THE ATOM

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THE ATOM

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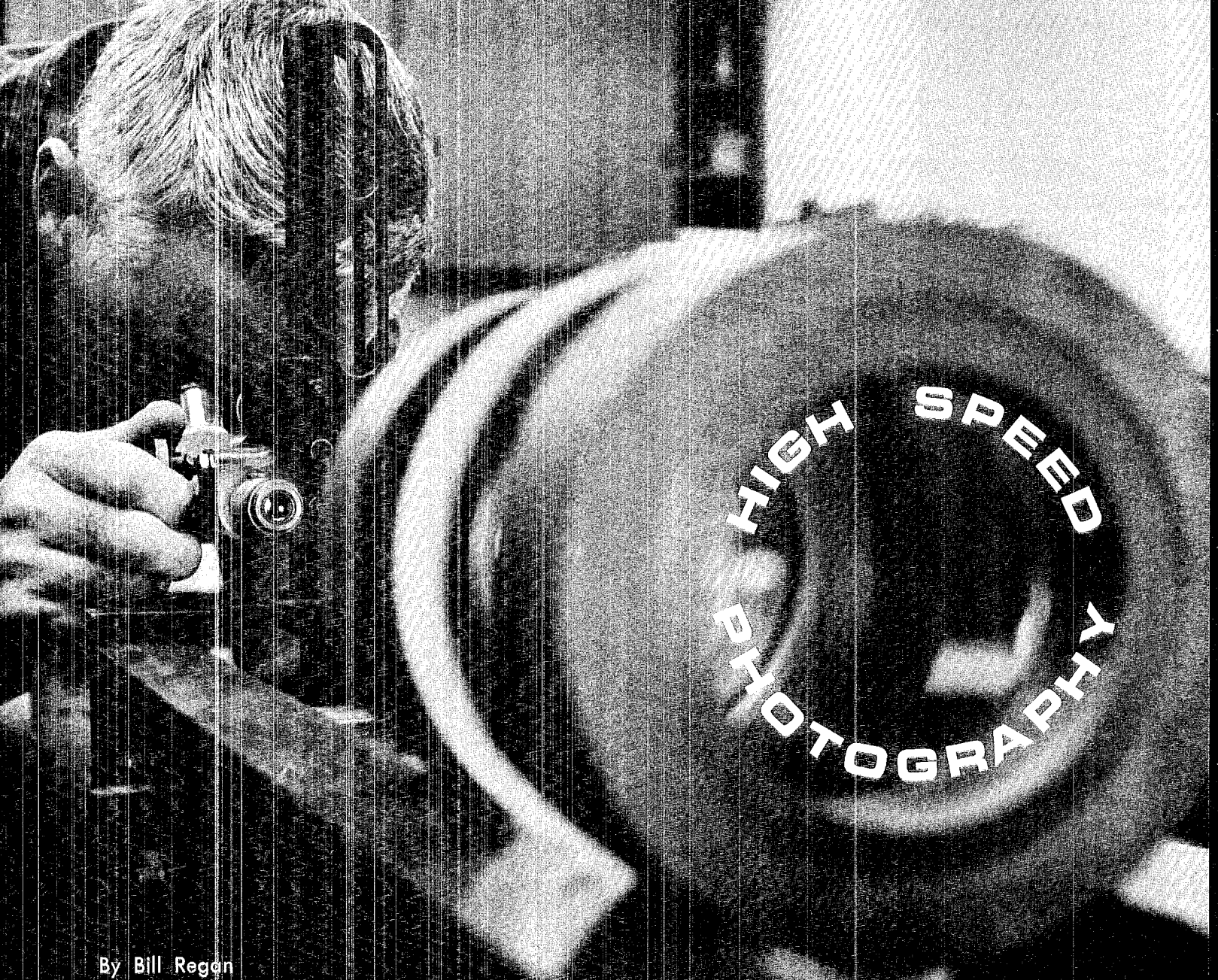
COVER:

Photographs such as this provide important information to GMX-7 scientists in their continuing investigations into the physics of initiation of explosives. This is a streak camera record of the shock wave generated by an exploding bridge wire detonator with a glass head. The photograph is taken from the rear through the transparent head of the detonator and gives a continuous time record of the reactive shock wave propagating away from the exploding wire. Story begins on page 1.



HIGH SPEED PHOTOGRAPHY

By Bill Regan

Photographs by Bill Regan and Bill Jack Rodgers

More than 100 years ago a pioneer English photographer used a lens, a light-tight box and an electric spark to freeze on a sensitized surface an image moving too fast to be visible to the human eye. Today, refinements of that same basic technique assist Los Alamos Scientific Laboratory scientists in their continuing probe into the physics of high explosives.

The pioneer photographer was William Henry Fox Talbot who in 1851 produced what is considered to be the first high speed photograph with an exposure duration of approximately 1/100,000 of a second. At Los Alamos, such a speed would now be far too slow to record events of interest in high explosives research. Exposure times per frame are now /continued on next page

Austin Bonner, GMX-6, prepares a camera for use in an Ancho Canyon bunker. Camera lens pointing upward to glass covered port hole in ceiling is focused on a mirror to reflect image from a high explosives experiment.

PRECEDING PAGE: O. G. "Bud" Winslow, GMX-8, checks quality of camera port glass by examining a resolution chart as viewed through the glass with a microscope. Careful attention to details such as this is responsible for the high quality of results obtained by LASL high speed photography experts.

high speed photography . . .

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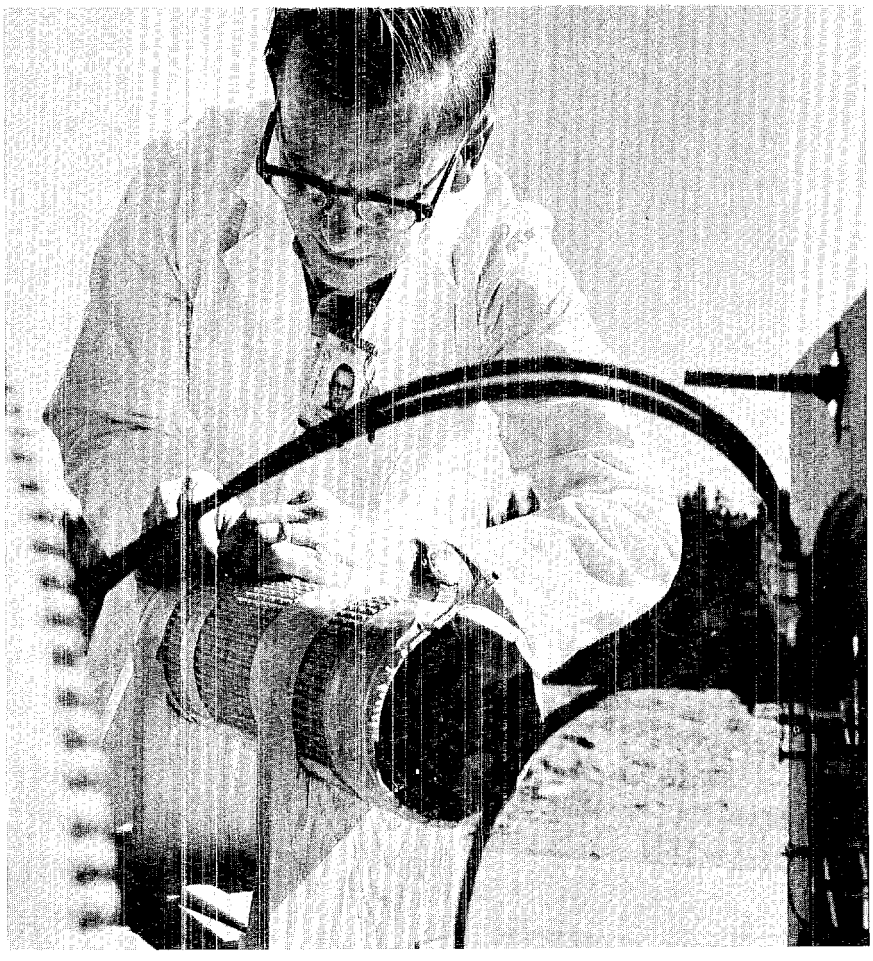
in the range of one to 20 shakes (a shake is one hundred-millionth of a second). Using slit or sweep cameras and suitable differential analysis techniques, scientists are able to resolve time points one to two nanoseconds apart (a nanosecond is one billionth of a second). The single lens has now become an optical system composed of many lenses. And the light-tight box containing the film is usually housed in a stout reinforced concrete bunker to protect it from the force of the explosion under study.

For objects which are not self-luminous, the spark flash has been replaced by an argon flash bomb. With this system, a plane wave generated by high explosive is used to shock an argon filled gap in a Lucite container, creating an extremely bright, short duration (one to two shakes) flash. The light is quenched when the wave hits the Lucite, thus controlling the flash duration by varying the gap, which also can be filled with air or xenon, giving much the same effect.

Although it may seem that present day experimenters using high speed photography in many sophisticated ways are far removed from Fox Talbot and his contemporaries of the mid- and late 1800's, surprisingly, most of the basic methods were proposed in the early days of the medium. Development waited only for the advance of technology to provide equipment and a widespread desire and need to study objects in rapid motion.

At Los Alamos the desire and the need came simultaneously with the founding of the secret laboratory to develop a new weapon of war—the atomic bomb. Design and development of this new kind of weapon required additional, and more exact, information on the physics of detonation, shock waves, behavior of detonators and movements of explosively driven systems. These had to be intensively studied and understood before a workable implosion system could be devised. High speed photography was and is one of the important tools used to obtain this kind of information.



LEFT: Argon flash bombs are used to illuminate explosives experiments which are not self-luminous. Donald L. Wilson, GMX-7, connects tube which will flow argon gas into space ahead of high explosive. ABOVE: Jerry Wackerle, GMX-7 assistant group leader, studies alignment and focus at streak camera slit plane. Image of sample area is enlarged eight times by a magnifying lens positioned near the experiment outside the camera bunker.

Along the road of refinement of equipment and techniques many a significant marker has been erected in the past quarter century by LASL scientists. The particular needs of the Laboratory have been met by an impressive series of inventions and general improvement of previously available photographic techniques. Today, phenomena of explosives and explosives systems are studied photographically by three groups in GMX division, GMX-6, 7 and 8. A fourth group, GMX-9, devotes its time to improvements in cameras and optics with principal emphasis now on optics. Emphasis has changed because excellent cameras are now commercially available with designs based on ideas patented by LASL's Berlyn Brixner. Historically, GMX-9's mission began in 1943 when it was Group E-2 of the Ordnance division. In addition to many other duties, the group, under the direction of the late Julian Mack, took on the responsibility of providing scientific photography and instrumentation. When Berlyn Brixner, present GMX-9 group leader, arrived at Los Alamos in July, 1943, the first continuously writing, rotating mirror, sweeping image slit camera, designed by Mack from a scheme by J. W. Beams of the University of Virginia, was under construction. Brixner was assigned to put the camera in operation. Important data about the implosion process experiments at Anchor Ranch were obtained with this instrument.

At about the same time, three high speed framing cameras, invented by William G. Marley of the British Mission assigned to Los Alamos, were brought to the project, and one was used to photograph implosion system experiments. These instruments exposed 59 frames, one inch by one inch, at the rate of 100,000 frames per second (fps).

