THE ATOM

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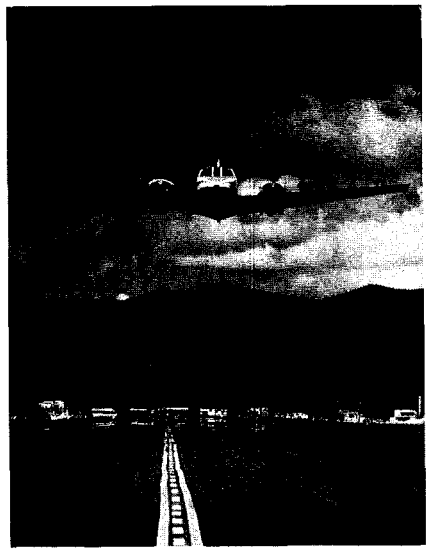
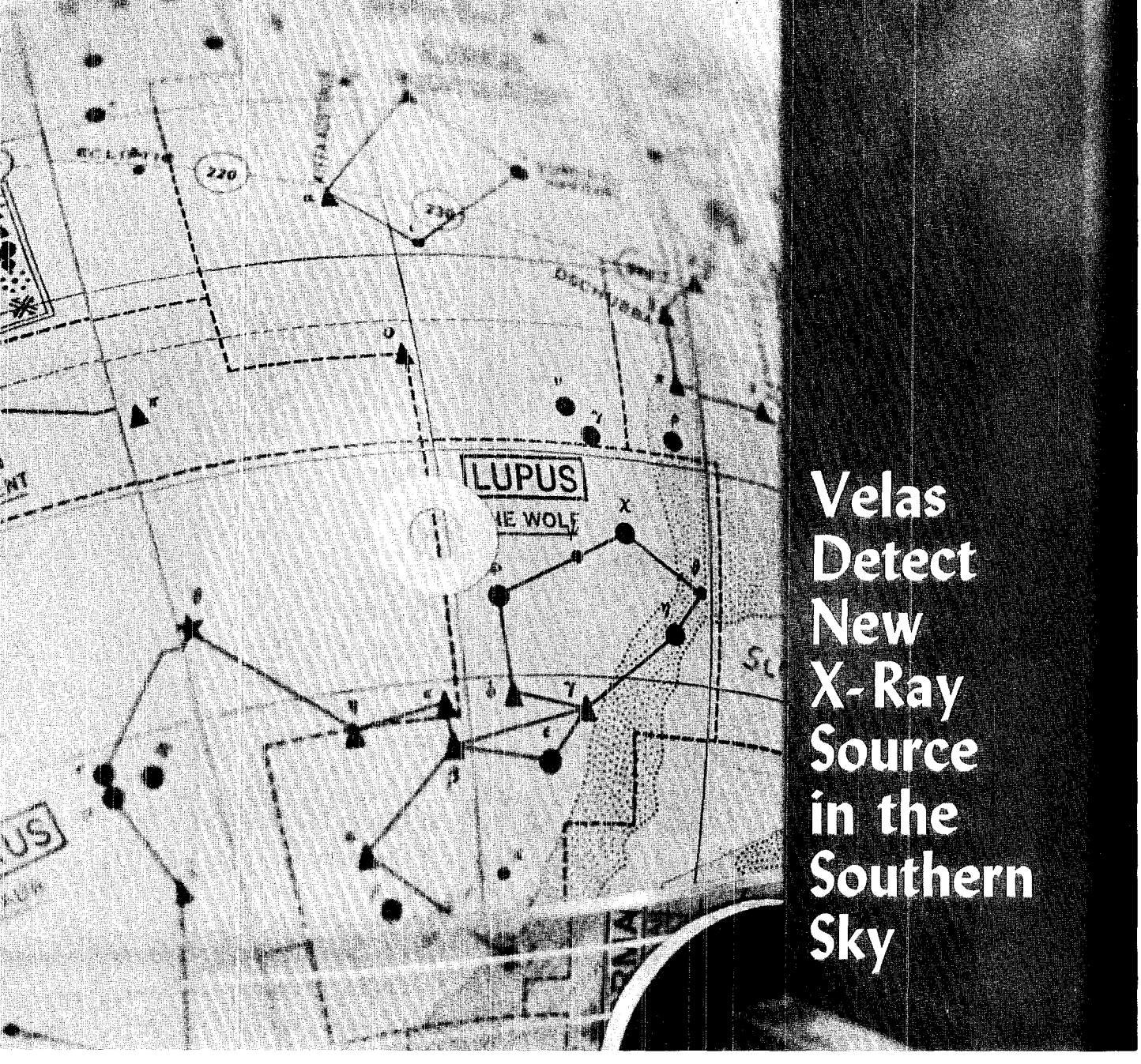


COVER:

A Carco flight takes off from the 4,916-foot runway at Los Alamos with passengers bound for Albuquerque. PUB-1 Photographer Bill Jack Rodgers photographed the scene from the west end of the runway. The story on Carco begins on page four.



