worry the auxiliarists. They feel that the more flagrant violations are likely to be committed by the people who don't cooperate in the inspection program.

Next to the courtesy inspection program, the flotilla's most important activity is conducting boating classes. Courses lasting one, three, and eight weeks are offered without charge to interested groups. Among local people who have received such instruction are members of the Girl Scout and Boy Scout organizations.

The auxiliarists are seeking new members both in Los Alamos and elsewhere in the state. When the local flotilla was formed, only five years ago, there were about 4,000 small boats registered in New Mexico. Now there are more than 10,000. With the opening of new waters to boating, the task of insuring boating safety is a rapidly growing one.

Newt Green, left, flotilla commander, talks over a day's boating activities with another Auxiliary member, Omar Gallagher. At center is Green's son Dennis.

Hill Booms As Government Builds

AEC IS SPENDING $13,000,000 FOR CONSTRUCTION THIS YEAR ON TOWN AND LABORATORY

In case you hadn't noticed, Los Alamos this year is experiencing one of the greatest bursts of government construction activity since the Laboratory's conversion to permanency on South Mesa a decade ago.

More than $13,000,000 is being spent by the Atomic Energy Commission on construction projects here this year.

About half the AEC money is for LASL Technical Area projects, including five major buildings. The rest is for improvements in the residential-commercial community north of the bridge.

continued on next page

Heavy compaction machine leaves a checkered pattern as it rolls along sub-grade of relocated Pajarito Road near LASL Technical Area 46.

Construction . . .

Continued from preceding page

Sizeable Tech Area expenditures are not unusual; nuclear research facilities just don't come cheap. But a $6,000,000 municipal improvement program in a town of 13,000 is something else aagin.

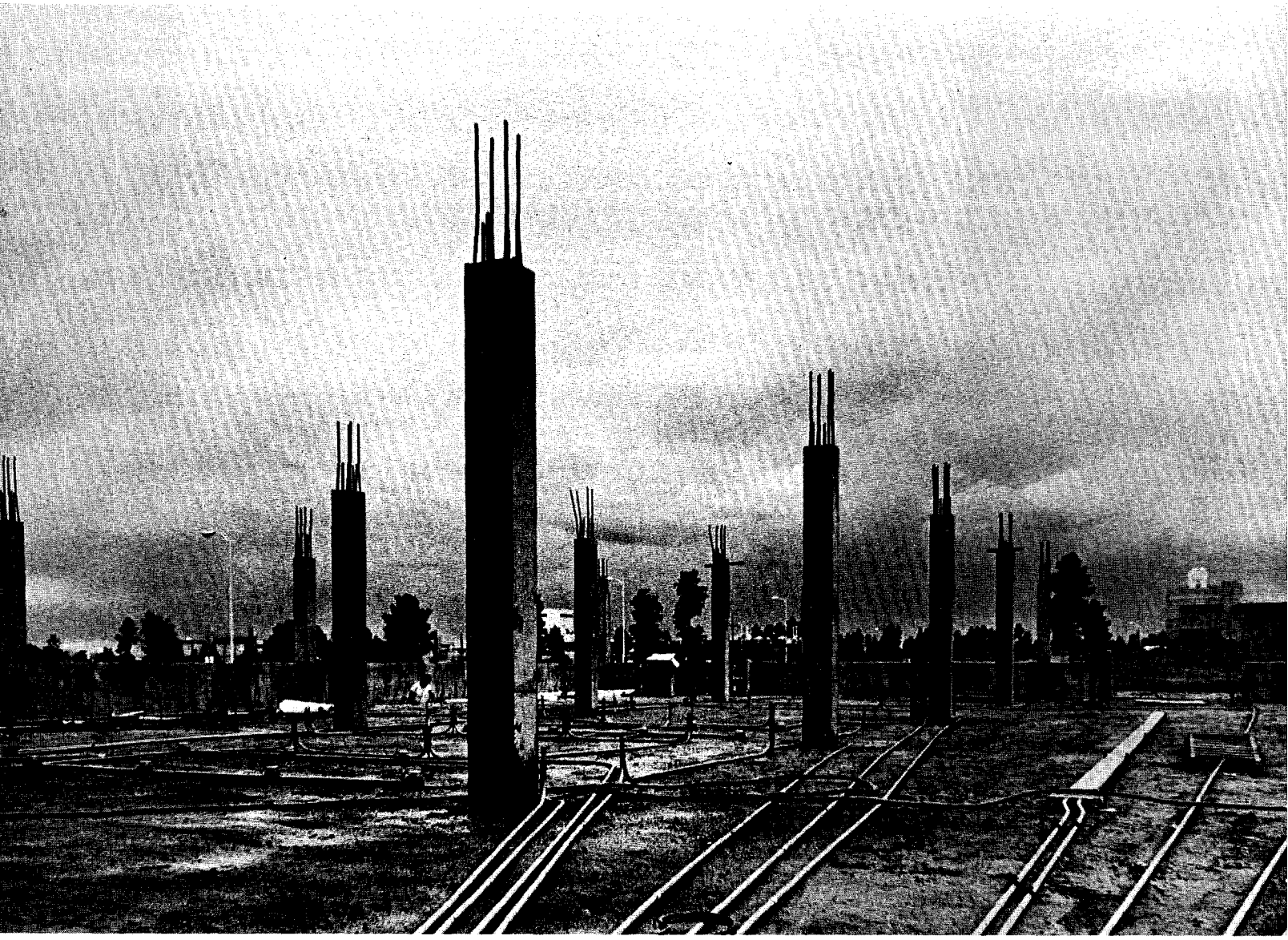
AEC isn't playing Santa Claus. As owner of the town it has an obligation to keep up with its growth and aging. The AEC's pocketbook is open widest, though, because of the obligations imposed by the so-called "disposal" legislation of 1962 that provides for sale of Government commercial and residential property and establishment of complete local government.

The law authorizes an estimated $8,700,000 in improvements as a sort of dowry to get the town going. Some $3,000,000 of that is being spent this year.

Evidences of the construction are all about, in new buildings, street modifications and a general atmosphere of digging, pouring and pounding.

One of the most impressive projects is the expansion of the high school. A new gymnasium is going

Concrete columns point skyward as LASL Administration Building addition takes shape.



up on the south side of the campus, adjacent to the swimming pool. The old gym will become a physical education center for girls. A new practical arts training building is on the north side of the campus. There is a new home economics cottage with multiple kitchen units, and a living room with a fireplace and picture window. The commercial courses building and the cafeteria have been enlarged. These high school improvements are costing approximately $1,400,000.

Diamond Drive traffic will flow more smoothly. Gone by mid-September will be both traffic-stopping pedestrian crossings in front of the high school. New will be two bridge-like overpasses, one crossing by the gymnasiums and the other between the commercial parking lot and auditorium. North from the high school, Diamond Drive has been widened at Sandia and again between Pueblo Junior High and Urban Street. Additional space will make express traffic lanes possible in those areas and is part of a long-range program designed to speed the flow of rush-hour traffic between Urban and the South Mesa Technical Areas.

Diamond is also being four-laned east from 35th Street, creating a true boulevard through the golf course to the most spectacular of all this year's work: The rebuilding of San Ildefonso Road (to Barranca Mesa), relocation of the San Ildefonso-North Mesa Road intersection, and construction of an entirely new two-lane paved highway up the west face and along the south side of North Mesa.

The intersection will be shifted about 250 feet to the south and will include the new road, which has been tentatively named San Ildefonso South by the AEC. There will be a pedestrian underpass making it possible to walk from either North Mesa or Barranca Mesa to a new sidewalk paralleling Diamond through the golf course without crossing a street.

The 13 per cent grade on San Ildefonso will be reduced to 7 per cent. The roadway will be widened to three surfaced lanes with provision for a fourth. Grade reduction will be accomplished by using material pared from the west cliff as fill. The new intersection will be about 20 feet higher than the old.

Commencing with Barranca Mesa, a construction tour would begin about half a mile east of the Barranca Mesa Elementary School.

Cement block and steel truss are linked by men erecting high school facilities.

The AEC has contracted to spend $641,000 for development of Subdivision 4, Phase A, and construction of a million-gallon steeel tank for water storage at Booster Station 3 on the Guaje Canyon Road. The tank will equalize pumping capacities in the water supply system from the Guaje well field. The new residential subdivision will have