In 1944, a synchronizing circuit was developed at Los Alamos to permit a more optically efficient rotating mirror design to be used in the slit camera. A magnetic signal from the mirror spindle was used to

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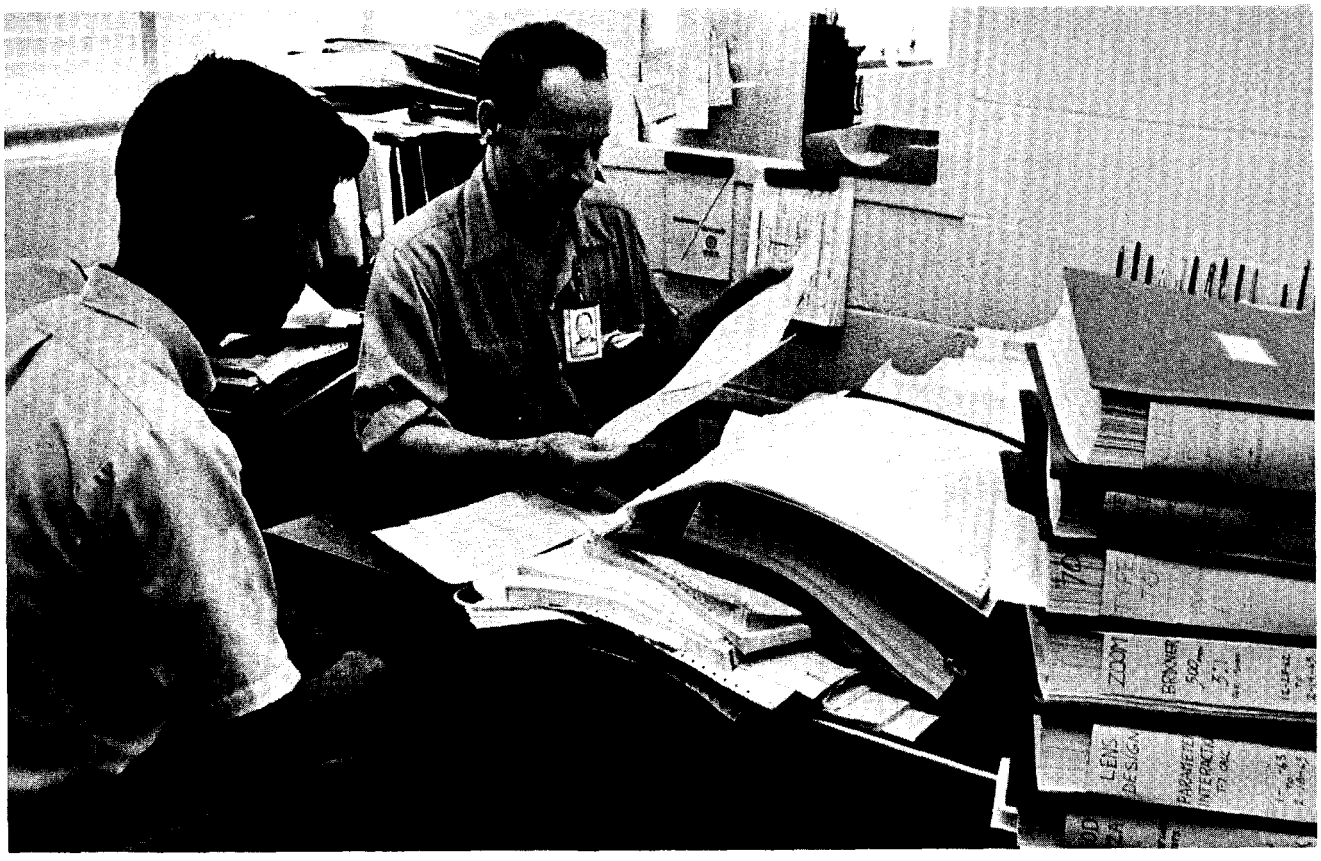

Berlyn Brixner, GMX-9 group leader, discusses design of a new lens with draftsman Ken Imamura. The stack of printouts on Brixner's desk was generated by the LASL computer code for lens design. Use of this code has resulted in improved optics for high speed framing and slit cameras used in explosives phenomena research.

high speed photography . . .

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time the explosion to make it coincide with the seeing period of the camera. This war-time development led to the design by Brixner in 1950 of a framing camera operating at the rate of 1,000,000 fps. A year later an improved version was in use, operating at the rate of 3,500,000 fps. The development of a 10,000 rps steel mirror by LASL staff member W. E. Buck made this remarkable speed possible. This camera was used to obtain valuable photographic data on the first thermonuclear weapon detonation, Nov. 1, 1952. By 1954, a framing rate of 15,000,000 fps had been attained.

It became obvious in the late 1950's that further improvement in the mechanical design of cameras was of little value, but that other factors entering into the final production of a satisfactory image could be refined. Lenses in particular needed improvement. This was pointed out graphically by a superior slit camera, the well known model 72 A, produced for GMX-7 by Brixner's group. Mechanically it performed very well, but no objective lens could be found to meet the stringent specifications set by GMX-7. Many lenses were tried with little improvement in performance noted. Eleven years after the camera was first put in use, the lens problem was solved by a LASL computer program for lens design.

In February of 1966, a finished objective lens designed by computer code was delivered to GMX-7 and met all their requirements. Since that time, six different lenses for use at different working distances have been made for this camera.

The many high speed cameras in use at LASL are now being further optimized by a new family of lenses designed for specific uses by a computer code, originally conceived by Brixner in 1958, written in 1959 by a former LASL staff member, John Holladay, and improved by the late Charles Lehman, a T-5 staff member, in 1962-'63.

What is the difference between framing and smear cameras? How do they work? Is the main goal of high

speed photography merely the production of more frames per second, thereby increasing the volume of information?

The framing camera exposes a sequence of individual photographs at a rate in the millions of frames per second. The number of frames produced varies. It may be 14, 25, 96 or perhaps as many as 170. Since it is not possible to move the film at this high speed, the photographic images are moved optically along a stationary film strip. To obtain these extreme speeds it is necessary to transfer the light beams from one photograph to the next by means of a high speed rotating mirror made of steel or other high strength metal. An optical compensation scheme enables the beams to be transferred without appreciably blurring the individual photographs. The penalty for increasing the framing rate is usually a decrease in frame size or resolution or a reduction in light available at the film plane. All of these factors must be carefully balanced to obtain the best possible compromise.

Here is where the problem of obtaining high speed photographic data becomes sticky. For any high speed rotating mirror camera, even though all its components are perfect and all its adjustments exactly right, there is a limit to the amount and quality of information it can record. The nature of light and the strength of the material in the rotating mirror help to determine the limit. The shorter the exposure time, the less distinct the picture is.

For scientific purposes, just as in the family snapshot, when the picture is so blurred that the details of interest cannot be seen, it is useless. If accurate measurements of the details are to be obtained, the requirements on picture quality can be defined with precision and the shortest useful exposure time determined.

For many of the problems faced at LASL the rotating mirror framing camera is not capable of producing pictures with adequate resolution at exposure times short enough to prevent motion blurring, and it is also more expensive to build.

For these reasons, another type—the slit, streak or, as it is often called, the smear camera—has been developed and refined. This camera does not produce a picture in the popular sense. A streak photograph is really a graph providing a record of motion as a function of time. One of the two space dimensions of the framing camera image is replaced by a time dimension.

In most applications of high speed photography, according to Bill Davis, GMX-8 physicist, the experimenter has a rather complete knowledge of *what* will happen but needs to measure exactly *when* it happens relative to some reference time. Knowledge of the time difference between the appearance or extinction of light at a number of points or along a few lines on the experiment frequently gives all the informa-

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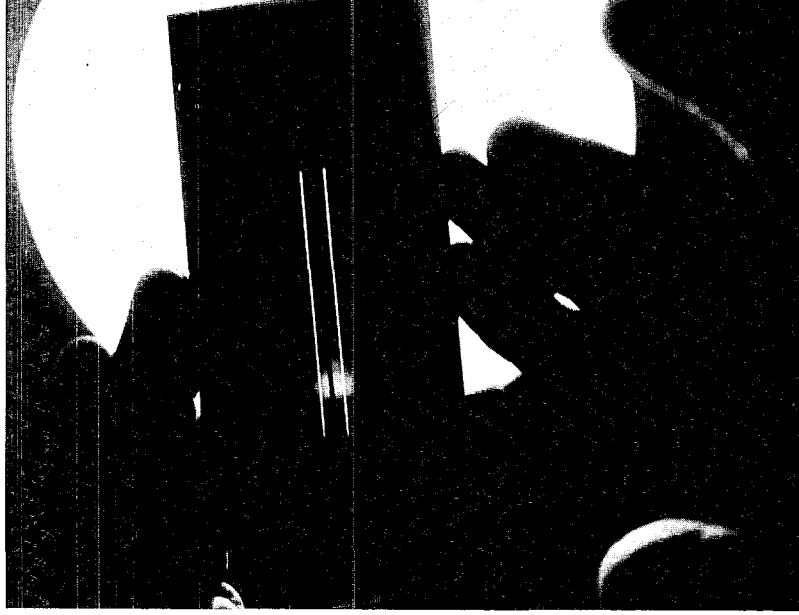
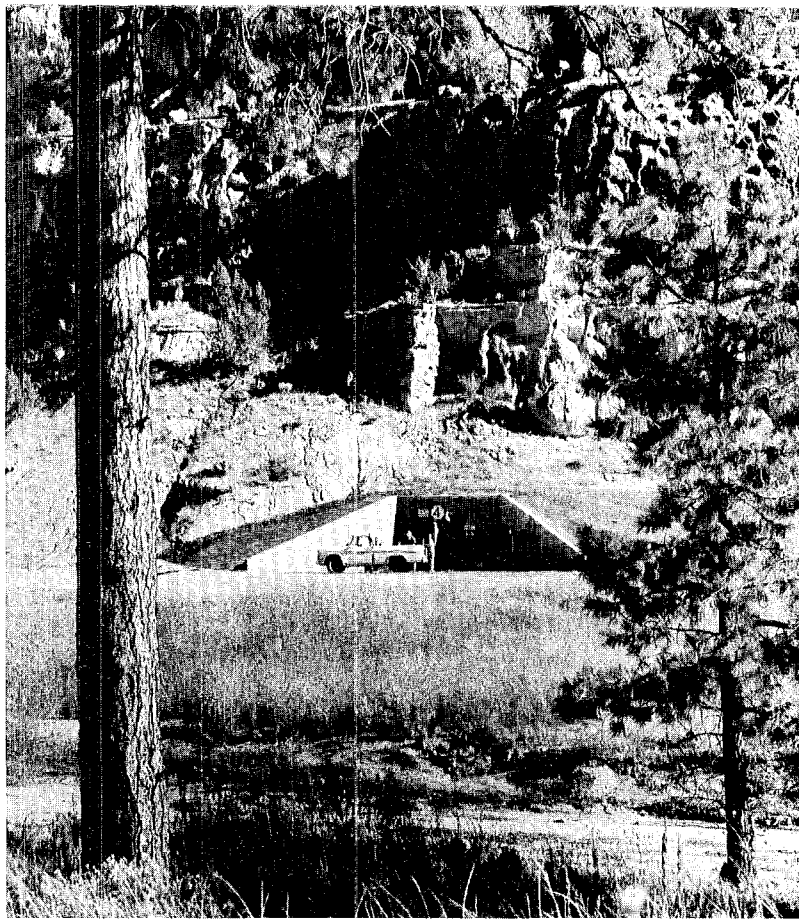
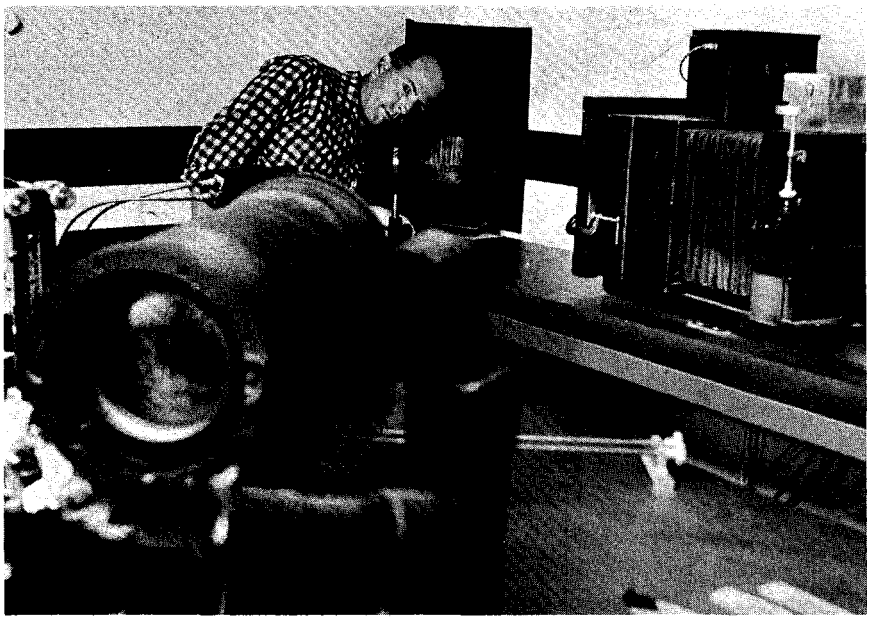


This is a dual slit plate for a LASL Model 72-A high speed streak camera. Streak cameras may also be called smear or slit cameras—the terms are interchangeable.