Velas Detect New X-Ray Source in the Southern Sky

A white ring on a space globe marks the approximate location of an x-ray source recently discovered by Vela Satellites 9 and 10.

Instruments aboard Vela Satellites 9 and 10 have detected the birth of a new x-ray source in the southern sky near the boundary between the constellations Centaurus and Lupus. On July 29 Los Alamos Scientific Laboratory staff members alerted the International Astronomical Union of the discovery.

LASL is responsible for the design and development of instrumentation for the Vela program, together with the Sandia Corporation. The Laboratory group most directly concerned with the satellite project is P-4 under the direction of Jim

continued on next page

Velas Detect...

Continued from page 1

Coon. Others participating in the program are the P-1 Space Electronics section under Paul Glore, and W-7, headed by Bill Chambers, which designed and developed instrumentation for the detection of solar x-rays and other radiations.

Velas 9 and 10 were launched from Cape Kennedy, Fla. May 23. Analysis of data sent back by detectors aboard the satellites revealed an x-ray source that peaked at an intensity roughly twice that of SCO XR-1, which previously had the highest intensity of any known cosmic x-ray source.

Satellite data indicates the source appeared between 2330 Universal Time July 6 and 0430 Universal Time July 9, according to an announcement made by J. P. Connor, W. D. Evans, and R. D. Belian, all staff members of P-4, the space physics group at the Laboratory.

The x-ray source, however, could have existed prior to that time, although in a much weaker state. Evans pointed out that there is always a level of radiation, called background, in space. If the newly-observed x-ray source was weaker than this background radiation prior to July 6, it could not have been detected. It would be only after the source reached an intensity greater than the background radiation level that it could be detected.

Prior to July 6, the source was not observed in the data for any of the observational periods during which its location in the sky was in view of satellite instruments. Since July 9 the source has been clearly visible to detectors for several hours each two and one-quarter days for which data is available.

The satellites are on opposite sides of the same orbit about 60,000 nautical miles from the earth. Each of them completes an orbit every four and a half days. The satellites are controlled so that their axes always point at the earth and their detectors observe in a direction that is perpendicular to their axes.

Connor noted that the source can be detected by each satellite for about eight hours every 55 hours (half an orbit) and good measurements of its intensity can be made for five or six hours. This eight-hour period of time does not run consecutively. It is divided by periods of time when the source is not within the field of view of the detector. Visualize a 180-degree curve on a highway. To the outside of the curve is a telephone pole. As a car, at night, enters the curve the telephone pole comes into view at one side of the beam from its headlights. As the car continues to turn, the pole is seen brightly illuminated and then disappears from view at the opposite side of the beam. Then, if one can assume for demonstration, that the taillights of the vehicle are as bright as the headlights, the telephone pole would again be illuminated when the rear of the car, nearing completion of the 180-degree turn, becomes aligned with it. In principal the x-ray detector on each of the Vela Satellites works much the same way. It detects the x-ray source at a point in its circular path, loses it when the detector's field of view shifts, and then picks the source up again as the satellite turns away from it.