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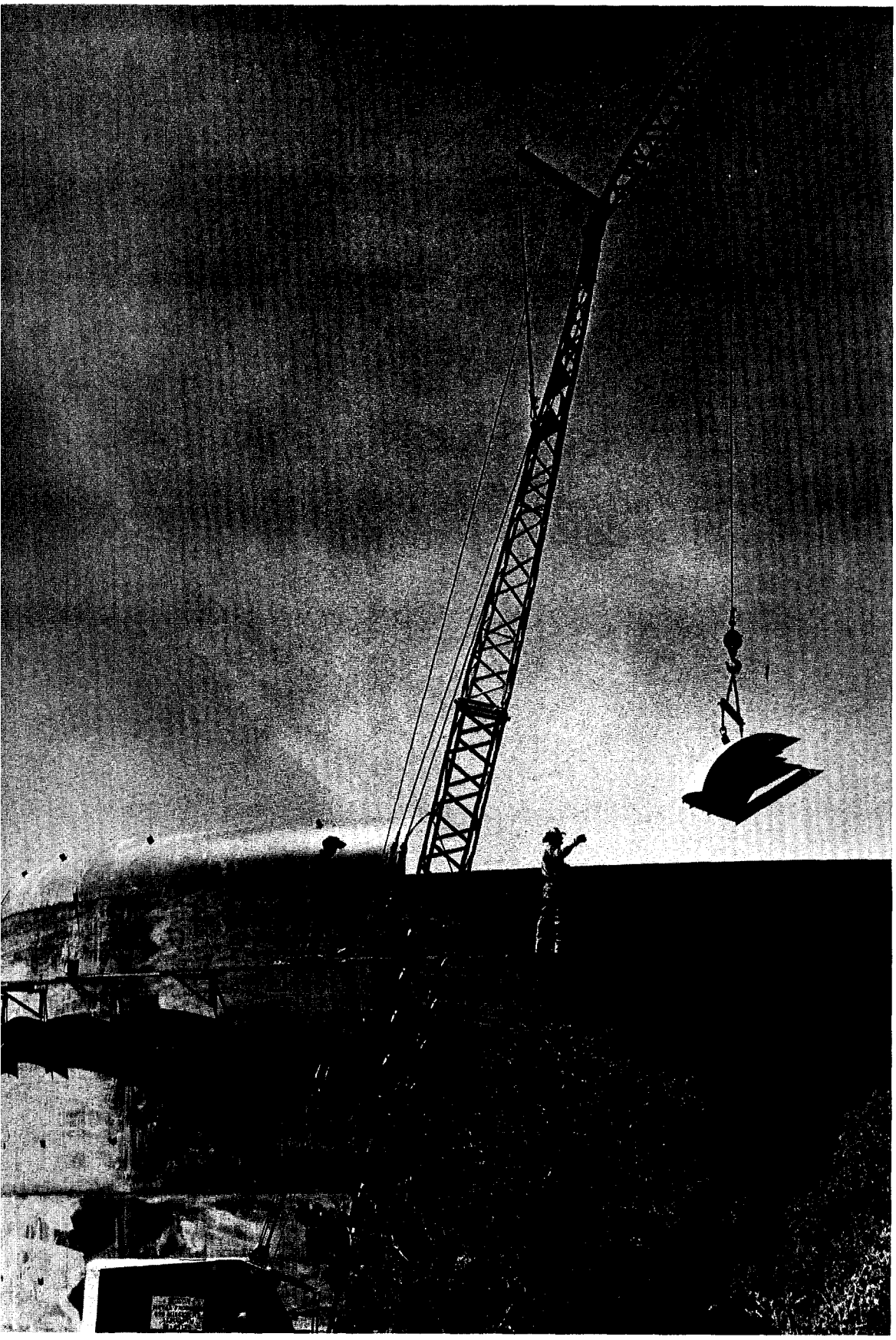
Work



Huge plates of steel pieced together to form new 1,-500,000-gallon water storage tank near junction of Pajarito Road and State Road 4. Tank is part of expanded water distribution system for White Rock and LASL Technical Area.

includes preparations for community disposal

continued from page 7

paved streets and utilities available for 141 lots. Lot sales will probably be next spring. The development is the final increment for which Federal funds are available on Barranca Mesa. The Barranca Mesa School, new a year ago, is getting a $211,000 addition for use this fall.

Back down on Diamond Drive, by the road to the cemetery, is the new North Community Fire Station, costing $170,000.

Throughout the North Community residential area crews have been digging for utility lines in the start of a planned three-year program to rehabilitate gas, water and sewer lines. Similar refurbishing is going on overhead to modernize the electrical distribution system. This year's "start" on the rehabilitation, which is a part of the disposal package, is costing nearly half a million dollars.

Several dozen duplexes of assorted classification have been getting a pre-disposal treatment this summer. Additional access walks and utility connections and foundation "fire-stop" walls are being installed on buildings that can be "split"; that is, each half sold to its occupant. In the Western Area new concrete driveways and sidewalks have been poured. Cost of this get-ready treatment totals about $202,000.

Downtown, the old Post Headquarters property at Fifteenth Street and Central Avenue has benefited from $83,000 in parking lot surfacing, sidewalk construction and utility installation. This is in preparation for use of the tract by a bank and shopping center. On the other side of the Community Center, 19th Street will be straightened to eliminate the rather narrow and winding access from Nectar Street to the innermost Community Center parking lot. A strip of Lodge-Bathtub Row green area will be taken.

Heading toward White Rock, nearly two miles of Pajarito Road is being widened seven feet and another 4800 feet have been completely relocated. This latter work eliminates two curves and provides room for expansion of N Division facilities at TA-46.

In White Rock the new $560,000 Piñon School has its first pupils and Grand Canyon Drive has been paved to the school, also giving access to a new residential subdivision. White Rock's growth is further stimulated by AEC investment of $456,000 in expanded water distribution facilities, including a new 1,500,000-gallon storage tank and mains to areas being developed for additional private housing on the east and west sides of the present White Rock residential district.

Drilling of a water well at the foot of Sandia Canyon near Highway 4 was started last month. The $169,000 well may be the start of a new well field in Sandia and Pajarito Canyons. Water from the well will be pumped to the new White Rock storage tank. The tank is also designed for use in a future water distribution "loop" that will serve the Tech Area in addition to White Rock.

Back up at the Tech Area, another six million dollars is providing the start on a number of major facilities and continuation or conclusion for several other big jobs that have been abuilding for several years.

Biggest Tech Area project this year is the addition to the Administration Building. The $2,249,000 job will supply expansion space for T Division, the Engineering Department and transfer of the Personnel, Supply and Property and Community Relations offices from their wartime buildings in old TA-1 near Ashley Pond. The addi-

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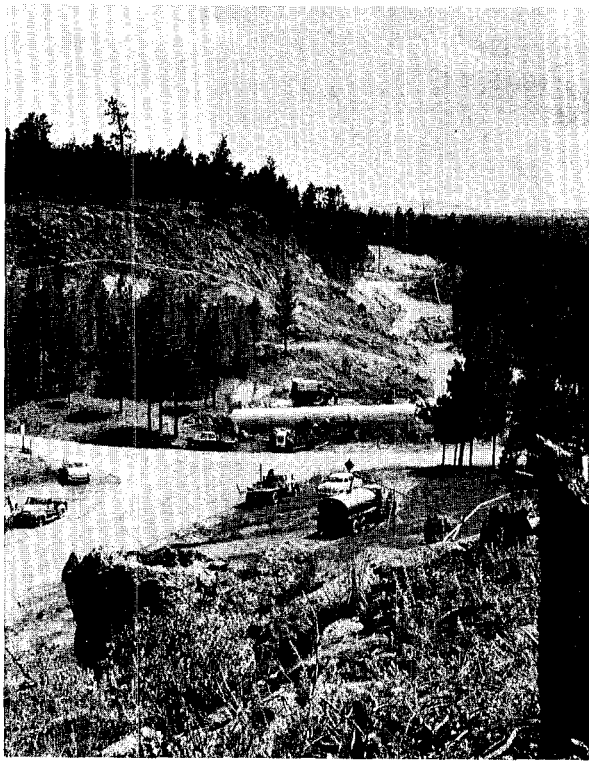


New access road to North Mesa is being carved from tufa and forest. Pedestrian underpass (center) will be 20 feet under new intersection of Diamond Drive (right, center) and San Ildefonso Road (lower left). Grade on San Ildefonso Road to Barranca Mesa will be reduced from 13 per cent to 7 per cent by paring away the cliff from where photo was taken and using it as fill.

Construction . . .

Continued from preceding page

tion is due for completion in late spring next year.

Work is just starting on four major building projects, one in TA-3 and the others at DP Site. The Occupational Health Laboratory will cost $1,383,000 to build, and will be located on Pajarito Road just east of the Diamond Drive intersection. In DP Site, construction is commencing on a new high temperature chemistry facility, cost $881,000; Plutonium Research Support Building, $467,000; and Phase II of the new Furnace Facility, $263,000. Phase I of the Furnace Facility, which cost some $450,000, was completed in mid-summer.

Construction continues full pace on the Fast Reactor Core Test Facility at TA-35. The $3,132,000 construction portion of the $8,000,000 facility started last year and is expected to be finished by summer of 1965. At UHTREX, LASL's other new reactor, construction is complete and the building at TA-52 is being prepared for equipment installation. Another building project, the $200,000 Engineering Laboratory addition at TA-46, was completed in July.

At almost every Tech Area site, lesser jobs have been in progress all summer. Automatic sprinkler systems have been installed in a number of fire-prone buildings, at a cost of $151,000. An overhead crane costing $14,000 was installed in SM-38 and lighting and ventilating improvements were done in shops buildings.

A new facility for storing and handling liquid and compressed gas is under construction near Sigma Building, at a cost of $150,000. A new Induction Heating Laboratory in SM-29 will cost $140,000 and the razing of old laboratory buildings in TA-1 will cost $225,000.

All the construction reported is done separate and apart from regular Laboratory and community operating budgets. Most work is performed under one of three funding methods:

—General Plant Projects (GPP). Construction of a relatively minor nature done by the Zia Company, or contracted out, is usually GPP money. The Diamond Drive widening near the high school and the 15th and Central commercial tract improvements are typical of community GPP expenses. Clearing of old TA-1 and the gas storage area are Tech Area GPP projects.

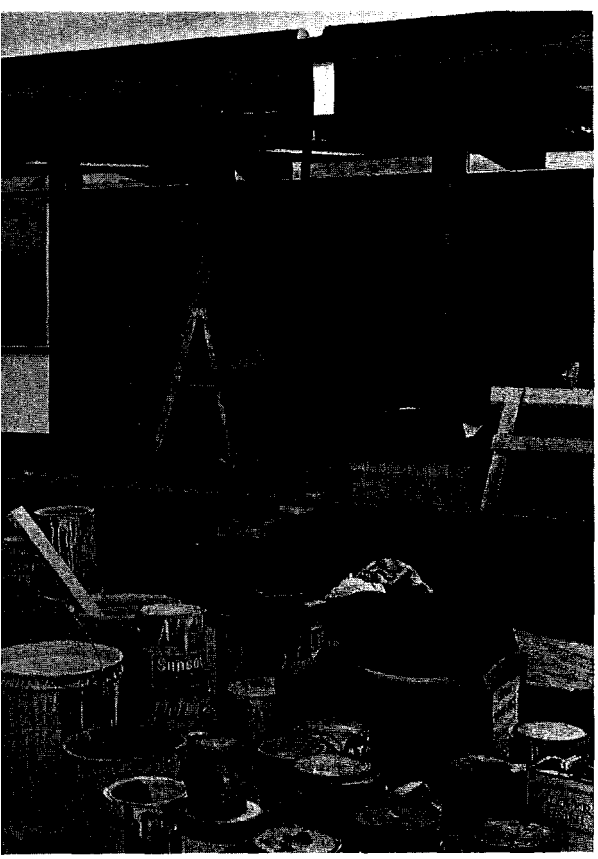
—Community Disposal Projects (CDP). These projects are those authorized under the disposal legislation; the high school expansion, utilities rehabilitation and San Ildefonso Road reconstruction are examples.