Safety is the prime consideration in choosing the location of a high explosives firing site, but a scenically attractive location seems to go along with that factor in Los Alamos. This site in Ancho Canyon is one of those used by GMX-6.





LEFT: Donald L. Wilson, GMX-7, observes image at smear camera film plane with a magnifier and uses phone to direct adjustment of experimental set-up outside bunker by co-worker Jerry Olivas. ABOVE: Bill Davis, GMX-8, adjusts alignment of 14 mirrors which reflect images from rotating mirror to framing camera film plane at far right. Davis and former LASL staff member T. E. Holland designed this camera which is capable of exposures as short as 15 shakes.

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tion needed. The smear camera satisfies this need by making not what most people would call a photograph, but a record. An opaque mask with a few transparent points or lines can be placed either near the explosive source or inside the camera. The mask image is moved along the film by reflection from the rotating mirror. If light is being produced behind the transparent area in the mask, the film will be exposed as the image of that area moves along the film, producing a streak. If the light is extinguished, the streak will stop at a position which is directly related to the time at which it was extinguished. By measuring the end points of all the streaks, the time differences are obtained. With cameras now in use, time differences can be measured with a precision of about one nanosecond. About 98 per cent of the high speed photographs taken at LASL are smear camera records. Their interpretation requires detailed knowledge of the experiment and the technique used to produce the light recorded.

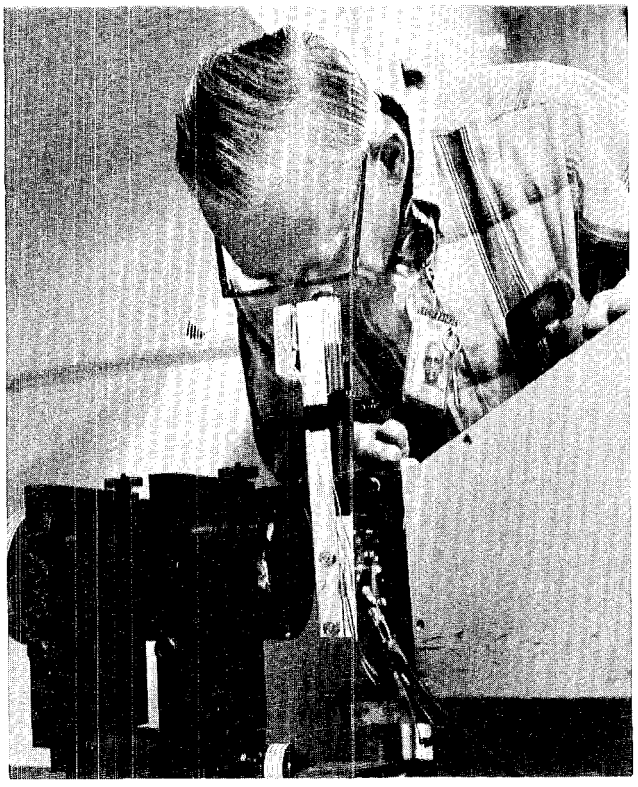
At GMX-8, whose basic assignment is to understand the physics of detonation and to be able to study velocity, temperature and pressure effects on weapons components, smear cameras are used extensively. Nearly 50,000 photo records are in the GMX-8 file. Here the emphasis is on improvement of resolution. And this is accomplished by devoting much effort on the part of a skilled team of technicians and experimenters to improving each element which makes up an experiment.

A framing camera which produces 14 frames on a strip of 35 mm film and is capable of exposures as short as 15 to 20 shakes was designed and developed by T. E. Holland, former GMX-8 staff member, and Davis. Instead of the customary lens strip used as framing stops by the Miller-Bowen type of framing camera, it uses a series of 14 mirror strips each set at the proper angle to reflect the image from the rotating mirror to the film plane. Simple construction and resolution near the theoretical limit at the highest framing rates are advantages of this design.

Still another approach to obtaining more useful

Barry Carlson, left, and John LaBerge, both GMX-8, position an experiment in front of camera bunker port.

James C. Anderson, GMX-7, uses a microscope to focus precisely the slit image on a Brixner-designed Model 72-A smear camera. The objective lens at left of the microscope is one of six especially designed for this camera by GMX-9 utilizing a LASL computer program.



information about explosive events is taken by Robert McQueen's group GMX-6 where color film is routinely used in high speed framing cameras. Interpretation of photographs showing behavior of materials subjected to extremes of heat and pressure from high explosives is enhanced by this additional information, according to J. D. Harper, GMX-6 staff member. Coupled with the use of color is the technique of taking stereo views of each experiment. Twin images are reflected in each frame by using mirrors placed in an elliptical track. Twenty-five frames are usually exposed at one microsecond per frame in a Beckman Whitley model 189 camera using High Speed Ektachrome film. This is the same material used by many amateur photographers; however, much higher than normal film speeds are obtained when necessary by special developing techniques. The available light level is the determining factor.

Although much of the work at GMX-6 is classified,

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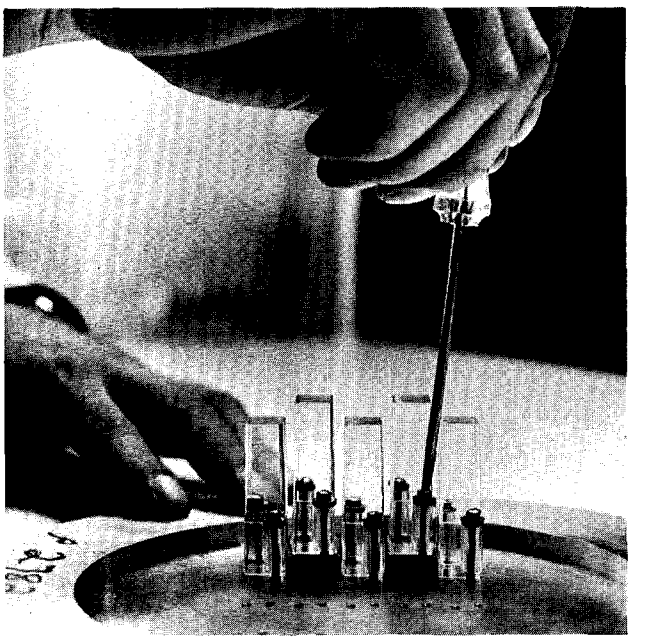
Abedon Lopez, left, and Felix DePaula, both GMX-6, prepare an experiment for measuring shock wave velocities through various materials. Samples are placed under four Lucite blocks painted black. High explosive charge will be placed under metal plate when setup is finally assembled at the firing point.



Closeup shows experiment for measuring shock wave velocities through various materials. Shock waves from high explosive placed beneath the metal plate travel through sample material (black blocks), hit an argon gas-filled gap in Lucite and cause a bright flash of light which is recorded through multiple slits by a streak camera.

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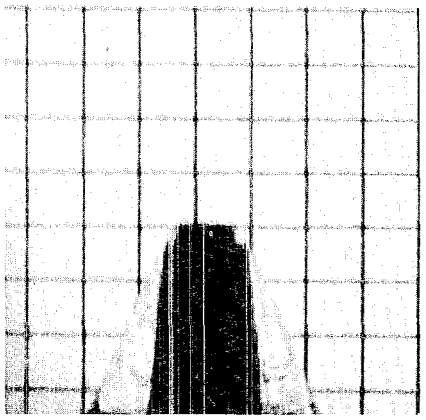
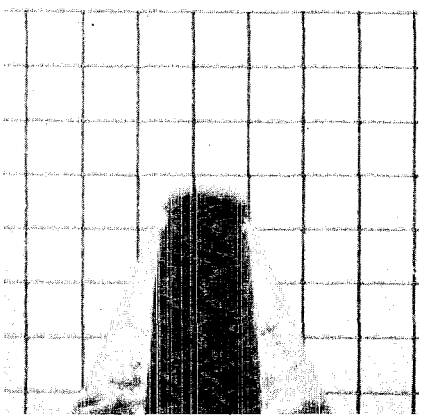
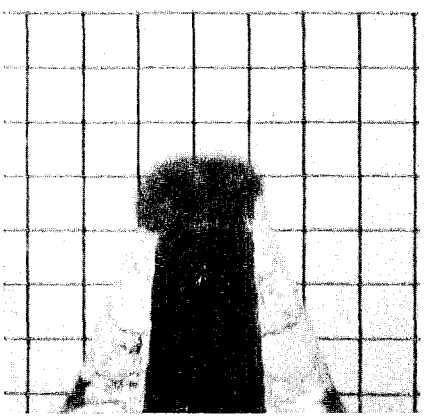
data of interest to geophysicists, for example, are being compiled from many shots fired to determine equations of state for various minerals and metals as well as other materials. According to a GMX-6 physicist, Stanley Marsh, conditions behind high intensity shock waves are comparable to those existing in the earth's interior where pressures of several millions of atmospheres and temperatures of several thousands of degrees exist. Velocities of shock waves are measured with multi-slit smear cameras. From these velocity measurements, pressures and densities are determined.

In contrast to GMX-6, which frequently fires large charges, group GMX-7's principal concern is with small explosive systems and checking performance of exploding-bridgewire detonators. The latter group has also done some research in previously mentioned areas of interest to GMX-6. In fact, some of the detonations are so small that they are carried out not in an armored bunker, but in a so-called "boom box" in an ordinary laboratory room. Quantities of approximately ½ gram or less of explosive are often used.

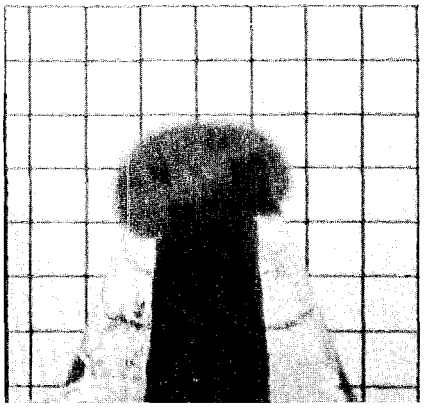
The explosions studied may be small, but it should be noted that the photographic requirements do not decrease correspondingly. As the explosive system gets smaller, better time and space resolution are required for studying its performance. For example, shock waves produced by a small explosion travel just as fast as those created by a large one, but the distance travelled and the area under study are much reduced. Therefore, the photographic record must meet more stringent requirements. Information gained is of great importance in designing efficient explosive driver systems. And here again the workhorse tools of high explosive research, the smear and framing cameras operating in the time scale of a few shakes, are used.

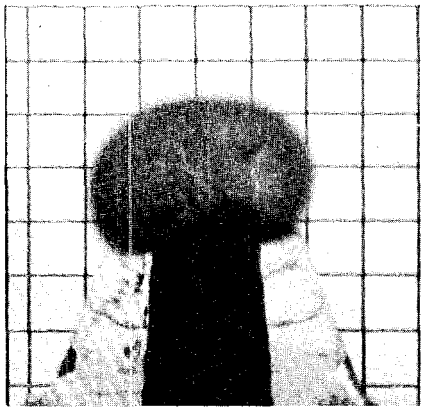


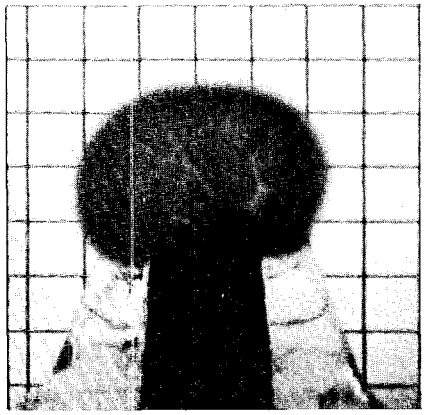




These six photographs selected from a sequence of 14 produced by the GMX-8 Davis-Holland framing camera show the mushroom-shaped detonation wave produced by a tube of Dithekite 13 liquid explosive in a box filled with the same material. The exposure for each frame was 18.7819 shakes, and the time period covered by the 14-frame sequence is 2.9347 microseconds. Inside tube diameter is ¼ inch.

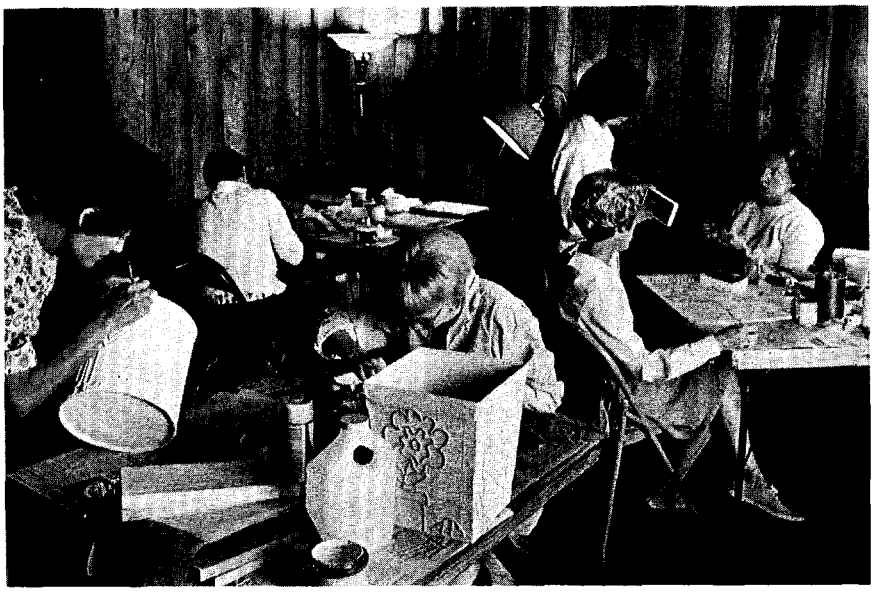






Still another area of information—spectral emission lines—is explored by GMX-7 using a low dispersion spectrograph. Emission properties of gases in shock tubes are recorded by sweeping the spectrograph image along a slit to produce a time resolved spectrogram, another type of high speed photographic analysis. A similar instrument is also in use at GMX-6 by Max Fowler, Bob Caird, Wray Garn and Dave Thomson for studies of Zeeman spectra and Faraday rotation in megagauss magnetic fields.

Although one might gain the impression that high speed photographic techniques are used at Los Alamos only for the study of explosives, it should be emphasized that this is certainly not the case. Plasma physicists in Project Sherwood have found use for the same refined equipment and methods. And a number of J division groups have found it necessary to utilize high speed photography to augment other types of data from weapons tests events.



Rooms at The Lodge which once served as overnight accommodations for official visitors to the Laboratory are now serving community groups such as this crafts class, including, from left, Mrs. Fred Kramer, Mrs. William E. Fox, Mrs. Walter Siglock, instructor Mrs. Blake Kersh, Mrs. J. C. Dotson, and Mrs. Robert Fultyn.

New Life for The Lodge

By Clo Loree

Rustic dining room of The Lodge has changed very little since the mid-'40s, but with addition of south wing, windows on each side of fireplace were removed.

SINCE THE "grand opening" in August of Fuller Lodge as the new cultural center for Los Alamos, many enthusiastic people have been talking and working to actually make it a going concern. To date there has been little visible progress, but when such an immense amount of enthusiasm and so much creative thinking gets channeled into one project, visible progress must be the next step.

Fuller Lodge's history has been varied and remarkable. But from Ranch School dances, plays and graduation exercises through the war days when Nobel scientists slept, ate, discussed and socialized there, The Lodge has been the hub of social activity in Los Alamos. On July 1, at the recommendation of the "Save The Lodge" committee, Fuller Lodge was released to the County of Los Alamos by the Atomic Energy Commission to be used as a museum and cultural center.

The one-year contract between the county and the AEC states the "scope of work" as the following:

"1. The county shall manage, operate and maintain The Lodge for the use of the general public pursuant to the provisions of this contract. The county's performance shall include, but is not limited to, the following:

a. managing, operating, maintaining and repairing The Lodge;

b. furnishing the necessary personnel, supplies, equipment and services for the management, operation, maintenance and repair of The Lodge except such as may be furnished by the Commission;

furnishing utilities and maintaining the utilities systems except such as may be furnished and maintained by the Commission;

effecting such alterations, improvements or additions to The Lodge as may be desired by the county and authorized in writing by the Commission; and

c. conducting or participating in such community activities and conducting such social and other recreational activities as may be determined by the county and the Commission to be in the best interests of the community in furtherance of the purposes of the Commission's operations in Los Alamos."

The County Fair and Rodeo Art Festival which marked the re-opening of The Lodge on Aug. 26 and 27 was conceived and executed in a very short period of time. Its success was apparent from the large crowds that wandered through The Lodge looking at the exhibits and attending the various musical and theatrical performances.

Perhaps the most ambitious undertaking that is a direct result of the proposed Cultural Center is the formation of the Los Alamos Arts Council which will have its first public meeting Nov. 17. The Arts Council has sent letters and copies of its provisional by-laws to 125 organizations in Los Alamos, inviting them to participate in the organizational meeting and join the Council so they can vote on the by-laws of the new organization at that time. The Council hopes it will be able to represent the majority of the culturally oriented groups in Los Alamos.

The Los Alamos Arts and Crafts Association is the first organization actually to contract with the county for space in The Lodge. The association has taken over the kitchen wing, and members have begun cleaning, painting and installing new lights and craft equipment. They plan to have individual space available for their membership and will soon begin lessons that will be open to anyone who is interested.

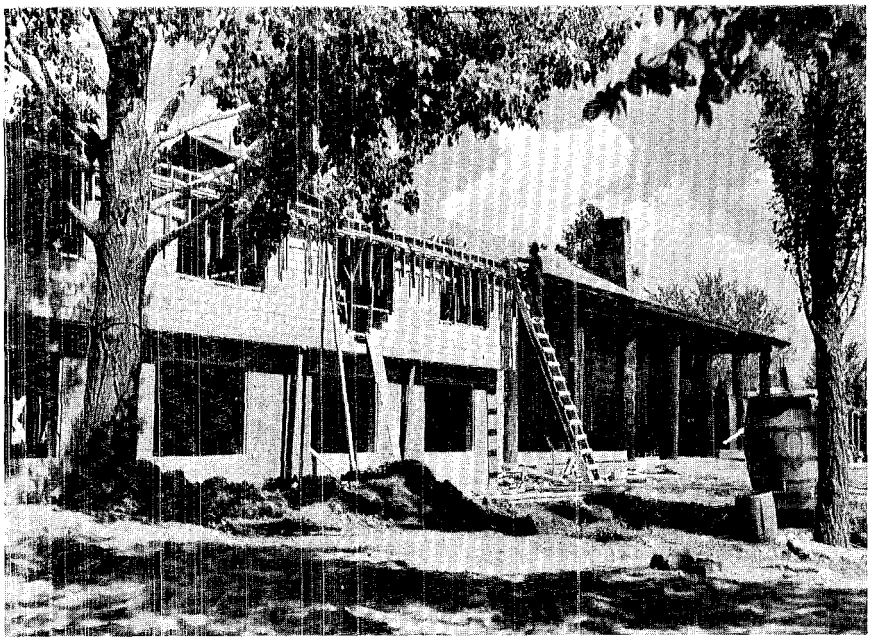
The association will also have two annual shows at The Lodge—one in the spring and one in the fall, according to the president, Hal Olsen, D-3. The first fall show will be Nov. 18 and 19.

Several other organizations have written letters to the county commissioners expressing their interest in using The Lodge. These include the Los Alamos Sinfonietta, Los Alamos Choral Society, Los Alamos Little Theatre, Inc., Don Juan Playhouse, Inc., Los Alamos Light Opera, Inc., Los Alamos dancing teachers and their classes, square and folk dancing groups, Los Alamos music teachers and their students, Los Alamos Film Society and the garden clubs.

The Los Alamos Historical Society has proposed a plan to use the guest house adjacent to The Lodge as a museum to complement the LASL Science Museum. Fred Worman, H-8, as curator, would emphasize the natural sciences and promote the whole area and its history —in particular the people of Pajarito Plateau.

The Chamber of Commerce has also proposed to the county commissioners that the Chamber manage reservations for county properties and be responsible for opening and closing The Lodge each day. Bookings for The Lodge are now being handled by the finance department of the county. Reservations may be made through Phyllis Bryan at the County Municipal building. Rooms are available for exhibits, meetings, lessons, private parties and similar uses for rental fees ranging from $3 a day for a small room to $20 for the main dining room. The Lodge is also available for official use to LASL, AEC and Zia free of charge.

One additional—but temporary—use has been proposed for The Lodge. Since Los Alamos will be a high altitude training site for Olympic athletes next summer, it is possible that some of the rooms will be used to house some of these athletes for several weeks before the Mexico City Olympics.



New wing added in 1948 increased the Lodge's sleeping accommodations.

The general warehouse (SM-30) has a seemingly endless number of bins stocked with items ranging from paint to screws to standard office supplies.

General Store On The Hill

By BILL RICHMOND

FROM PLATINUM AND GOLD to typhoid vaccine to liquid hydrogen—the "General Store On The Hill" has a multitude of items not found in the usual general or neighborhood store—or at many other laboratories, for that matter.

In fact, the warehouse facilities of the Los Alamos Scientific Laboratory contain more than 32,000 separate items.

Among the "best sellers" are ball point pens and aspirin. Each of the 4,000 LASL employes used an average of 10 ball point pens and 43 aspirin last year.

The four main warehouses at LASL—general, chemical, metal and gas stocks—are geographically separated because of operational necessities. In addition, there are warehouse facilities at the Nevada Test Site and branch stockrooms scattered throughout the technical areas of LASL. All of these facilities are under the supervision of the Supply and Property Department.

LASL's warehouse complex is reputedly one of the largest in the Atomic Energy Commission's operations with an inventory of about $2.5 million and a monthly issue of about $150,000.

All stock items available from LASL warehouses are listed in a stock catalog accessible to all employes—usually in the group offices. There are an estimated 700 of these catalogs in Los Alamos—and at other laboratories and AEC installations—plus about 50 individual sections for those specialized groups which normally order only limited items. These catalogs are kept up to date by a full-time employe who prepares memorandums for each catalog listing corrections, plus new and discontinued items. A complete cycle of the catalog is made each year. That is, if all corrections are entered when received, the catalog on Jan. 1, 1968, would be completely different from the one on Jan. 1 of this year.

Records of supplies issued are maintained on computer cards which are forwarded to the Accounting Office. Once a week Accounting sends a listing of supplies drawn by each group to the group leader for his

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The loading dock at the general warehouse does a thriving business in handling the thousands of items shipped and received there.

LASL Warehouses . . .

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approval. This list shows the name of the person drawing the materials, the quantity, value of each item and total value.

The inventory is based on the normal usage of a particular item. Thus, if the normal inventory of an item is 10 and someone wants 100, SP-3 (Stores and Warehousing) notes that it can't possibly fulfill the request immediately. However, a memo or letter to SP-3 well in advance of the time the material is needed will allow them to order sufficient quantities.

In one small, locked room of the general warehouse--SM-30--are safes containing the rare and precious metals valued at about $200,000.

There is detailed accountability on precious metals, such as gold, platinum, silver and palladium, and if these metals are destroyed, a report must be written and submitted to SP-2 and AO. Rare metals available include titanium, tantalum, niobium and others.