—Line Items. Projects specifically named in the AEC budget as approved by Congress are Line Items. The new Piñon School is a Line Item; so are the new Tech Area buildings.

Obtaining money from Congress for any kind of project is a long and frequently patience-stretching bit of business. Because of the lag between planning and engineering work and the awarding of a contract for actual construction, engineering and budget-fiscal offices work several years in advance. Most of the money being spent now, for example, was first accounted for as an estimate perhaps two or three years ago. It appeared next in the budget for fiscal 1964, which began July 1, 1963, but didn't actually become available in full until Congress made the fiscal appropriation last February. Projects for fiscal 1965 are also commencing but will be financed with periodic allocations of money from the AEC in anticipation of the full Congressional appropriation, which may be months in coming.

For such reasons as the above, it is difficult for AEC and Laboratory planners to predict what's going to be done "next year." An economy drive in the Government, or an upsurge in Federal spending, can have both immediate and long-term effect on even the most well-justified programs and plans.

There's no doubt, however, that calendar 1964 will go into the records as one of the busiest ever at Los Alamos.



Colorful school facilities make classwork more pleasant. Studying in this new Los Alamos school building should be a breeze.

KIWI LEAVES 'EM SMILING AS THE BIRD BOWS OUT

Rover Reactor Test Highly Successful

Plenty pleased with the Kiwi-B4-E, this group of nuclear rocket scientists and administrators were photographed minutes after observing the successful testing of the reactor, August 28. Left to right are: Keith Boyer, associate J Division leader; Milton Klein, assistant to the manager, Space Nuclear Propulsion Office; Luther Lyon, N-1; Raemer Schreiber, LASL technical associate director; Harold Finger, manager, SNPO; Donald Rose, N-1 (partially hidden); Donald MacMillan, N-1 group leader; Charles Campbell, AEC Los Alamos Area Manager.

Nine years of research and five years of testing came to fulfillment August 28 when LASL's Kiwi-B4-E reactor, from all indications, turned in a dazzling performance at Jackass Flats.

The B4-E test, eighth and final in the Kiwi series, operated for more than eight minutes at close to its design power of 1000 megawatts. There were no problems either with vibrations or with the nozzle such as those which cut short early reactor tests.

Roderick W. Spence, N Division Leader, said the test "should not be thought of as an isolated success, but rather the culmination of all the previous tests in the Kiwi series."

Spence added that "while some of the earlier tests were not as dramatic as that of the Kiwi-B4-E, they provided crucial information."

Raemer E. Schreiber, LASL Technical Associate Director, said the test "looked wonderful," and added that only the hydrogen supply limited operating time of the Kiwi-B4-E. Some 10,000 gallons of liquid hydrogen per minute was pumped through the system during the power run. Capacity of the test cell is 100,000 gallons. The reactor actually ran for more than 12 minutes, including start up and shut down time during which liquid hydrogen was also used.

Harold B. Finger, head of the Space Nuclear Propulsion Office, said that from both visual and instrumentation evidence the test appeared extremely successful, and "all test objectives were met."

L. P. Gise, manager of the AEC's Albuquerque Operations, and his assistant, J. L. McGraw, wired Schreiber at NRDS immediately following the B4-E test, saying, "Our most sincere congratulations to you and all of your Rover people. We knew you could do it; now others know it, too."

Last month's successful test gives natural impetus to Project Rover, the nation's program to develop a nuclear rocket, and gives a firm basis for all future work. Rover now branches into a two-pronged attack on space with LASL already well along with design and development work on bigger and more advanced uranium-graphite reactors known as Phoebus, and with the NERVA contract team of Aerojet-General and Westinghouse planning the first power run of their rocket reactor, NRX-A2, in mid-September. LASL's first Phoebus engine is scheduled to be tested early in 1965.

Already, in anticipation of the Phoebus program an architectural and engineering contract has been given to the C. F. Braun Co., Los Angeles, to modify and enlarge Test Cell "C," where the B4-E was tested; and to draw up design criteria for a proposed new facility known as Test Cell "E."

The Kiwi program began at Los Alamos in 1955, and testing started in 1959. Objective of the program was the development of basic graphite nuclear rocket technology.

This is a 'Model' Institution

Calvin, the talking beaver, is the official symbol of Beaver National Forest at Ghost Ranch museum. He speaks two languages (via tape recorder).

Many of the Displays at Ghost Ranch Museum Are Small in Scale But Big in Interest

The people and the livestock are so real they are startling, even though you know they are only half-scale models. A real-life, pint-sized antelope fawn wandering around does not seem at all out of place. A scale-model fisherman whips a half-scale stream burbling through a meadow where half-scale cows and sheep graze. Nearby the fisherman's family is busy around a miniature camp.

This place is Ghost Ranch Museum, on U.S. Highway 84, some 65 miles northwest of Santa Fe, founded and operated by the same people who developed the famous Arizona-Sonora Desert Museum at Tucson. Admission is free. Within the Ghost Ranch Museum grounds is a unique institution—Beaver National Forest—maintained by the U.S. Forest Service, the only scale model national forest in the country. One and a quarter acres in extent, it demonstrates a multiple-use forest like the adjacent Carson National Forest which covers a million and a quarter acres.

In both forests, camping and fishing are enjoyed, livestock fattens on grass in controlled areas, timber is selectively harvested, fire lookouts watch for smoke, wild animals find a haven. A full-time (and full-sized) forest ranger is in charge of the Beaver forest. A life-sized model beaver equipped with a loudspeaker lectures in two languages on the forest and its functions, from a hidden tape.

Exhibits of some of the innumerable dinosaur fossils found in the Abiquiu region are among the interesting indoor displays at Ghost Ranch museum.

Also within the Museum grounds, the museum staff is setting up a dramatic exhibit on soil erosion for the U.S. Soil Conservation Service, showing what has happened to much of northern New Mexico as the result of 150 years of over-grazing, and what has to be done to bring back the land. This will be a "talking" exhibit also; part of it is already in operation.

The principal theme of the whole Museum is soil, grass and water, and their relation to the vanishing wildlife of the region. The site of the Museum was deliberately selected for its proximity to a wide, deep, and ugly arroyo as a prime example of devastation by erosion. The Soil Conservation Service exhibit will include a path through and around the arroyo, with photographs, cross-section displays and telescopes at various stations to demonstrate what has happened there.

The Museum was built just five years ago by the Charles Lathrop Pack Forestry Foundation of Washington, D.C. It is on land leased from the Board of Christian Education of the United Presbyterian Church, which maintains a year-around conference center at nearby Ghost Ranch. The 25,000-acre ranch was donated to the church in 1955 by Mr. and Mrs. Arthur N. Pack. Pack is president of the foundation which bears his father's name. He was a founder and editor of Nature Magazine and the American Nature Association, and together with his father, Charles Lathrop Pack, started the American Tree Association and Pack Forestry Foundation. He is still very active in conservation work. He lives in Tucson, where he has been president of the Chamber of Commerce, and flies his own plane frequently to Ghost Ranch, where he and Mrs. Pack maintain a trailer home. He and Mrs. Pack built the Española hospital as a gift to the people of the valley.

The Museum was conceived, designed and is directed by William H. Carr, a veteran naturalist and conservationist, who also designed and directed the building of the Arizona-Sonora Desert Museum. Carr, as director-emeritus of the Tucson museum, spends the winter there, and the rest of the year at Ghost Ranch. He is vice-president of the foundation. Thirty-five years ago he built the first museum of this kind, at Bear Mountain State Park in New York State, and since has devoted his life to interpreting nature to the public and arousing interest in conservation of the nation's natural resources.

Supported entirely by contributions, the Museum has attracted increasing interest from passersby as well as residents from northern New Mexico. By its fifth anniversary on July 12, it had registered 320,000 people, and that same Sunday saw its first one-day visitation of 1,000 people. It has a lot of wild visitors, too, including a herd of 60 native antelope who some-

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Ghost Ranch . . .

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times graze within easy sight of the Museum.

The Museum has both indoor and outdoor exhibits, showing the land as it was and as it is, and depicting the prehistoric life as well as the present. The region around Ghost Ranch is world-famous for its dinosaur bones, and nearly Abiquiu dam site is a virtual quarry for relics of the giant creatures who lived here 150 million years ago. Bones, teeth and skulls of several prehistoric species are on display.

Live snakes, lizards and insects of the region are shown in lighted dioramas in the main building, while outside in caged or open enclosures most of the common mammals are displayed. Wildcats and cougars, coyotes and wolves, badgers, squirrels, a fox, an antelope, a marmot, prairie dogs, a pair of deodorized skunks, a porcupine, muskrats, raccoons and a live beaver are among the many living native creatures there.

Three great horned owls, on leashes, sit in the windows of the Museum main building and look over all the visitors with cold yellow eyes. The wolves are not natives, since the species has been extinct in the region for 40 years, but they belong to the similar Mexican (Chihuahua) species, having been born in the Arizona museum. Quite a few of the other animals have been donated by the Arizona museum, but they are of identical species to the New Mexico natives.

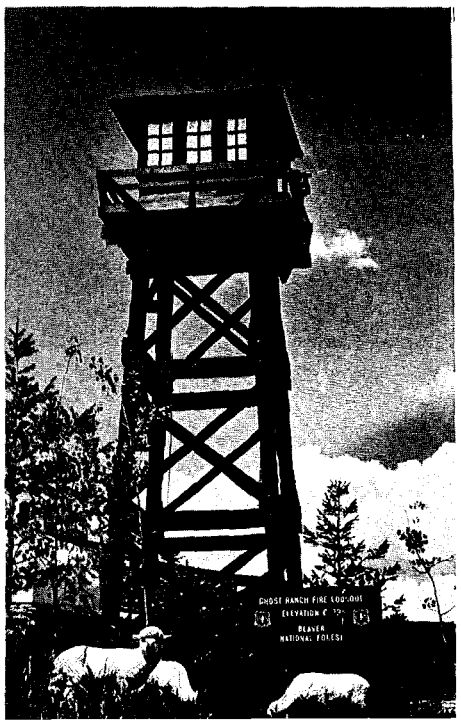
There is no bear there now; one they had was sent

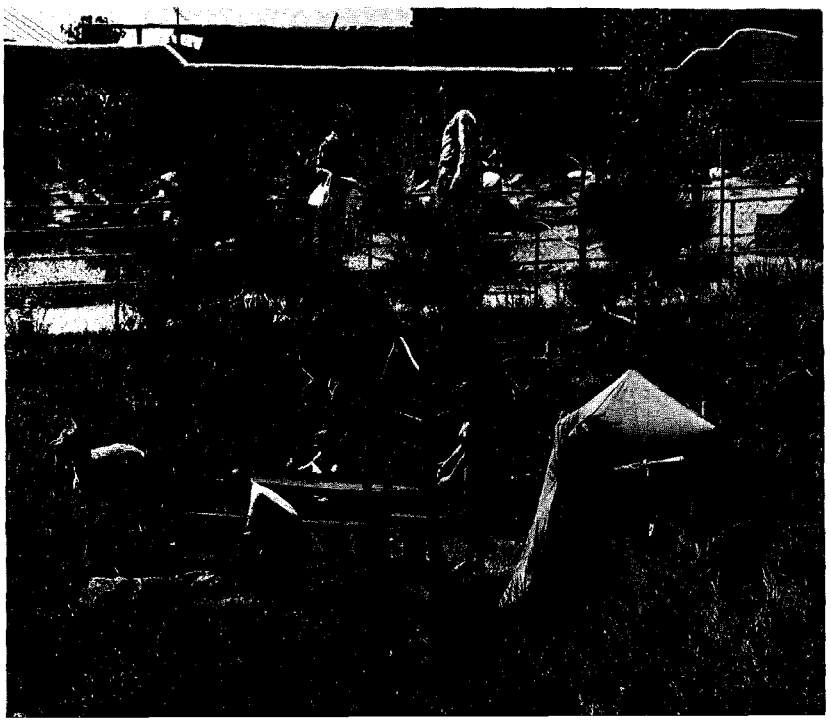
Miniature loggers in a miniature forest are so realistic they startle visitors to Beaver National Forest.

Robert, the big bob-cat at Ghost Ranch museum zoo, is so tame he likes to rub whiskers with members of the museum staff.

Half-scale sheep and a half-scale fire tower contribute to the illusion of a full-sized operation at Beaver National Forest in northern New Mexico.

Real-life antelope fawn wandering through the Beaver National Forest camp area looks huge in comparison to half-scale campers.





back to Washington to become the bride of Smokey the Bear, and is still there. Earlier, a small bear grew up too fast and had to be turned over to a zoo that had room for him. Carr hopes to acquire another one soon to round out the animal display.

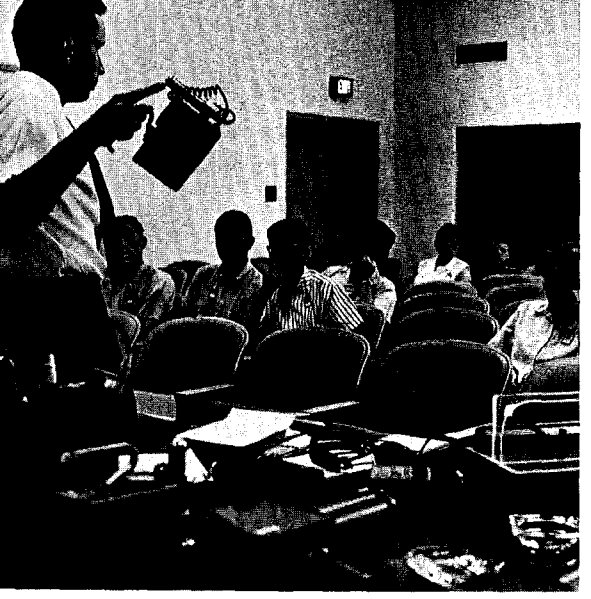
Besides the animals, several native birds are on display in large, walk-through cages which are being expanded for additional exhibits. There are also many of the native trees and shrubs growing in the grounds, each with its descriptive label.

Telescopes mounted along a stairway point to the spectacularly beautiful red and yellow cliffs that surround the museum, each directed to a strata which is a cross-section of the earth's geological history. The stairway is appropriately called a "Walk Up Through the Ages." This exhibit carries out the main theme by demonstrating what a short time man has been on the earth, compared to geologic time, and how much damage he has succeeded in doing to the land in that brief period.

One building is devoted entirely to the beaver, namesake of the forest and symbol of the whole institution. Evolution of the beaver, its skill as a dam builder, and the story of the mountain men who opened up the west in their search for beaver pelts, are graphically told here. A collection of paintings of beaver, and beaver figurines made by American and Canadian Indians, is part of this exhibit. Abiquiu, the nearest town, 14 miles east, was a center for fur trading activity in the period 1820-1850, as were Taos and Santa Fe.

One of the unique features of the Museum is its signs, authored by Carr. They read: DO NOT FEED YOUR FINGERS TO THE ANIMALS. THEIR DIET IS CAREFULLY SUPERVISED, and RACCOON TAILS SHOULD BE ATTACHED TO RACCOONS, NOT TO HATS OF WOULD-BE DAVY CROCKETTS.

Zorro, a full-grown gray fox, is a favorite of the visitors to Ghost Ranch museum. He is as fond of being petted as any dog.



Volunteer instructor Carl Buckland demonstrates the use of a radiation counter to Los Alamos high school students who spent part of their summer attending a special class.

SUMMERTIME WAS STUDY TIME TO STUDY TIME

A group of 20 Los Alamos high school students proved this summer that youth will seek an education, even if it's non-credit and must be paid for.

The students joined the new Los Alamos Summer Science Program whose goal is to interest youth in pursuing scientific studies. Central theme of the six-week course, which was offered through the Los Alamos Schools Summer Program, was the origin of the universe and man—studying both through concepts of time.

With classes meeting in the high school and certain areas of the Laboratory, the program included lectures, laboratory experiments, field trips, and seminars. The course was headed by high school physics teacher Robert Caswell, and several members of the LASL staff served as volunteer instructors.

A general introduction to the course was presented by R. F. Taschek, head of LASL's Physics Division. First part of the program dealt with archaeological and geological time. After a number of lectures by Ernest Anderson, H-4, the students participated in sample preparation, analysis, and data evaluation on radioactive carbon dating methods.

G. M. Matlack, CMB-1, lectured on radiochemical time clocks for dating the age of the earth through the use of radioactive uranium, and thorium. Fred Worman, H-8, further discussed geological genesis and took the group on a field trip to Ghost Ranch. Carl Buckland demonstrated and lectured on the simple types of radiation, their detection and interactions with matter. The class studied alpha, beta and gamma radiation sources and detection instruments.

W. L. Briscoe, P-1, discussed the accuracy of present terrestrial time as a measure of civilization, starting with early timing and navigational problems. This was extended into lectures on modern laboratory timing systems, including a day in the LASL Time Standards Laboratory, under the direction of G. O. Bjarke, P-1.

As the second part of the program, Charles Critchfield, T-DO, and J. Terrell and N. Jarmie, both of P-DOR, discussed space travel timing, including associated timing on non-terrestrial systems, "red shift," nucleo genesis, special theory of relativity aspects of cosmology, and small particle physics. The latter included subatomic particle time of flight studies and a visit to the LASL Van de Graaff accelerator.

The last third of the Summer Science Program had to do with biological timing and speculations on origin of life. Don Petersen, H-4, conducted the class in biological timing, which included around-the-clock participation by the students in experiments concerning the sequence of temporal biochemical relationships in the life cycle of mammalian cells. This course, held in the HRL building, impressed upon the students the abnormal working hours many scientists face. Don Ott, H-4, speculated on the origin of life and discussed genetic transfer of hereditary traits.

The summer program was budgeted at $500, $200 of which was underwritten by the Los Alamos Kiwanis. Tuition was $20 per student, and most of the balance was contributed by local professional societies. The program was so successful that sponsors are planning to continue the program.

As envisioned now, the course would cover three different subjects spanning as many summers and then repeat itself, thus giving a sophomore in high school a chance to participate in all three before going on to college.

The Church At Ranchos de Taos

One of two rare statues of St. Francis in the church. It dates from the Sixteenth Century.

STORY AND ILLUSTRATIONS BY TONY AMSDEN

Franciscan missionaries established churches throughout the Southwest with skill and enthusiasm over a two-hundred year period beginning at the turn of the 17th century. Twenty-one of these missions were in the area that was to become California, 20 in Texas, 18 in Arizona, but the greatest number were in New Mexico, which had 49.

The Pueblo Indians in this area were a prime target for conversion; consequently most of these mission churches were in the Rio Grande Valley, although some of the mission churches were constructed for the benefit of Spanish settlers. Many of the old buildings have disappeared without a trace, but a few are still in existence and may be seen today.

The old mission church of San Francisco de Asis is located in the village of Ranchos de Taos, about sixty miles north of Los Alamos and three miles south of Taos itself. It was built in the 18th century for a

continued on next page

Front view of the old mission church of St. Francis of Assisi. The church, south of Taos, has been in continuous use since it was completed in 1772 and contains many famous art objects.