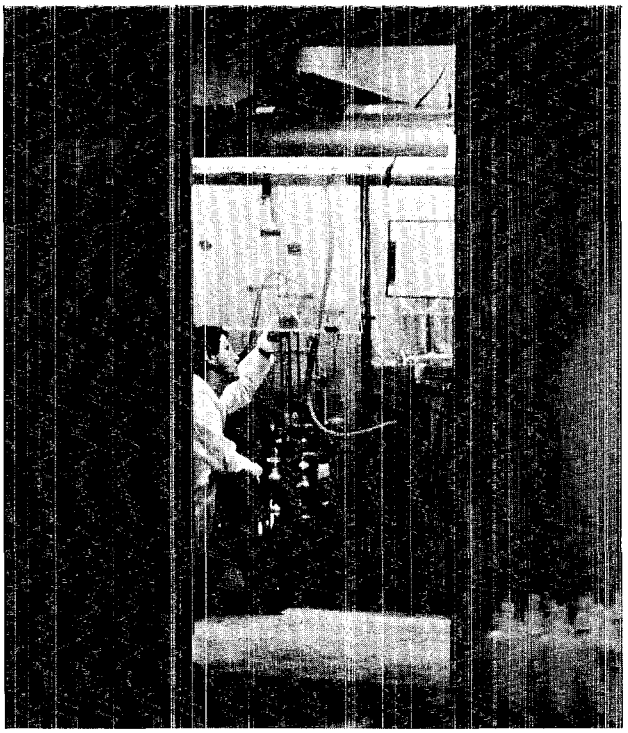
When precious or rare metals are returned to the warehouse, a certificate from the Health Division certifying that there is no contamination must accompany the metals.

Among the services provided by the warehouse facilities at LASL is the furnishing of homes for consultants who are here for a month or two. The cost—to both the Laboratory and the consultant—would be prohibitive if the consultant had to move his furniture here and then move it back at the end of each short consulting period. Therefore, LASL will furnish the house the consultant rents with whatever he requires. This includes furniture, dishes, lawnmowers and other necessary items.

This service must be approved by SP-DO and Personnel. Home furnishings are provided for about 20 consultants a year. Several furnished apartments are also maintained for consultants who come to LASL without their families.

A clothing stock is also maintained at SM-30 where "clean" clothes and safety equipment are issued. This clothing includes a complete change from skin out for personnel in some technical areas. After being worn, the clothing is collected at the various sites by a laundry in Santa Fe which specializes in cleaning contaminated clothes. The clothing is then returned to SM-30 where it is monitored for contamination and replaced in stock. LASL uses about a ton of "clean" clothes a day.

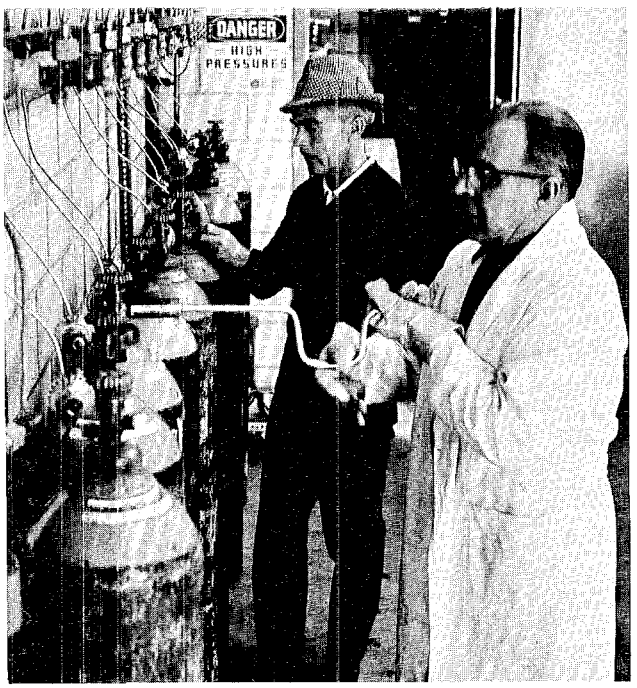
Other items such as safety shoes, safety glasses and jackets are also issued from clothing stock.



Wilfred Romero of SP-3 operates the mercury still in the chemical warehouse.

"Clean" clothes are monitored and stored in the general warehouse after being returned from a laundry in Santa Fe which cleans contaminated clothing.

Rudy Campbell, left, and Tony Serna, both of SP-3 at the liquid and compressed gas facility, connect the helium gas bottles to fill them with high pressure gas.



The shipping and receiving group (SP-4) also works out of SM-30. All supplies and material consigned to LASL or leaving LASL are the responsibility of SP-4. Items and supplies ordered by LASL personnel that are not carried in stock--such as special printing jobs, brochures and special equipment--are also handled by Shipping and Receiving.

A carpenter shop in one corner of SM-30 handles all the crating and boxing for outgoing shipments—including the placing of special seals for classified deliveries. Incoming classified material is placed in a vault until it can be delivered to the proper group. However, the general rule is that all classified material is delivered to the group that ordered it the same day it is received.

Storage space for unclassified material is provided to requesting groups at both SM-30 and SM-142 which is north of the general warehouse.

The typewriter and instrument repair sections are also located in SM-30. They maintain and repair all typewriters and office equipment except the IBM models which are taken care of by an IBM employe who is assigned to LASL full-time. The instrument repair section includes several electronics technicians

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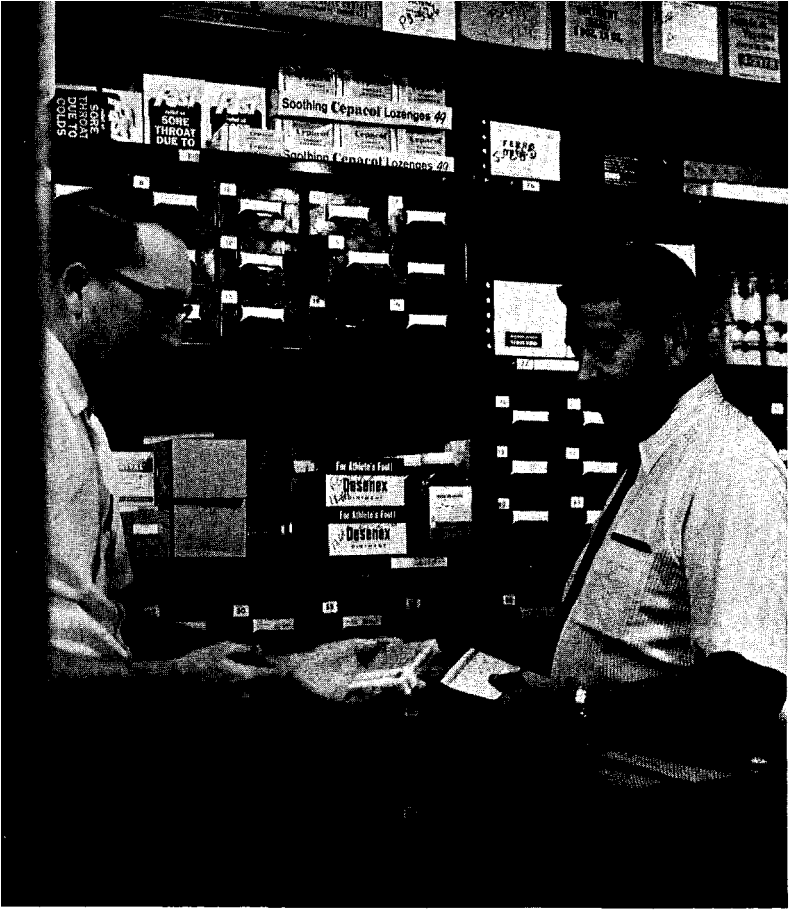


LEFT: Newby Ellington and Joe Tapia inventory stocks in the pharmaceutical section. ABOVE: Benny Montoya fills order for precious metals, which are stored in locked safe.

LASL Warehouses . . .

continued from preceding page

who repair some of the more sophisticated equipment used by the Laboratory.

Across the driveway to the south of SM-30 is the chemical warehouse, SM-31, where supplies used in the various laboratories of LASL are stored and issued. This includes glassware, H-2 medical supplies, rare earths (neodymium, praseodymium, samarium, ytterbium, etc.,) quartz materials, diamond-polishing compound and practically all basic supplies for a well-equipped laboratory. The medical supplies, which are issued only to H-2, range from aspirin to tetanus, smallpox and typhoid vaccines.

One section of SM-31 is used for the storage of flammables. This area has heat sensors for fire protection. When these are "tripped", an alarm rings. About 60 seconds later the doors automatically close and seal, and carbon dioxide floods the area.

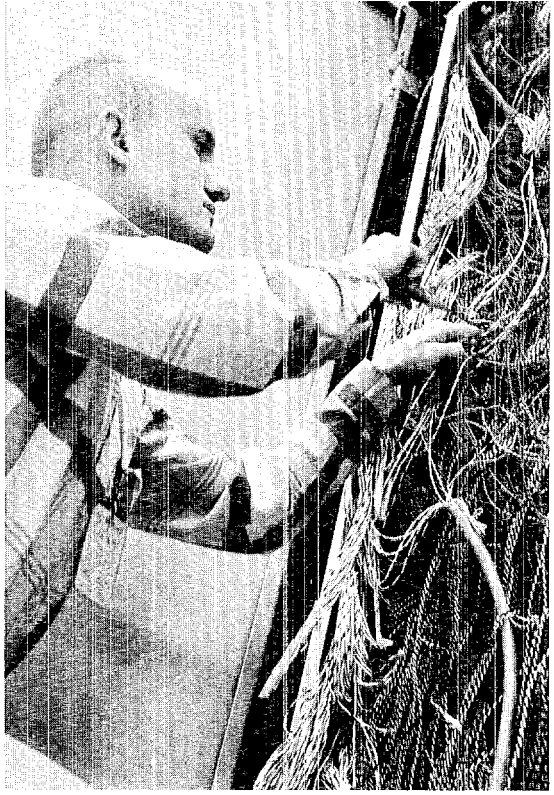
Another room is known as the "safe room" and is used for storage of solvents with high vapor pressure. This room has a blow-out wall in the event of a pressure build-up—and it has blown out on one occasion. The 190-proof alcohol is also stored in the safe-room which has a combination lock on the door.

SM-31 also has a mercury still where the mercury used in the various laboratories is stored. The still has a capacity of 64 pounds a day, although it seldom distills that much. Instead, only the normal requirement is made. The mercury is purchased in the raw stage and purified at LASL because it is cheaper this way. With a still, the used mercury can be reclaimed.

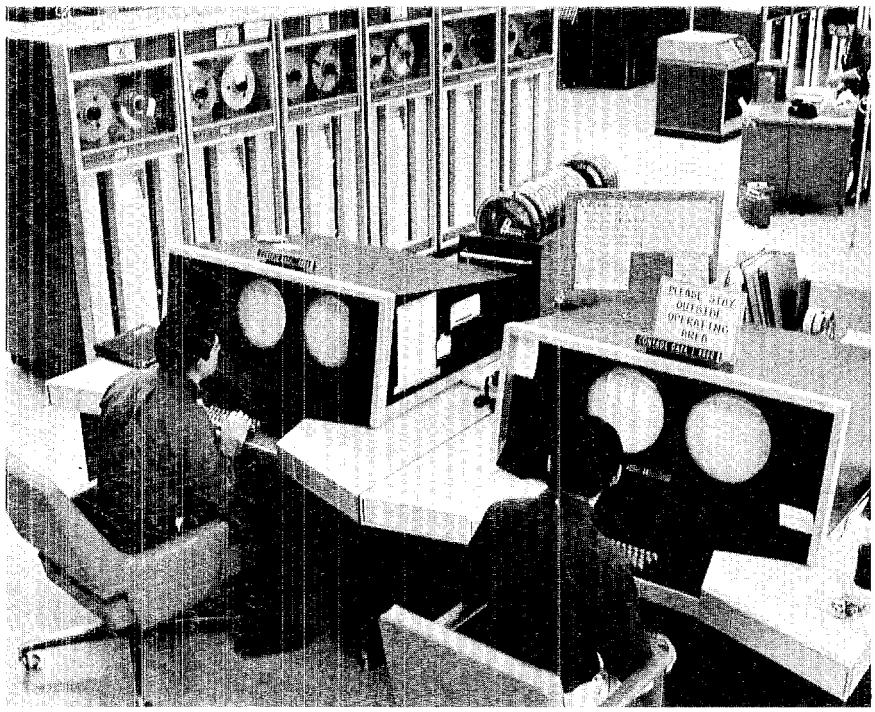
The metal supply storage area is located in the main Shops building south of the Administration building. Here, lead bricks, bronze, copper, nickel, magnesium, stainless and tool steel, cadmium and nearly all types of metal are stored. This facility is primarily for the use of shops personnel, although others who require these materials may obtain them.

The liquid and compressed gas facility is located at SM-170 and is equipped to provide liquid nitrogen, liquid hydrogen and liquid helium as well as about 100 different types of gases. The more than 8,000 gas cylinders—with a capacity ranging from five cubic feet to 240 cubic feet—are filled here, as are the more than 80 gas trailers.

Supplying a laboratory the size of LASL, with its varied programs, is a major undertaking. But the SP department proves daily it is capable of doing the job.



Engineer Dan Chambers checks one of the many leads in the main frame computer unit.



Abad Sandoval, T-1, at left console, runs test problems on the new computer while Bill Dimas, T-1, continues normal work at the console of the first 6600 which has been in use since mid-1966.

LASL Receives New Computer

A NEW COMPUTER recently received by the Los Alamos Scientific Laboratory will increase the capabilities of the Laboratory's already extensive Central Computing Facility by 67 per cent.

This newest addition to LASL's family of computers is a Control Data Corporation 6600 computer system. In mid-1966 LASL received its first 6600, and the Central Computing Facility in SM-132 now has two of these models plus two IBM 7094's and one IBM 7030 (STRETCH).

After the new machine has been installed, there will be a 30-day performance period where actual problems will be processed. If the machine meets its performance criteria, the AEC will accept the computer, turn it over to LASL and pay Control Data Corporation--about $3 million for the second 6600. The first model cost about $4 million, but some of the equipment purchased for it can also be used by the second model.

A data exchange coupler permits the two 6600s to communicate directly with each other and allows one computer to use information that has been programmed into the other. Either machine can also communicate with some of the other's input and output equipment.

Edward A. Voorhees, coordinator for automatic data processing, and his alternate coordinator, William J. Worlton, noted that LASL requirements for computing facilities are approximately doubled every two years. The primary reason for purchasing the second 6600 is that the existing computing facility is "saturated," they reported.

To illustrate the rapid advancement made in computers during the past two decades, Worlton said, "In 1944, the most modern computer known was the Harvard Mark I which had an operational lifetime of about 15 years. The 6600 can do as much work in two minutes as the Mark I did in 15 years."

John Walter tries a salmon egg, but the pool was as fishless as it was beautiful.

Overnight Hike to Nambe Creek

Story and photographs by Bob Masterson

October may seem to be late in the year for an overnight hike into the mountains, but not to the father (me) of an eight-year-old boy (Rob) who had been eager to try out the new pack and sleeping bag acquired back in July just before the onset of the usual late-summer "monsoon" in the Northern New Mexico mountains. Consequently, as things began to dry out at the end of September, tentative plans were made for a hike with John Walter, W-1, and his son, John, a classmate of Rob's at Mesa School.

The first problem was deciding on a destination. What was wanted was a fairly short hike (wouldn't want to overtax the boys) within a reasonable driving distance of Los Alamos with possibilities for some fishing.

The final choice, the upper reaches of Nambe Creek, was suggested by a friend of John's who described a nice short hike and referred to the great fishing in the creek as a result of a series of small dams that create deep pools in an otherwise shallow creek.

There were actually two possible hikes to choose from since John's friend was somewhat vague as to the exact location of the dams. One is by way of the Borrego Trail from Aspen Ranch—now abandoned and being cut up for summer home sites. It is at the end of a short dead-end road leading north from the road which connects State Road 22 just west of Tesuque with the Hyde Park Road about a mile below the Aspen Basin ski area. The second hike begins at the recreation area just below and to the west of the main ski lodge and chair lift at Aspen Basin. The first part of this route is by way of the Windsor Trail, which leads over the Puerto Nambe (Nambe Pass) between Santa Fe Baldy and Penitente Peak into the Pecos River valley, and the last two-thirds follows an unnamed side trail leading down to Nambe Creek. The best map of the area, showing both routes, is the Aspen Basin quadrangle put out by the U.S. Geological Survey.

Despite the fact that it was clearly longer—total distance is about two and a half miles—and more difficult, the Ski Basin-Windsor Trail hike was chosen for its greater scenic potential.

The first three quarters of a mile is a 600-foot climb up the east side of Aspen Peak to the saddle northeast of the mountain. There are several points on the way up with clear views of the ski slopes across the valley. These make good places to stop and catch your breath while admiring the scenery.

Up on the saddle the trail passes through the gate marking the boundary of the Pecos Wilderness Area of the Santa Fe National Forest. A large sign explains that this 136,000-acre tract is being preserved as nearly as possible in its natural wild state and that motorized vehicles are forbidden. At this point the trail also starts downhill and descends almost continuously until reaching the creek 2,000 feet lower.

The boys greeted this switch from up to down with an enthusiasm which was dampened only a

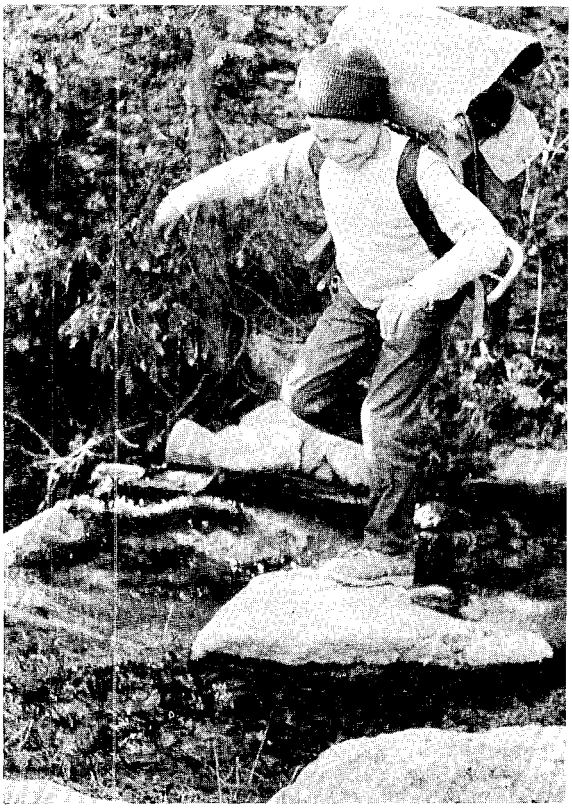
little when the dads pointed out that a trail that goes down must eventually go up.

We followed the Windsor Trail as it descended slightly for perhaps another quarter mile until we came to the trail branching off to the north. A trail marker at this point announced that the Puerto Nambe was on up the Windsor Trail and Aspen Basin was back the way we had come. This new trail plunges abruptly down a fairly steep slope with little in the way of switchbacks. After the first sharp drop the trail levels out considerably and runs along the top of a long spur which the boys promptly dubbed Choctaw Ridge in honor of Billy Joe McAllister of Tallahatchie Bridge fame.

From several points along this ridge the view of the upper Nambe Valley and the aspen-dappled slopes of Santa Fe Baldy was magnificent. At the end of the ridge we scrambled down one last precipitous incline to the narrow floor of the valley, where the trail disappeared in a relatively level open area bordering the creek. This little park, carpeted with aspen leaves from the trees shading it, was immediately chosen as our campsite—a decision gratefully endorsed by our aching "downhill" muscles.

A brief exploration of the creek in the immediate vicinity of the campsite revealed no dams or deep pools likely to harbor trout. And a hike downstream as far as the smaller creek coming into the Nambe from the Capulin Meadows to the north was equally fruitless. The Nambe is a pretty stream, but the particular stretch we covered is utterly lacking in dams, deep holes—or fish, if our efforts are to be considered as valid evidence. The fellowship was great, but the awful truth is that we were skunked.

We hiked back to our camp at noon, fixed a quick lunch and started the long grind back up the mountain. It was a stiff climb, but all agreed the trip was a success—dams or no dams, fish or no fish.



Rob negotiates the first obstacle in the trail—the creek flowing past the picnic area that is the starting point for the hike. This creek is the beginning of the Rio En Medio.

The gate leading into the Pecos Wilderness Area, which marked the end of the uphill grind on the return trip, was a happy sight indeed.

The Technical Side

Symposium on Detonations and Reactions in Shock Waves, American Chemical Society, Chicago, Ill., Sept. 10-15:

"Detonation Spin in Driven Shock Waves in a Dilute Exothermic Mixture" by G. L. Schott, GMX-7

British Nuclear Energy Society's International Conference on the Physics Problems of Reactor Shielding, Harwell, England, Sept. 26-29:

"Shield Analysis of an Experimental Fast Reactor" by D. J. Dudziak and M. E. Battat, both K-1

"The Design and Performance of an Open-Well Shield for High-Power Propulsion Reactor Testing" by G. A. Graves, N-2

Albuquerque Operations Office Computer Meeting, Los Alamos, Sept. 27-28:

"LASL 'Natural' Language Efforts" by G. L. Carter, T-1

"Integrating Design and Production" by J. B. Bourne, GMX-3

"The Role of Computers in P-Division" by H. T. Motz, P-DO

"History of MANIAC Development" by R. B. Lazarus, T-7

American Nuclear Society Meeting, Albuquerque, Sept. 28:

"Reminiscences on Trinity" by R. D. Krohn, D-6

Presentation at High Altitude Observatory, Boulder, Colo., Sept. 28:

"Thermal Properties of the Interplanetary Medium" by A. J. Hundhausen, T-12

Presentation at Institute for Telecommunication Sciences and Aeronomy, Boulder, Colo., Sept. 29:

"Plasma Flow in the Earth's Magnetosheath and Bowshock" by A. J. Hundhausen, T-12

Presentation at Joint Meeting with the Rocky Mountain Section of the American Industrial Hygiene Association; Rio Grande Chapter, Health Physics Society, and New Mexico Academy of Sciences, Sandia Base, Albuquerque, Sept. 29-30:

"Air Sampling with Mylar Bags for Gas Chromatography" by B. C. Eutsler and E. E. Campbell, both H-5

Eighteenth Annual Meeting of the American Association for Laboratory Animal Science, Washington, D.C., Oct. 2-6:

"Behavioral Evaluation of Rhesus Monkeys exposed to Protracted Gamma Irradiation" by J. F. Spalding, H-4; D. N. Farrer, Holloman Air Force Base; L. M. Holland, H-4; R. G. Braun, Holloman AFB

"Performance of Trained Monkeys exposed to Gamma Rays" by L. M. Holland, H-4 (Movie)

Nuclear Metallurgical Society Meeting on Plutonium Fuels Technology, Phoenix, Ariz., Oct. 4-6:

"Plutonium—Then and Now" by R. D. Baker, CMB-DO (Keynote address)

"Thermal Conductivity of Uranium-Plutonium Carbide Fuels" by J. A. Leary, and K. W. R. Johnson, both CMB-11

Institute of Electrical and Electronic Engineers Ultrasonics Symposium, Vancouver, B.C., Canada, Oct. 4-6:

"Second Sound in He^4 Crystals" by C. C. Ackerman, CMF-9

Colloquium, Lawrence Radiation Laboratory, Berkeley, Calif., Oct. 3:

"The Mass Law and Nucleosynthesis by Rapid Neutron Capture" by P. A. Seeger, W-8

Governor's Safety Conference, Idaho Falls, Idaho, Oct. 5:

"Industrial Hygiene — Its Importance in the Protection of the Industrial Worker" by H. F. Schulte, H-5

Presentation at the Greater Rio Grande Chapter, Association for Computing Machinery, Albuquerque, Oct. 5-6:

"LASL 'Natural' Language Efforts" by G. L. Carter, T-1

Eleventh Conference on Analytical Chemistry in Nuclear Technology, Gatlinburg, Tenn., Oct. 10-12:

"Concentrations and Distributions of Carbon and Oxygen by ^3He Activation and Autoradiography" by D. M. Holm and W. M. Sanders, both K-1, W. L. Briscoe, P-1, and J. L. Parker, K-1

Fourth Conference on Exploding Wire Phenomenon, sponsored by the Air Force Cambridge Research Laboratories and accepted by the American Physical Society as a Topical Conference, Boston, Mass., Oct. 18-20:

"Deflagration of Secondary Explosives by Slowly Exploding Wires" by R. J. Reithel, GMX-7

20th Annual Gaseous Electronics Conference, San Francisco, Calif., Oct. 18-20:

"Reactions of N^+_2 within N_2" by W. B. Maier, II, J-10

Presentation at American Physical Society Meeting, Division of Nuclear Physics, Madison, Wisc., Oct. 23-25:

"Measurement of Fission Cross Sections" by M. G. Silbert, P-DOR

American Institute of Aeronautics and Astronautics Fourth Annual Meeting and Technical Display, Anaheim Convention Center, Anaheim, Calif., Oct. 23-27:

"Nuclear Rockets" by Keith Boyer, J-DO

Fourteenth Nuclear Science Symposium, Institute of Electrical and Electronic Engineers, Los Angeles, Calif., Oct. 31-Nov. 2:

"The On-line Application of Electronic Calculators to Nuclear Counting Systems" by H. J. Fullbright, III, GMX-1

"Determination of Oxygen in Germanium by ^3He Activation" by D. M. Holm, K-1, W. L. Briscoe, P-1, and J. L. Parker, K-1

Capt. James Greening, USAF, a military staff member with LASL group W-1, has been awarded a certificate of merit from the Air Force Systems Command for work in the weapons support program.