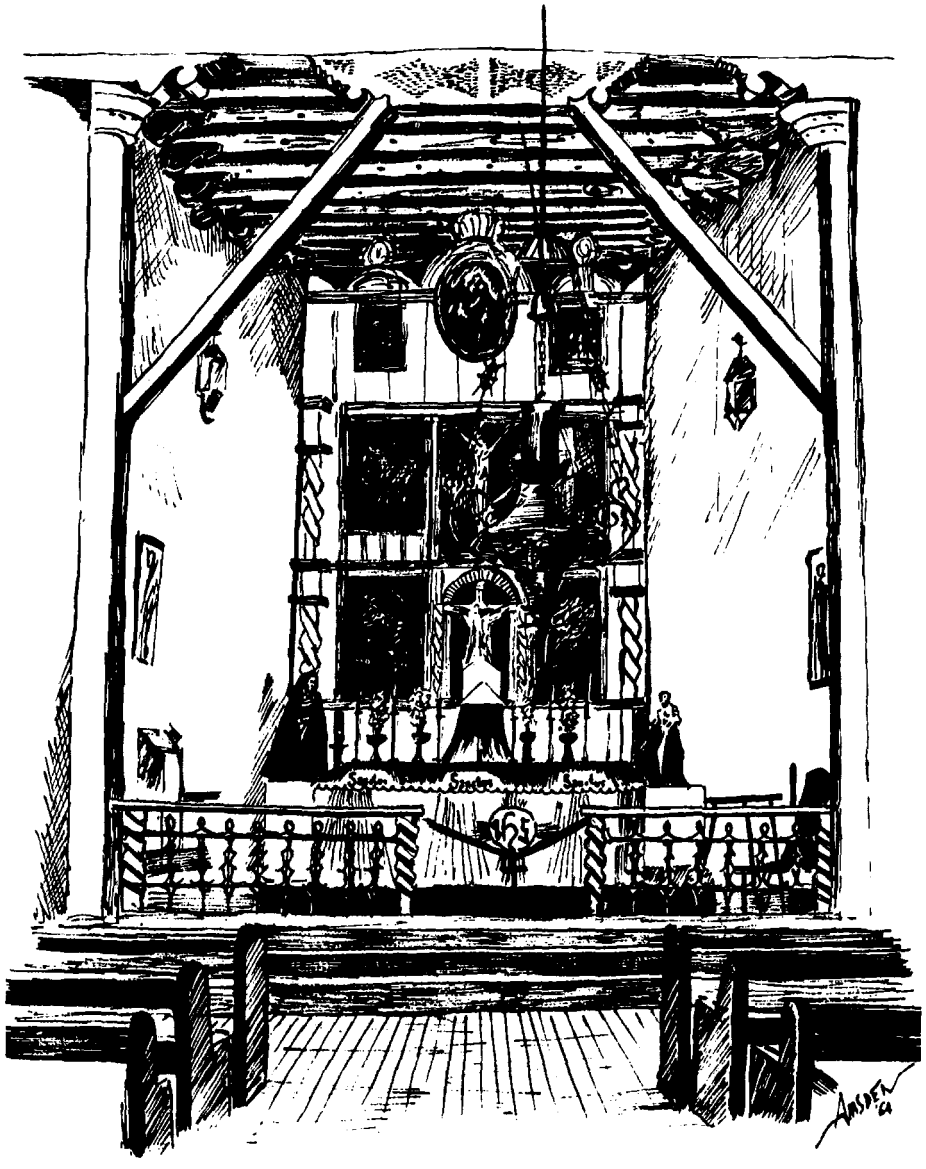
Church at Ranchos de Taos...

Continued from preceding page

number of Spanish-American families from neighboring ranchos in the area.

Although it is one of the last of the Franciscan churches established in the Southwest, it has the distinction of being the oldest unrestored church in that entire area, and has been in continuous use since it was completed in 1772. It is also generally considered to be the most beautiful of the old New Mexico churches. The rear with its massive sloping buttresses has been photographed almost as often as the front.

The building was designed in Spain in the early 1700s, and the construction took nearly a half century. Only native materials were used, the primary one being sun-dried adobe bricks made on the site itself of clay mud mixed with straw.



This is the sanctuary. The present altar is of more recent origin but the eight oil paintings behind it are older than the church itself.

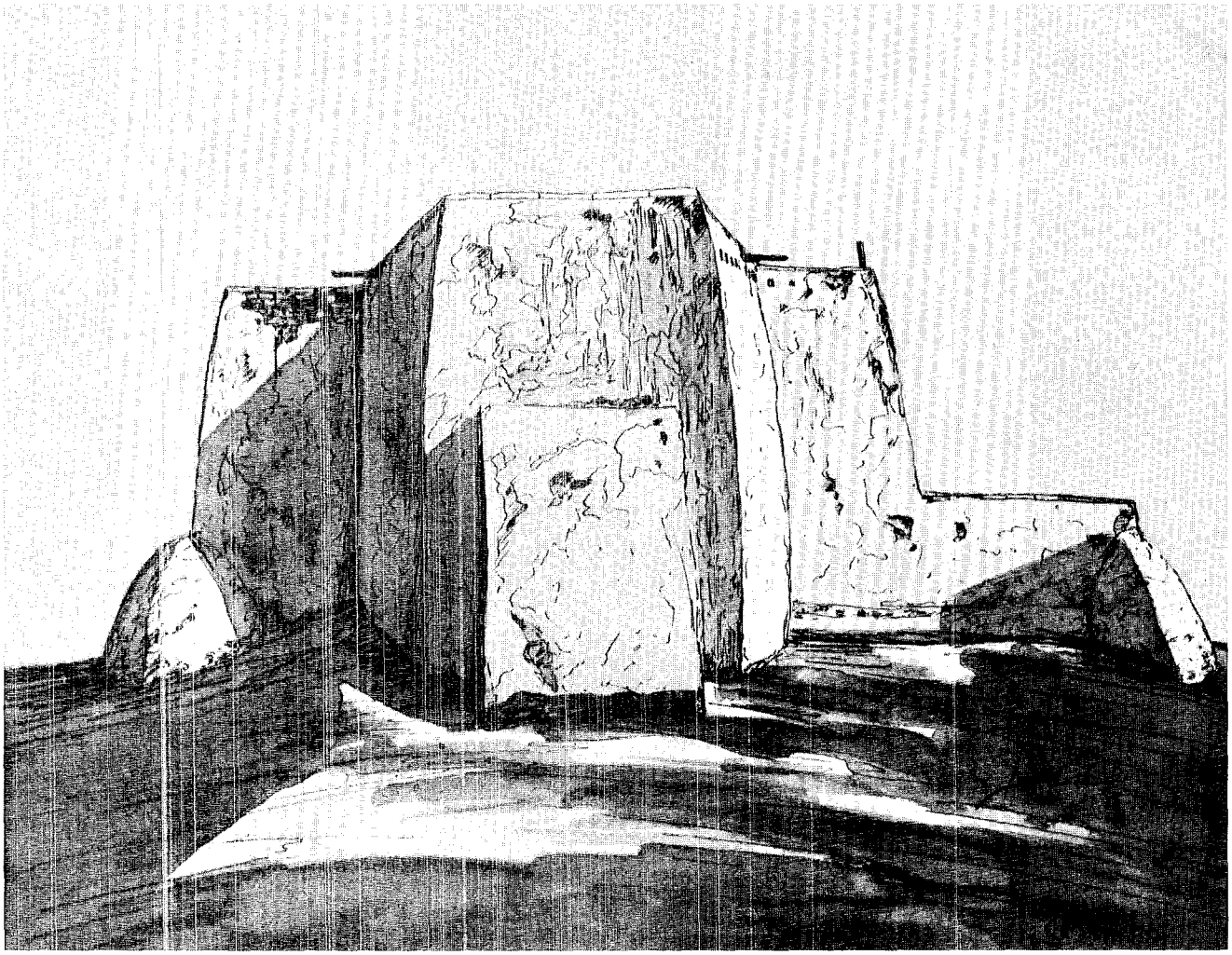
Considering that the church is 108 feet long, with walls five and a half feet thick, one can appreciate the tens of thousands of adobes that were required. The periodical replastering the building undergoes is a nine-day job in itself, involving many people. By tradition the hand-plastering has devolved on the women, while the men mix and carry the mud for them.

The roof is supported by huge hand-hewn *vigas* or rafters that were hauled from the neighboring Taos Mountains. The *corbels* that support them were handcarved and painted with vegetable dyes by native artists. Originally the only window was a small opening above the nave, covered with deerskin. It was so situated that in the early morning a shaft of sunlight shone through onto the adobe altar. The floor was of hard-packed clay, and was barren of pews or other furniture, as parishoners of those days stood or knelt on the floor. As was the custom, numerous priests and prominent parishoners were buried in the churchyard and beneath the church floor itself.

As time has passed, a sacristy has been added to the left of the crucero, and windows have been cut in the side walls, testifying to their great thickness. The pine-board floor has recently been replaced with one of modern vinyl tile, and the old original hand-made pews exchanged for a new set. A heating system has been added and electric lights have been installed, but candles in the old tin wallholders still light evening services. These alterations have done little to threaten the ancient charm of the interior.

The church contains many art treasures well worth seeing, including statuary, paintings, and liturgical objects. Their value has been estimated by some at over a half-million dollars, with their authenticity verified by church records.

The wooden reredos behind the altar was designed to simulate its stone or marble counterparts in the



The back of the church is photographed nearly as often as the front. The building was designed in Spain in the early 1700's and the construction, using only native materials, took nearly half a century.

old European cathedrals. It is as old as the church itself, but the eight oil paintings it contains are even older, and were brought from Mexico to adorn the new church. Unfortunately, these masterpieces have suffered extensive water damage from seepage in the old roof.

Although the altar and most of the liturgical vessels are relatively recent, the sanctuary contains three beautiful pieces handcrafted in silver in the 1600s and sent over from Spain with the church plans. All have been in constant use ever since. They include a recessional cross, an aspergiale or holy water sprinkler, and a set of three chime bells, which are used to announce the entry of the priest at Mass.

The sanctuary also contains two ancient *santos* and a silver candelabra. A beautiful old lamp hangs overhead, and there are two rare statues of St. Francis at either side. The artistic touches on the one illustrated would date it to the 16th century. There is another fine reredoes in the transcept; a central panel contains a handcarved and handpainted crucifixion scene with figures clothed in deerskin.