The citation, signed by Gen. James Ferguson, commander, AFSC, Washington, D.C., was presented to Capt. Greening at a recent ceremony at the Air Force Weapons Laboratory in Albuquerque, by Col. David R. Jones, director. Capt. Greening was cited for his outstanding performance as project officer, Weapons Integration Branch, AFWL, for the period December, 1964, to April, 1967.

David A. Sundberg, first editor of *The Atom*, has been named director of public information at Oak Ridge National Laboratory. He joined Oak Ridge in March as editor of a newly established quarterly journal, after serving as editor of the American Nuclear Society's *Nuclear News*. Sundberg was at Los Alamos from 1961 to 1965, serving as assistant editor of the old *LASL News* and then as *Atom* editor.

Raemer E. Schreiber, technical associate director of LASL, presided over the winter meeting of the American Nuclear Society held in Chicago Nov. 5 through 9. Schreiber assumed the presidency of the ANS earlier this year. In addition, LASL scientists contributed six technical papers to the meeting and chaired one of the sessions.

short subjects

Rodney S. Thurston, CMF-9, was recently elected to a three-year term on the Cryogenic Engineering Conference Committee. Previous Los Alamos employes who have served on the Conference Committee are **E. F. Hammel, F. J. Edeskuty** and **A. F. Schuch.**

The Cryogenic Engineering Conference is affiliated with the National Academy of Sciences through the Division of Engineering of the National Research Council. The conference is an interdisciplinary gathering of engineers and scientists concerned with the problems of research, development and product use at extremely low temperatures.

In 1965, Thurston's work on pressure oscillations which develop during the heated flow of liquid hydrogen was selected as the award winning paper of the previous Cryogenic Engineering Conference. This work was done while he was on the Laboratory's graduate thesis program. Thurston received a Ph.D. in mechanical engineering from the University of New Mexico in 1966.

Hans Bethe Awarded Nobel Prize for Physics

The 1967 Nobel prize for physics has been awarded to Hans Bethe for his "contributions to the theory of nuclear reactions, especially his discoveries concerning the energy production in stars."

Bethe, a professor of physics at Cornell University and a LASL consultant, received a $62,000 cash award and a gold medal. Prof. Erik Rudberg, permanent secretary of the Swedish Royal Academy of Science, said Bethe carried on the work begun by Einstein in explaining the laws of energy.

Bethe's research in theoretical physics played a significant part in the work at Los Alamos during World War II, when he was leader of the theoretical division.

Research in nuclear physics led Bethe to the theory of energy production in stars. This theory explains those most important processes of stellar phenomena, which are ultimately responsible for the birth and death of stellar systems, for the origin of extra-terrestrial radiation and hence for the source of energy which has made possible life on this planet.

Since the war, he has made important contributions to the quantum field theories, to the meson theory of nuclear forces and to the theory of the internal energy of nuclei. Simultaneously with these activities, he also has participated in technical work directed toward the use of nuclear energy for the production of useful power.

He received the AEC's Enrico Fermi Award for 1961 for "contributions to nuclear and theoretical physics, to peaceful uses of atomic energy, and to the security of the United States."

223 Awarded U of C Service Pins

More than 200 long-time employes at the Los Alamos Scientific Laboratory were honored last month with the presentation of University of California service pins at a ceremony in the Administration building auditorium. Director Norris E. Bradbury made the awards to the veteran employes, including 60 who have served the Laboratory for 20 years, 89 eligible for 15-year awards, and 74 who have worked at LASL ten years.

The following people were invited to the pin award ceremony:

20-Year Pins

Henry J. Abeyta, CMB-6; Lawrence Apodaca, SP-DO (NTS); Gilbert P. Apprill, CMB-7; John Baldridge, AO-3; Glen B. Barber, J-12; Edwin A. Bemis, H-1; Curtis A. Bond, GMX-3; Wallace H. Borkenhagen, P-16;

Robert H. Campbell, J-DO; Barbara L. Crabtree, PER-DO; Ramona M. Dallege, SP-4; Benjamin C. Diven, P-3; Cornelius J. Everett, Jr., T-8; John D. Farr, CMB-3; Robert D. Geoffrion, H-1; Blanche L. Gilman, MR; Edward R. Grilly, CMF-9;

William E. Haag, GMX-1; W. Stanley Hall, P-12; Troy C. Harris, GMX-3; Allen W. Hasty, CMB-AP; Sidney W. Hayter, CMB-8; James H. Hill, J-7; Juliamarie Langham, H-DO; Robert J. Lanter, W-3; William H. Lawson, GMX-3; Felipe M. Lopez, SP-4; Annie S. Lujan, GMX-7;

Pat McAndrew, MR; William J. Maraman, CMB-11; Lydia G. Martinez, W-1; Miguel A. Martinez, SP-3; Frank A. Montoya, SP-3; Arturo E. Ortega, SD-1; Robert H. Osborn, CMB-6; John B. Panowski, GMX-3; John R. Phillips, K-3; Elsie H. Pierce, P-2; Frances G. Quintana, D-8;

Helen F. Redman, D-2; Vernor G. Rexroth, Jr., CMB-7; Jose B. Romero, H-1; George N. Rupert, CMB-3; Salvatore E. Russo, ENG-3; Henry C. Salazar, SP-3; Jose S. Sanchez, SP-3; Joseph Schaffer, SP-4; Frankie J. Southard, CMB-7; James G. Stearns, Jr., H-3; Bergen R. Suydam, T-DO-T;

Antonio P. Tafoya, SP-3; Billy D. Travis, CMB-8; Jose L. Trujillo, GMX-3; John M. Turner, GMX-3; Lucas R. Velasquez, GMX-3; Bob E. Watt, P-DO; Walter H. Weber, P-1; Boyd W. West, AO-DO; Harry O. Whipple, H-DO; Ralph A. Wicklin, N-5.

15-Year Pins

Marvin D. Anstey, SD-O; Stewart A. Apgar, N-1; Henry Aranda, H-1; Robert H. Bates, AO-4; John F. Baytos, GMX-3; Donald L. Bell, SD-5; George I. Bell, T-DO-T; Robert Benz, CMB-3; Theodore M. Benziger, GMX-2; Esther Y. Bottom, H-2; Naomi R. Bourne, CMB-DO; Neale O. Byers, ENG-3;

Johnny F. Chavez, GMX-6; Ivan J. Cherry, T-1; Edra L. Childers, GMX-7; Theodore R. Cole, CMB-7; Jerry P. Conner, P-4; Loyd K. Cox, PER-5; Irene Z. Crawford, GMX-3; Daniel J. Darnell, SD-1; Precilla R. Diaz, MR; Orlan P. Dorman, Dir. Office; William C. Dunn, SD-5;

Malcolm E. Ennis, W-8; Gilbert H. Ferran, H-5; Dale S. Fisher, CMB-6; Billy D. Fordham, GMX-3; Mike A. Gallegos, P-1; Hugh J. Gay, SD-5; Bernie G. Gilbert, SD-4; Glen A. Graves, N-2; Dale M. Holm, K-1; Armanda L. Jackson, GMX-7; James O. Johnson, GMX-7; H. Erma Jones, P-1; John F. Kephart, W-7;

Stanley A. Landeen, GMX-4; Margaret A. Lang, T-DO; Tom C. Langhorst, SP-11; S. Kenneth Lilly, N-7; John D. Lucero, AO-3; Buford C. Lyon, J-DO; Joe E. Maestas, CMB-6; Lawrence F. Manker, Sr., GMX-3; George Martinez, GMX-6; Jose A. Martinez, CMB-AS; Jose U. Martinez, H-1; Juan C. Martinez, GMX-3; Joe A. Mascarenas, CMB-11; James E. Mayer, J-16; Mary T. Menzel, T-9; Jose B. Montoya, SP-3; Ruben O. Montoya, CMB-6;

Quay E. Nims, CMB-6; Marjorie A. Orth, PUB-DO; Robert M. Pena, D-8; Peter J. Peterson, CMB-14; Relf L. Price, Jr., GMX-3; John D. Rogers, Jr., CMF-9; W. Laverne Rogers, ENG-1; Eddie G. Roybal, SP-4;

Patricia A. Sander, AO-5; Carol E. Schweitzer, P-DO; Alice B. Sisneros, GMX-7; Beatrice L. Smith, AO-1; Ronald K. Smith, P-9; Dorothy L. Stam, J-10; Leland R. Stein, T-5; David W. Steinhaus, CMB-1; Frances M. Stephens, GMX-4; Ward Stephens, GMX-3; William R. Stratton, N-2;

Carl F. Talafous, SD-3; David B. Thomson, GMX-6; Munson M. Thorpe, N-6; Louis F. Torghele, W-4; Celestino M. Trujillo, GMX-3; Clarence E. Tubb, SD-5; William E. Tynan, SD-5; Charles W. Van De Veer, SD-5; Edward A. Voorhees, T-1;

Karl B. Wallick, T-5; Emma A. Warren, P-12; Jewel A. Watson, GMX-3; Lemuel P. Westlake, SD-1; Carl E. Whitis, SD-5; David A. Woodwell, P-1; Claudia V. York, P-1; Alfred M. Zerwas, SD-6.

10-Year Pins

Robert E. Agner, SD-O; Lon F. Alexander, Jr., CMB-7; Dale D. Armstrong, P-12; Philip E. Armstrong, CMF-13; Don A. Baker, P-18; Donald W. Barr, J-11; Eugene W. Boettcher, SD-2; Rumaldo A.

continued on next page

new hires

CMF Division

Eiichi Fukushima, Seattle Wash., CMF-4
Laurence J. Campbell, Urbana, Ill., CMF-9

Engineering Department

Phillip L. Roybal, Santa Fe, ENG-3
John N. Savage, Santa Fe, ENG-6

GMX Division

Guy E. Eden, Santa Fe, GMX-11

H Division

Felicia L. Winn, Los Alamos, H-DO

J Division

Ronald N. Dyer, Albuquerque, J-7
Marian G. Gallegos, Santa Fe, J-10
David S. De Young, Ithaca, N.Y., J-10
Walter Matuska, Jr., Austin, Texas, J-15
Kenneth Fallon, Chula Vista, Calif., J-17

K Division

Rebecca A. Trujillo, Espanola, K-4

MP Division

Phyllis H. Wallis, Los Alamos, MP-1
John L. Temple, Seattle, Wash., MP-3

Mail and Records

John O. Lucero, Espanola, M&R
Wilma McBride, Portales, N.M., M&R
Elmer J. Werner, Philadelphia, Pa., M&R-1

N Division

Howard O. Menlove, Karlsruhe, Germany, N-6
Gary M. Worth, Sunnyvale, Calif., N-6
Florence M. Denbow, Los Alamos, N-7

P Division

Richard L. Hutson, Boulder, Colo., P-DOR
Herman C. Owens, Zurich, Switzerland, P-4
Richard D. Belian, Albuquerque, P-4
Charles R. Cotter, Bennett, Colo., P-9
Peter R. Forman, Berkeley, Calif., P-14
John D. Smith, Salina, Kans., P-15

Shops Department

Robert J. Grieggs, St. Marys, Pa., SD-1

Supply and Property

Elvira E. Martinez, Santa Fe, SP-5
Michael A. Wolf, Omaha, Neb., SP-5
Virgie L. Lundgaard, Los Alamos, SP-12

T Division

Carol A. Sowder, Los Alamos, T-1
Adelaido Sandoval, Albuquerque, T-1
George R. Spillman, Albuquerque, T-2
Victor Franco, Berkeley, Calif., T-9

Wage and Salary

LeRoy E. Apodaca, Seattle, Wash., WSD

service pins . . .

continued from preceding page

Borrego, SP-4; Stanley E. Bronisz, CMF-5; Ernest A. Bryant, J-11;

Howard H. Cady, GMX-2; John J. Chamberlin, T-1; Charlie G. Charlton, P-16; Robert E. Cowan, CMB-6; Bobby G. Craig, GMX-8; Stanley A. Daily, N-1; James R. Davis, SD-5; Albert P. Delgado, SD-1; Willard B. Dudgeon, J-7;

Newby G. Ellington, SP-3; Librado E. Esquibel, N-3; Kendall F. Famularo, W-4; Charles A. Fenstermacher, J-8; Paul L. Flynn, H-2; Omar O. Gallagher, ENG-4; Pablo E. Gonzales, CMB-7; Eero A. Hakkila, CMB-1; Leon Heller, T-9; LaVere A. Hiteman, W-1; Franz C. Jahoda, P-15; Merrill E. Kenyon, W-1; Donald Kincaid, ENG-4;

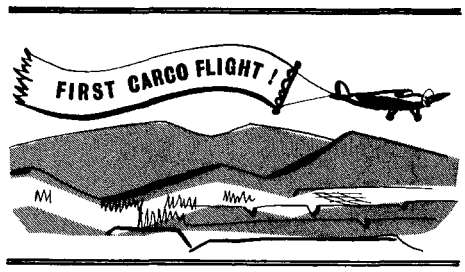
Eleanor E. Langley, N-3; Eric S. Lazzaro, GMX-4; John W. Lipp, SP-DO (NTS); Calvin C. Longmire, J-11; Ralph McFarland, SD-1; John Marshall, Jr., P-17; Joe F. Martinez, CMB-AP; Hazel M. May, P-1; Billy D. Meixner, T-2; Marie T. Moquino, PER-4; Kenneth H. Olsen, J-15; Richard B. Olwin, W-1;

Donald W. Parker, ENG-3; Raymond Pollock, Jr., T-2; Warren E. Quinn, P-15; Werner Riesenfeld, P-18; Bertha M. Rivas, CMB-1; Herman L. Rohr, CMF-13; Raymond B. Roof, Jr., CMF-5; Jose G. Roybal, H-7; James R. Ruhe, MP-3; Paul H. Salazar, P-1; M. Louis Silver, PER-4; Doyle D. Simes, ENG-1; Dennis D. Simmonds, T-5; Wendell E. Smith, SD-5; James C. Stevenson, W-1; Nile A. Tack, GMX-3; John W. Taylor, GMX-6; Richard F. Thomas, T-5; Jay Todd, Jr., W-4; James R. Travis, GMX-8;

Sue Vandervoort, T-1; Marvin A. Van Dilla, H-4; Joseph Vucenic, D-8; Richard L. Wakefield, J-16; Richard H. Warnes, GMX-4; Richard E. Welch, N-5; Harry E. Williams, Jr., ENG-4; Donald L. Wilson, GMX-7; Vera J. Wright, GMX-DO; Gerhard W. Zimmermann, W-7.

Oops! That's Llewellyn Jones, CMF-4, at left in this photo which ran in the October Atom with a story on postdoctoral research at LASL. He was incorrectly identified as Wes Jones, who is in group CMB-11. Robert Ryan, at right, did postdoc research under Llewellyn Jones's direction.

20 years ago in los alamos



Culled from the Los Alamos Times, November, 1947, by Robert Y. Porton

AEC Inaugurates Air Charter Service for Project

This community came several degrees closer to "the outside world" this month with announcement by CARCO Air Service, Albuquerque, of inauguration of an air charter service and the arrival of the first mail by air. Clark Carr, operator of the company, said CARCO will service Los Alamos official and charter passenger service between the Hill and Albuquerque.

Phones Switched to Dial

The switch-over from manual to dial telephone operation on the Hill was announced today by R. L. Kennedy, communications chief. The cut-over will bring into service more than 400 new phones, mostly in residences. The status of Los Alamos as an extension of the Santa Fe main switchboard will end with the cut-over, Kennedy emphasized.

While the change may be a matter of some pride to local residents, the corollary to this is that calls between here and the capitol city will be long distance.

Film on Los Alamos

The sound version of the Pathe News film on Los Alamos will be shown Sunday and Monday at the Hill Theater. It features David B. Hall, leader of P-5 group, his wife Jane, alternate leader, and the fast reactor on which both work. The short feature is publicized as the first film of Los Alamos and stresses the security angle of the community.

Residents' Divorce Status Hangs Fire

Briefs on the question of jurisdiction of state divorce laws concerning Los Alamos residents will be filed in the near future, District Judge David W. Carmody said this week. The judge, questioning his jurisdiction in the case, refused to grant a decree by default recently to a local woman. If no jurisdiction is found, Judge Carmody already has expressed himself in favor of a Supreme Court ruling that would resolve, one way or the other, the doubt of legality of previous divorce decrees.

The jurisdictional dispute, long a speculative topic among Los Alamos persons, has attracted national attention.

what's doing

LOS ALAMOS SINFONIETTA: Sunday, Nov. 12, 8:15 p.m., Cumbres Junior High School auditorium, first concert of the season. Donald Gerheart, conductor; Allan Malmberg, solo cellist. Season tickets at $4 for adults, $2 for students available from Rosemary O'Connor, or single admission at door: $1.50 for adults, 75 cents for students.

LOS ALAMOS CONCERT ASSOCIATION: Tuesday, Nov. 28—Amin Feres, baritone, 8:15 p.m., Lensic Theater, 211 W. San Francisco, Santa Fe.

FILM SOCIETY: Civic Auditorium, admission by single ticket, 90 cents, or season ticket, $4.

Wednesday, Nov. 15, 7 and 9 p.m. "Green Magic"

NINTH ANNUAL CHARITY BALL: Immaculate Heart of Mary Parish Hall, Nov. 17, 9 p.m. to 1 a.m. Los Alamos All-Stars Orchestra. $15 per couple. For reservations call Mrs. Frank Welch, 8-44595, or Mrs. Richard Smale, 2-3934.

LIGHT OPERA: Lerner and Lowe's "On a Clear Day You Can See Forever," Dec. 1, 2, 8 and 9, Civic Auditorium, 8:30 p.m. All seats reserved. Mail orders accepted from Nov. 11 to Los Alamos Light Opera, P.O. Box 352; on Sat., Nov. 18, at Clement and Benner Dept. Store; from Nov. 20 evenings 7 p.m. to 9 p.m. at auditorium box office. Prices: $3, $2.50, $2 and $1.50.

LOS ALAMOS ARTS AND CRAFTS ASSOCIATION:

Exhibit, LASL Personnel Building, now through Dec. 31, representational show of all members of association.

Fall Art Show, The Lodge, Saturday and Sunday, Nov. 18 and 19.

SKI AND SKATE SALE: Sponsored by Los Alamos Ski Club and Los Alamos Skating Club. Wednesday, Nov. 29, and Wednesday, Dec. 13, 7 p.m. to 9 p.m. each evening, Recreation Hall, Rooms 1 and 2. All items should be marked with owner's name, description of item and price desired.

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

Saturday, Nov. 11, Ruins above Jemez Springs. Norris Nereson, leader, 2-3856.

Thursday through Sunday, Nov. 23-26, Grand Canyon. Avery Gage, leader, 2-5485. (Contact leader early)

Saturday and Sunday, Dec. 2-3, weekend camping trip to Gila River. Mike Williams, leader, 2-3616.

MESA PUBLIC LIBRARY EXHIBITS:

Art Exhibits:

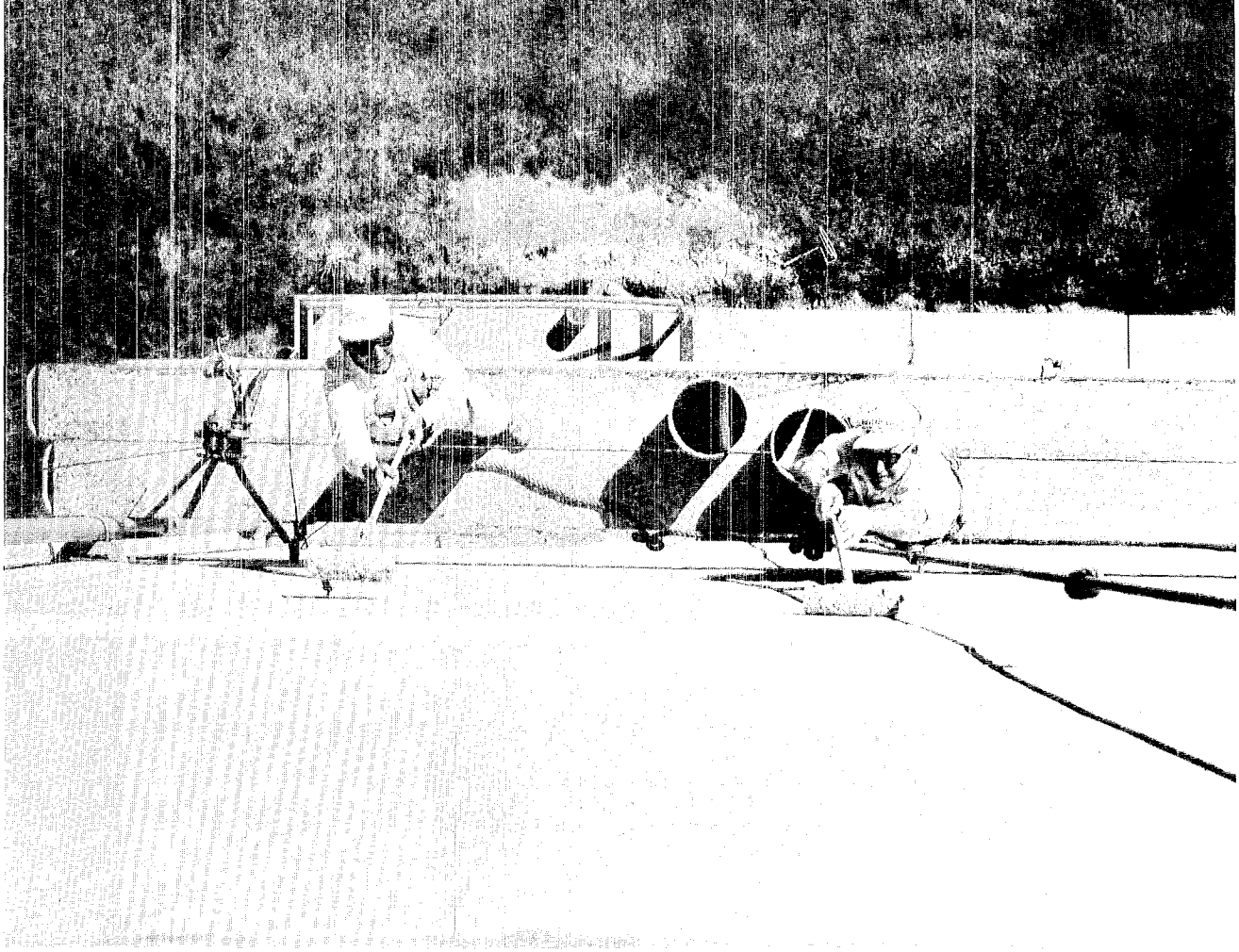
Oct. 21-Nov. 11—Watercolors by Pat Trujillo, Los Alamos

Nov. 11-Dec. 1—Watercolors by Merle Fox, Santa Fe

Case Exhibits:

Oct. 31-Nov. 20—Creative Stitchery Group of Los Alamos AAUW

Nov. 20-Dec. 4—UNICEF Cards



Zia painters Cosme Carrillo and Max Ortiz wield the rollers to give the LASL Administration building a new coat of gray paint. Photographer Bill Jack Rodgers inched his way to the edge of the roof of D wing to get this picture.

BACK COVER:

Lighting the LA on the mountain was far from an easy chore, but Los Alamos High School youngsters made the effort for their homecoming celebration last month. Photo by Bill Jack Rodgers.