Perhaps the most famous art object of all today is the "mystery painting" which was given to the church in 1948. Entitled "The Shadow of the Cross," it was painted by Henri Ault over sixty years ago. Under daylight or any artificial light, one sees a portrait of Jesus standing on the banks of Galilee. But in darkness, the picture reputedly becomes self-illuminated, and the shadow of a cross appears over the left shoulder, and a halo over the head of the figure. No one, apparently including the artist himself, has been able to explain this change with darkness, and numerous tests for radioactivity, luminous paint, and other chemicals have all proved negative.

It is said that the House of the Lord Shall Endure Forever. The old Mission at Ranchos de Taos, with its simple charm and inspiring atmosphere, has endured nearly two hundred years. It is helping to perpetuate that House.

The Technical Side

MURA Linear Accelerator Conference, Madison, Wisconsin, July 20-24:

"Beam Dynamics Calculations for Alvarez Type Linear Accelerators" by Marvin Rich, T-3.

"A Green's Function Approach to the Calculations of Drift Tube Cavities" by Marvin Rich, T-3 and William M. Visscher, T-DO.

"A Numerical Study of Particle Dynamics in a High-Energy Proton Linear Accelerator" by Mark Jakobson, P-11 and William M. Visscher, T-DO.

"Coupled Resonator Model of Linear Accelerator Tanks" by Darragh E. Nagle, P-11.

"The LASL Meson Factory" by Darragh E. Nagle, P-11.

"RF Phase and Amplitude Control" by Robert A. Jameson, P-11.

Ninth Symposium on Ballistic Missile and Space Technology, sponsored by Air Force Systems Command, San Diego, Calif., August 12-14:

"Explosive Simulation of Nuclear Blast on Test Vehicles" by William E. Deal, Jr., and John W. Taylor, both GMX-6.

"Electromagnetic Signals Produced by Nuclear Detonations" by Conrad L. Longmire, T-4.

American Institute of Aeronautics and Astronautics Meeting, Los Angeles, Calif., August 11: (Classified Meeting)

"The Kiwi-B-4D Reactor Design and Test Results" by Franklin P. Durham, N-DO.

7th Annual Rocky Mountain Spectroscopy Conference, Denver, Colorado, August 10-11:

"New Apparatus and Techniques for High Resolution Spectroscopic Studies of Complex Atomic Spectra" by David W. Steinhaus, CMB-1.

Talk at University of Wyoming, Laramie, August 17:

"Probing the Atomic Nucleus" by Richard F. Taschek, P-DO.

The Tenth International Symposium on Combustion, Cambridge, England, August 17-21:

"Measurements of the Detonation Front Structure in Condensed Phase Explosives" by Bobby G. Craig, GMX-8.

"Electrical Measurements in Reaction Zones of High Explosives" by Bernard Hayes, GMX-8.

Presentation at Office of Naval Research's 1st Research Seminar, Sandia Corp., Albuquerque, August 18:

"Physics at Los Alamos" by Louis Rosen, P-DO.

LASL Represented at Geneva

Eight LASL staff members are authors or co-authors of papers prepared for the Third International Conference on the Peaceful Uses of Atomic Energy in Geneva, Switzerland.

Nuclear specialists from 37 countries and five international organizations were participants in the conference, held August 31 to September 9 in the Palais des Nations.

In addition to papers, two displays from the Laboratory's nondestructive testing group (GMX-1) were included in the technical exposition staged by the United States in conjunction with the conference.

Only LASL staffer presenting a paper was George I. Bell of T Division. His report on developments in neutron transport theory was coauthored by Bengt G. Carlson and Kaye D. Lathrop, both of T Division.

Other Los Alamos contributors, all co-authors, were: James L. Tuck, P-DO, "Controlled Fusion Research in the USA;" Ernest W. Salmi and George W. Grover, both of N-5, "Thermionic Diodes for Direct Conversion Reactors"; L. D. Kirkbride, K-2, "Irradiation Behavior of Fluid Fuels," and George Best, K-1, "Fast Critical Experiments and Their Analysis."

The LASL exhibits:

—A working model of a beta backscatter material tester, a device that measures the reflection of beta radiation to determine thickness and quality of inside coatings of small bore tubes.

—Use of the recently developed Insertion X ray Generator for the inspection of welds in tubing. The X ray beams are produced by electron bombardment of a tantalum target.

Cryogenic Engineering Conference, University of Pennsylvania, Philadelphia, August 17-21:

"Liquid Level Measurement" by Donald H. Liebenberg, CMF-9.

"Experimental Study of H_2OLH_2 and H_2O-LN_2 Heat Exchangers" by Kenneth D. Williamson and John R. Bartlit, both CMB-9.

"The Compressibility of Perlite" by Jan K. Novak, CMF-9.

"Pressurization Analysis of a Large Scale Liquid Hydrogen Dewar" by Donald H. Liebenberg and Frederick J. Edeskuty, both CMF-9.

"A Nitrogen Supply System for Post-Run Cooldown of Nuclear Reactors" by James H. Fretwell, CMF-9.

"Detection of Density Variations in Flowing Two-Phase Hydrogen" by Walter L. Willis, CMF-9, and Jesse R. Smith, NERVA.

"Large Volume Operational Room Inerting" by Keith Boyer, J-DO, and Harry Otway and R. C. Parker, both J-5 (NTS).

"Probing Experiments on Pressure Oscillations in Two Phase and Supercritical Hydrogen with Forced Convection Heat Transfer" by Rodney S. Thurston, N-4.

"Safety in Cryogenic Operations" by Roy Reider, H-3.

"Cryogenic Seal Seminar" by John C. Bronson, CMF-9.

"Storage and Transfer of Cryogenic Liquids" by Frederick J. Edeskuty, CMF-9.

Sagamore Conference, sponsored by Army Material Research Agency, Sagamore, N.Y., August 18-21:

"Comparison of Eigenvalues and Eigenfunctions Obtained by Various Methods" by James T. Waber, CMF-5.

148th National Meeting of the American Chemical Society, Chicago, August 30 thru September 4:

"Protactinium(V) Fluorides, Analogs of Tantalum or Uranium" by Larned B. Asprey and Robert A. Penneman, both CMF-4.

"Fused Salt Electrorefining of Molten Plutonium and Its Alloys" by Lawrence J. Mullins, Jr. and Joseph A. Leary, both CMB-11.

"Preparation of Neptunium-237 and Americium-241 Metal on Multigram Scale" by Karl Wm. R. Johnson, Joseph A. Leary and Arthur N. Morgan, all CMB-11.

"β, β-Dinitroalkyl Amines, Nitramines, and Related Compounds" by H. E. Ungnade and L. W. Kissinger, both GMX-2.

"Some Phase Equilibria in the U-N System" by Robert Benz and M. G. Bowman, both CMB-3.

Presentation at Columbia Chapter of the Health Physics Society, Richland, August 26:

"International Activities of the Health Physics Society" by H. F. Schulte, H-5.

9th International Conference on Low Temperature Physics, Columbus, Ohio, August 31 thru September 4:

"Isothermal Flow of Liquid He II in Narrow Channels" by William E. Keller and Edward F. Hammel, both CMF-9.

"Localized Moments of Very Dilute Fe Impurities in Metals from Mössbauer Effect Studies from 0.5 to 300°K" by R. D. Taylor and W. A. Steyert, both CMF-9, and T. A. Kitchens, Jr., P-11.

"Properties of the bcc-hcp Phase Transitions of He^3 and He^4" by A. F. Schuch and W. C. Overton, Jr., both CMF-9.

"Second Sound in Square and Cubical Cavities" by Philip J. Bendt, CMF-9.

"He^4 Melting Curve Minimum" by S. G. Sydoriak and R. L. Mills, both CMF-9.

Presentation at Pacific Northwest Chapter of the American Industrial Hygiene Association, Richland, August 28:

"Present and Future Activities of the American Industrial Hygiene Association" by H. F. Schulte, H-5.

Annual Meeting of the Institute for Mathematical Statistics, Amherst, Mass., August 26-29:

"On the Selection of the First Sample Size in Some Two-State Sampling" by Aaron Goldman, T-1.

NEW HIRES

Martha Jane O'Neal, Los Alamos, GMX-1.

John Carroll Elder, Clayton, N.M., K-1.

Darlene Marcia Avila, Los Alamos, SP-DO (Casual).

James Bishop Proebstel, Santa Fe, GMX-11.

Michael Henry Thomas, Santa Fe, P-14.

Marcial Rosendo Lujan, Espanola, CMB-6.

Jean Vera Johnson, Los Alamos, GMX-6.

Millard Ray Edwards, Burrton, Kansas, N-7.

Lee Arlen Builta, Lakeview, Oregon, GMX-11.

Philip Anthony Seeger, Pasadena, California, W-8 (Rehire).

Keith Skelton Thomas, Baltimore, Md., P-15.

Dennis Lee Orphal, Columbia, South Carolina, GMX-4.

Lionel Perry Collier, Haynesville, La., SP-6.

John Parker Shannon, Newton, Mass,. T-3 (Rehire).

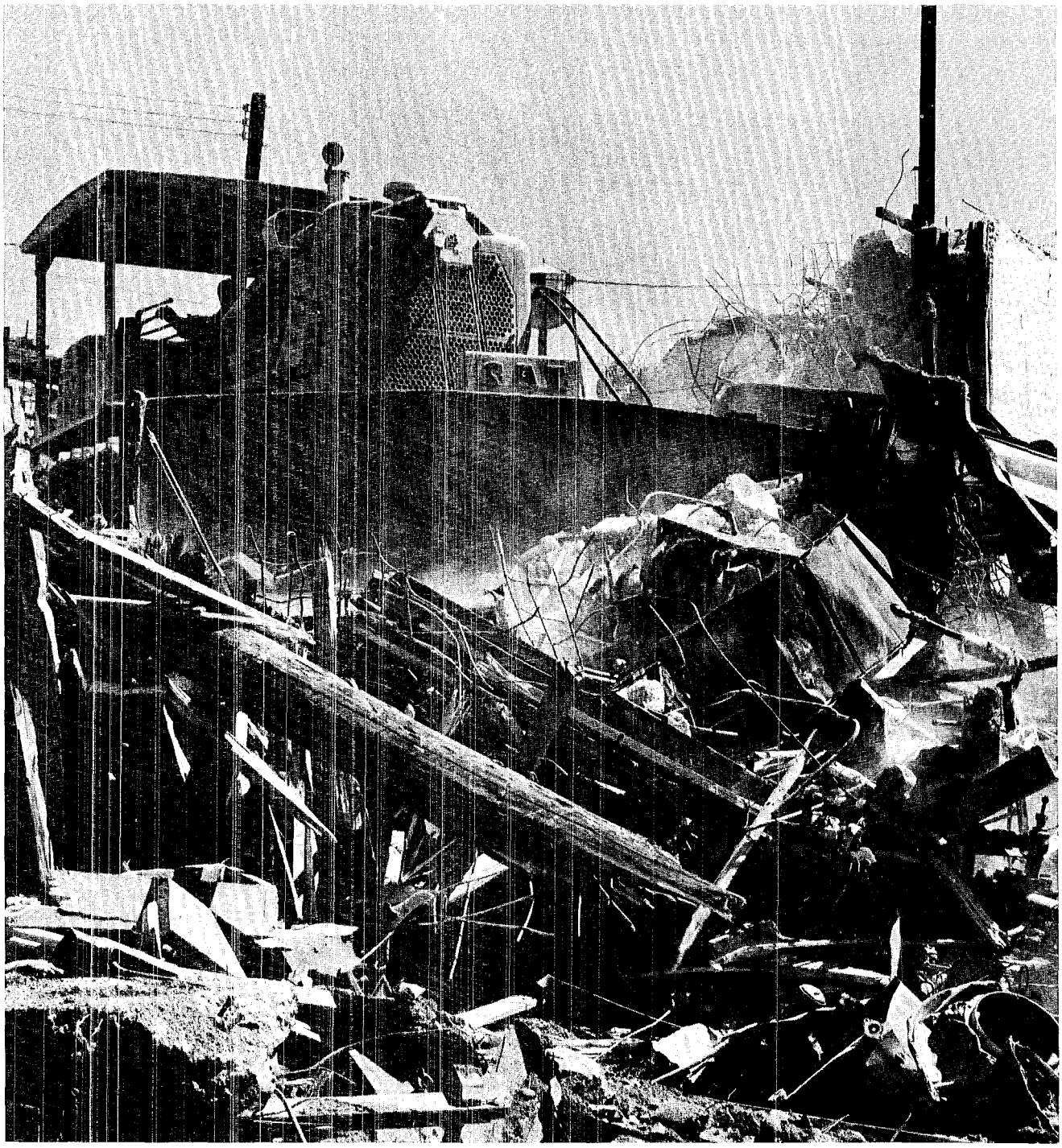
Christa Carola Sobczak, Los Alamos, SP-1.

Charles William Henderson, III, Millville, N.J., SD-3.

Warren Howard Buxton, Buffalo, Wyoming, GMX-11.

Donald Macklee Wickline, Denver, SD-1.

It's the End of the Road



A Zia Co. workman piles up debris of old TA-1 with a bulldozer.

for TA-1

LASL'S FIRST TECHNICAL AREA IS BEING RAZED

Old TA-1, south of Trinity Drive, in the most literal sense is rapidly biting the dust. The Zia Company, under the supervision of Charlie Stallings, ENG-4, is razing six buildings in the old Sigma area.

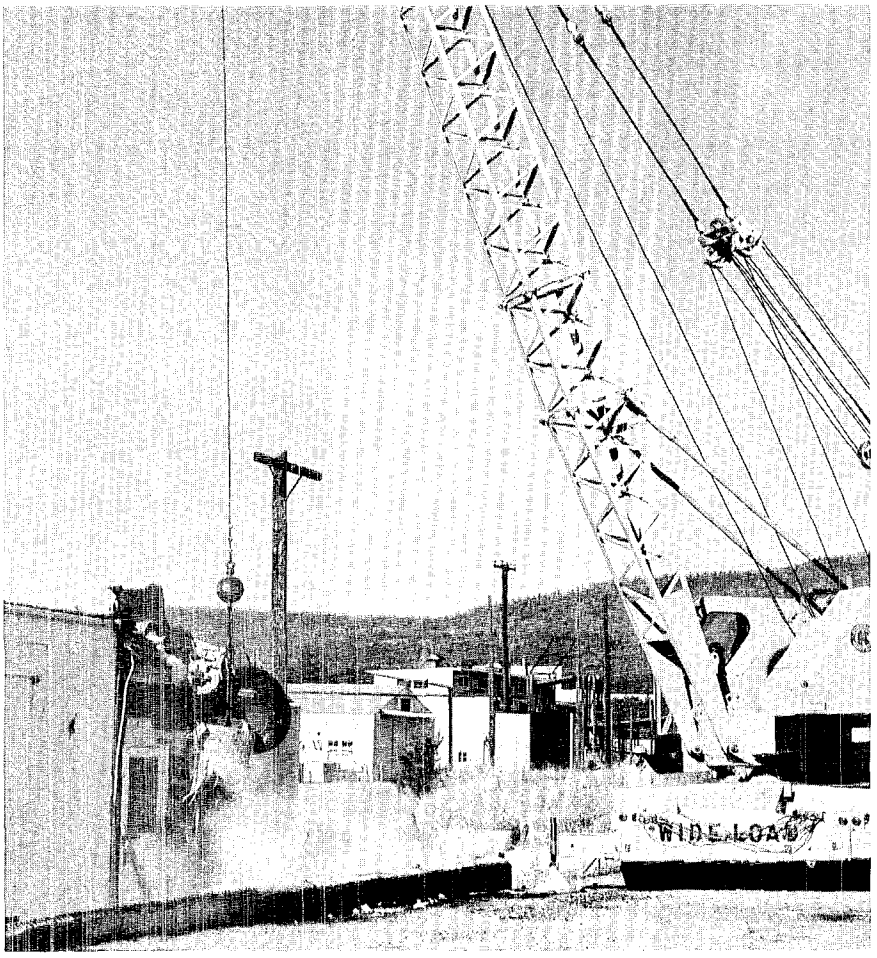
The six structures, which were connected with early nuclear weapons work at Los Alamos, were a few of the last remaining buildings in the original technical area located near the Community Center.

Building 30, TU, TU annex, D-5 vault, and the Heat Treat buildings have all been demolished by the "head ache ball," and bull dozers completed the work by grinding the remains beneath their treads. Old Sigma Building is being dismantled by hand. All residual material is being taken to the Mesa del Buey contaminated dump to be burned; or in the case of concrete, buried.

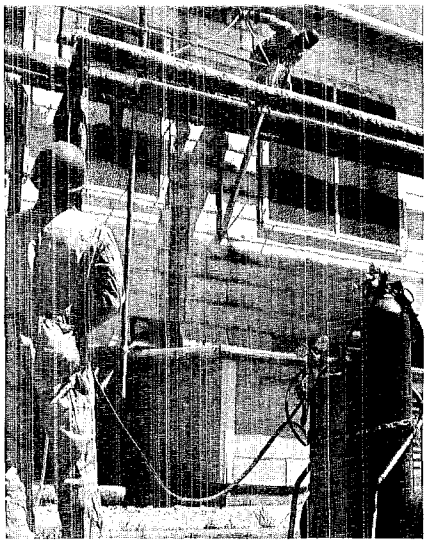
The razing started July 21. First the buildings were stripped of equipment, then destroyed, concrete broken up and removed, old acid sewer lines and septic tanks dug up and disposed of.

The old vault building was completed January, 1945; followed by Heat Treat and TU buildings, August, 1945; Sigma Building, September, 1945; Building 30, July, 1946; and TU annex, July, 1948.

Six other buildings in the area subsequently will be surplused by the AEC and sold to successful bidders. After all 12 buildings have been removed, the land will revert to AEC Real Estate and be used for commercial purposes.



"Headache ball" swung by a big crane was the chief leveler in the demolition of Los Alamos Scientific Laboratory's original technical area.



An acetylene torch makes short work of cutting up assorted hardware in preparing to demolish TA-1.

A workman puts on a mask to protect him from radioactive dust which has accumulated in the old buildings.

WHAT'S DOING

All times listed
are Mountain Daylight Time

KIDS DAY: An annual event sponsored by Kiwanis, Saturday, September 12.

Swimming meet, 9 a.m., at high school pool. Two age groups: 10 and under; 11 and 12.

Kids' Pet Show, 1 p.m., Mesa school playground.

Track and Feld Events, 2 p.m., Sullivan Field. Two age groups: 8 and 9; 10 and 11.

LITTLE THEATER: Civic Auditorium. Admission by season ticket or single admission tickets available at the door at $1.75, adult; 75 cents, student.

Friday and Saturday, September 18 and 19, "The Caine Mutiny Court-Martial." Curtain time, 8:30 p.m.

FILM SOCIETY special lecture by Jack Garfein, stage and motion picture director. Scenes from two of Mr. Garfein's pictures will supplement his talk.

Friday, September 11, 7:30 p.m., Civic Auditorium.

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information on specific hikes.

Thursday, September 3, evening hike. Leader, Dibbon Hagar.

Thursday, September 10, evening hike. Leader, Marlene Cockle.

Sunday, September 13. Hike to be announced. Leader, Don Rose.

Friday-Sunday, September 25-27, Santa Barbara campground to Cowles and vice versa by two parties.

LOS ALAMOS HIGH SCHOOL POOL: Summer schedule for public swimming. Adults 35 cents, students 15 cents.

Monday through Friday, 2 to 10 p.m.

Saturday and Sundays, 1 p.m. to 6 p.m.

INTERNATIONAL FOLK DANCE CLUB: Open to the public. Meets every Tuesday, 8 p.m., Recreation Hall.

SWIMMING CLUB OF LOS ALAMOS, INC., Membership open to adults interested in swimming. Club meets every Sunday, 7 to 9 p.m.

Letter from FDR to Oppenheimer Added to LASL Museum Display

A typewritten letter, with the handwritten word *Secret* at its opening, has been added to the collection of scientific and historic memorabilia in the LASL Museum in AP Building.

The letter was sent to Dr. J. R. Oppenheimer at Post Office Box 1663, Santa Fe, New Mexico, on June 29, 1943. It is on stationery with the simple heading THE WHITE HOUSE WASHINGTON and is hand-signed, Franklin D. Roosevelt.

Roosevelt apparently wished to impress upon Oppenheimer and his scientific associates the importance with which the Government viewed their work.

"I know that you and your colleagues are working on a hazardous matter under unusual circumstances," Roosevelt wrote. "The fact that the outcome of your labors is of such great significance to the nation requires that this program be even more drastically guarded than other highly secret war developments."

The President related his directions for special security precautions and continued:

"Whatever the enemy may be planning, American science will be equal to the challenge. With this thought in mind, I send this note of confidence and appreciation.

"Though there are other important groups at work, I am writing only to you as the leader of the one which is operating under very special conditions, and to General Groves. While this letter is secret, the contents of it may be disclosed to your associates under the pledge of secrecy."

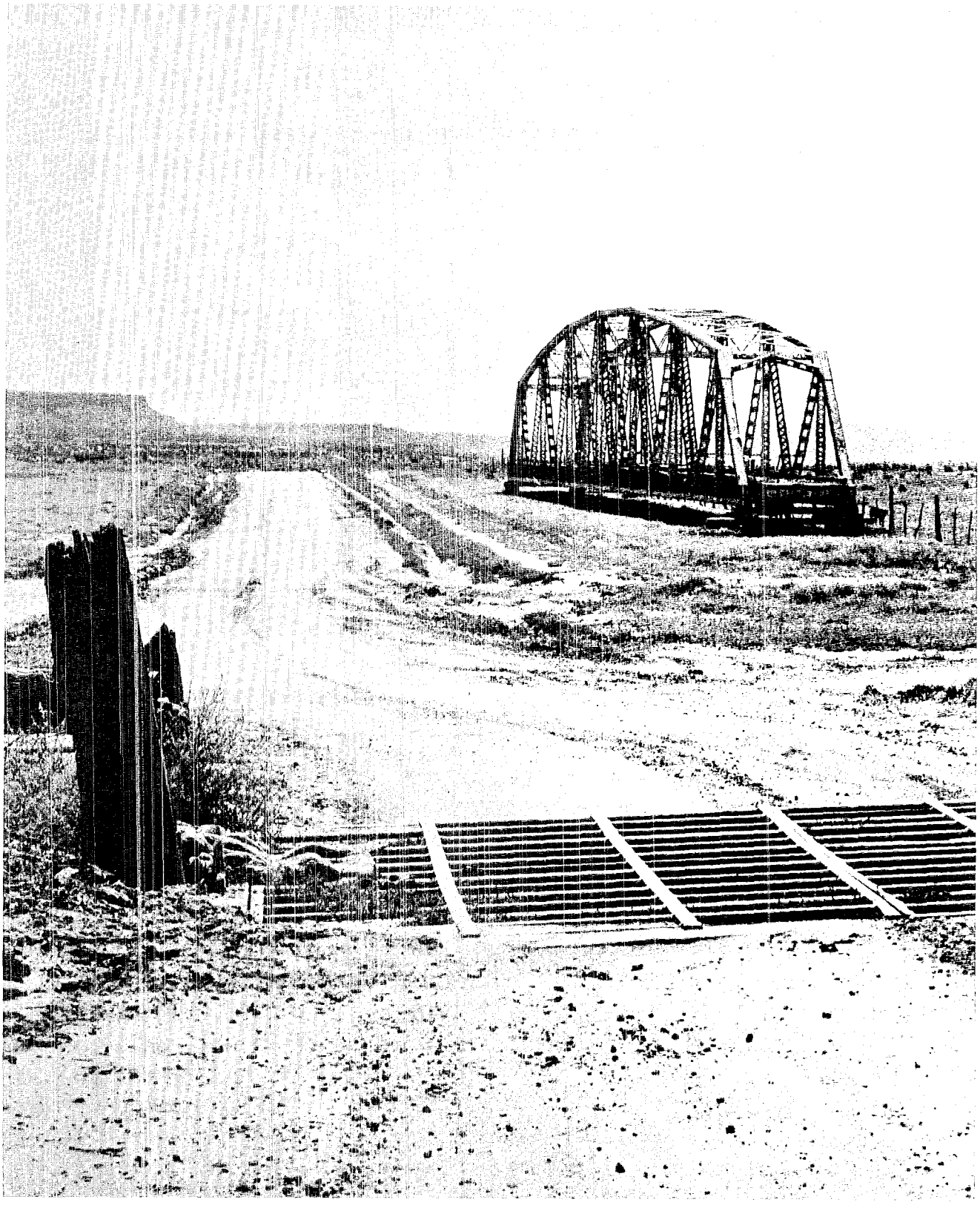
Oppenheimer made the letter available as a result of his visit here May 18, when he toured the museum. He mentioned its existence while looking at other historic documents on exhibit, and told Community Relations Director Robert Y. Porton, who has charge of the museum, that he would send it along.

Rover Safety Experiment Planned

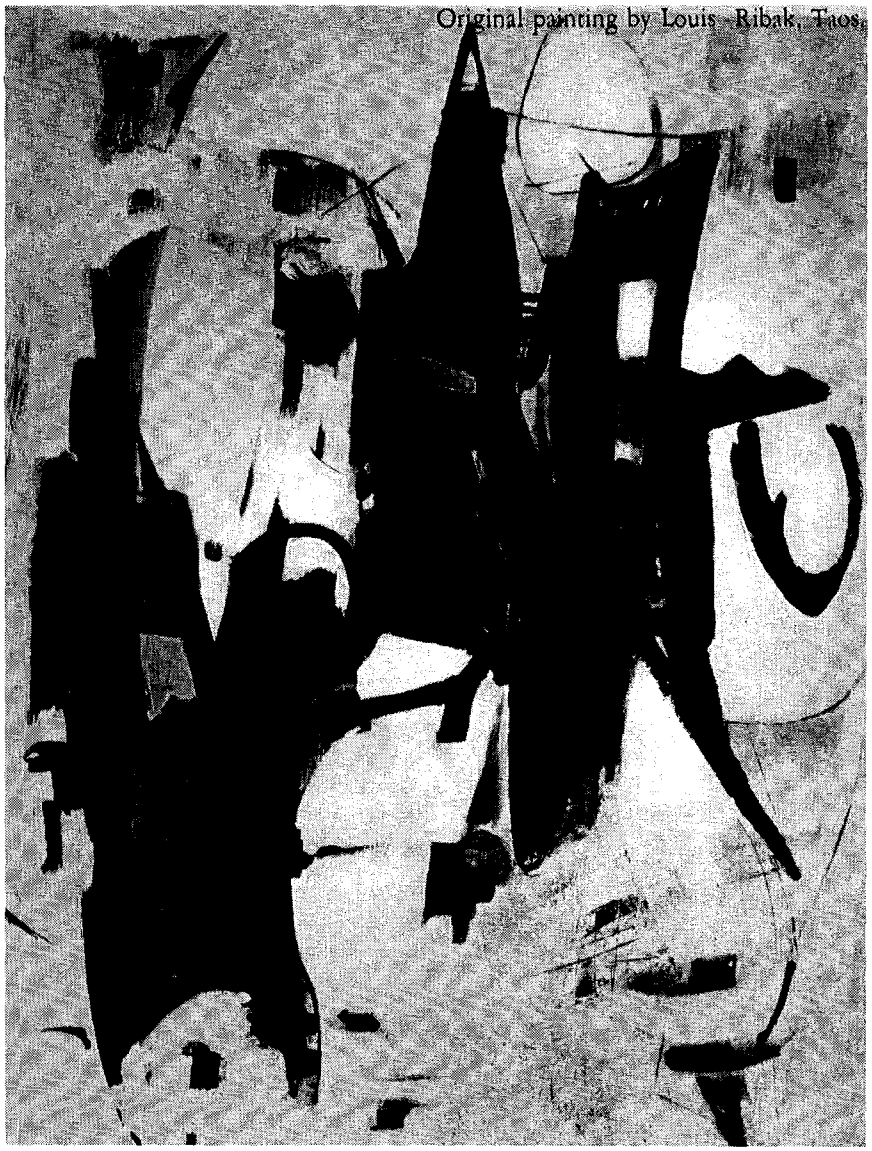
A modified Kiwi-B4-E reactor will be deliberately exploded during an abnormal transient test early this winter at the Nuclear Rocket Development Station, Nevada. The test, to be conducted by LASL, will be known as Kiwi-TNT—an appropriate acronym for Transient Nuclear Test.

In the Kiwi-TNT experiment, the reactor will be placed about 600 feet from Test Cell "C" at NRDS. The control rods will be driven abnormally fast, and presumably the reactor will be blown apart by internal vapor pressure. The high explosive equivalent of the Kiwi-TNT experiment will be approximately 100 pounds of HE.

Dr. L. D. P. King, head of LASL's Rover Flight Safety office, said the Kiwi-TNT experiment will be used to obtain basic reactor shutdown information, which in turn can be used to obtain more accurate estimates of various possible reactor accidents. During the test, scientists will be able to observe a uranium-graphite reactor system at very high temperatures, about which little is known, Dr. King said.



What is a bridge doing in the midst of a New Mexico rangeland? There isn't a river in sight and the bridge spans nothing but grass and a few grazing cattle. The long steel structure is a couple of hundred yards off the highway south of Navajo Lake near the northwest corner of the state. Photograph by Bill Jack Rodgers.



Henry T. Motz
3187 Woodland
Los Alamos, New Mexico

Man's accelerating progress toward mastering his environment is experiencing a startling thrust as a result of experimentation in nuclear space propulsion and controlled thermonuclear reactions.

Qualified applicants are invited to send resumes to:
Director of Personnel Division 63-90

los alamos
scientific laboratory
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LOS ALAMOS, NEW MEXICO

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