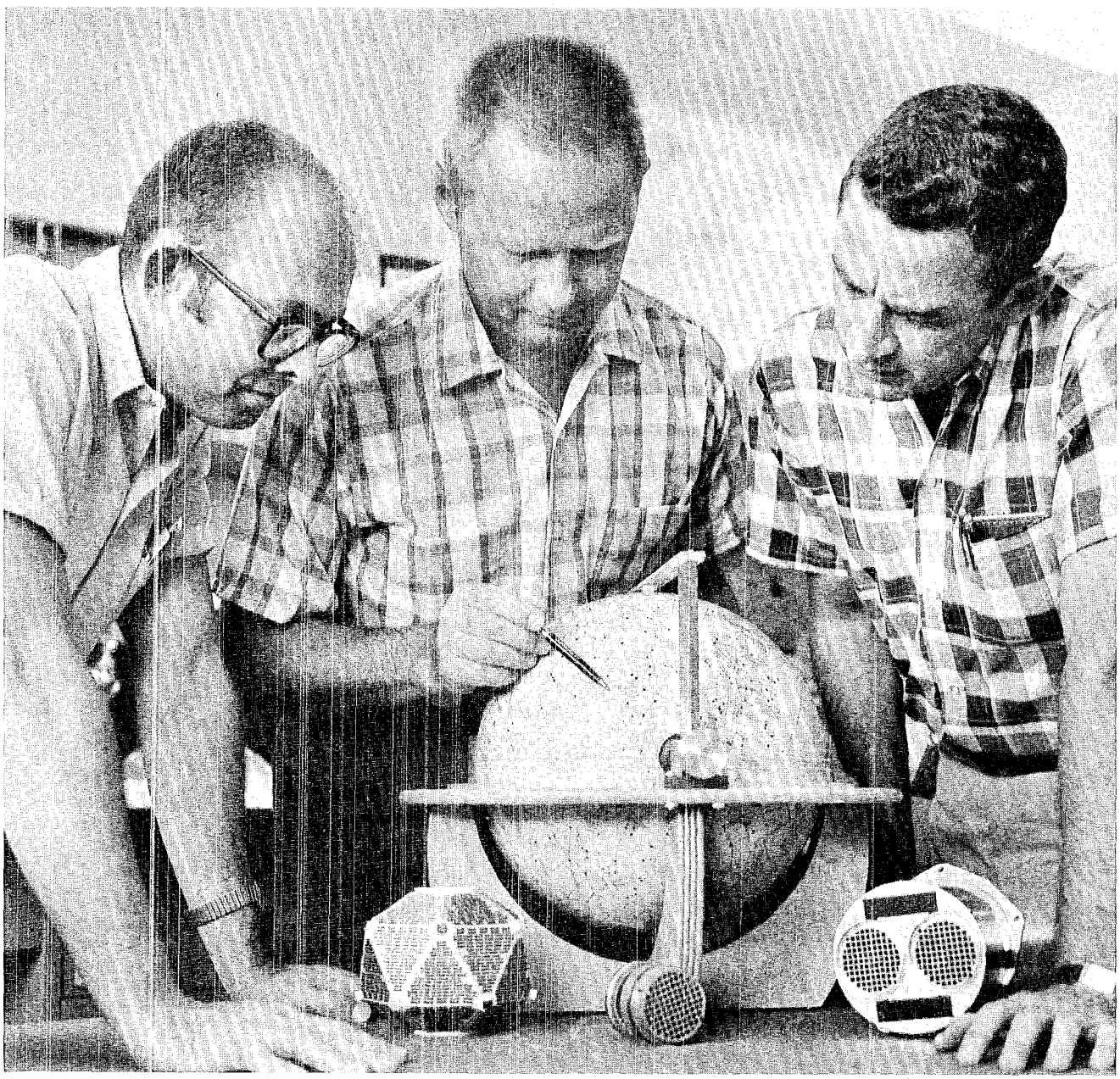
The first measurements on July 9 showed a counting rate approximately equal to that produced by SCO XR-1 in the energy range of three to 12 keV. SCO XR-1 is also monitored by the Vela Satellites. In subsequent measurements the counting rate increased to approximately twice the initially measured value. Sufficient data is not presently available to establish a trend in the intensity variations although the counting rate has diminished from the peak value.

"We don't know what will happen or how far it will diminish in intensity. It may stabilize or it may disappear," Connor said. LASL scientists also stated that distance traveled by the x-rays cannot be accurately established. The nearest star to the earth is Proxima Centauri which is about four light years away. Other stars are hundreds of light years away.

About 40 x-ray sources have been discovered in the last several years; none of them have emitted such intense radiation as the one recently discovered. Only three of the total number have been tentatively identified with an optical object that can be seen with telescopes.

One of the problems in identifying an optical object as the source of x-rays is pinning down the exact location from which the x-rays are emitted. From orbit position data received from Velas 9 and 10 by P-4, the emitting source has been positioned within plus or minus two degrees; however, in a field of stars at distances measured in light years, two degrees either way is a big area in which to pinpoint a source of radiation. There are thousands of faint stars even in such a small region as this.

When Evans, Connor and Belian notified the International Astronomical Union, they did so knowing that the astronomer's radio telescopes



The three men who alerted the International Astronomical Union of the discovery of a new x-ray source in the southern sky study a space globe. They are R. D. Belian, J. P. Connor, and W. D. Evans, all of P-4. In left foreground is a model of a Vela Satellite. In right foreground is an x-ray detector, similar to the ones used on the two satellites which were launched May 23. The x-ray source has been located to within plus or minus two degrees.

might well have a better chance than optical telescopes of locating the source and pinpointing it more accurately, although, even with radio telescopes, prospects are not too encouraging. As time goes on LASL scientists hope to lessen the margin of error to plus or minus one degree. The most they hope for is to locate the source to within plus or minus half a degree.

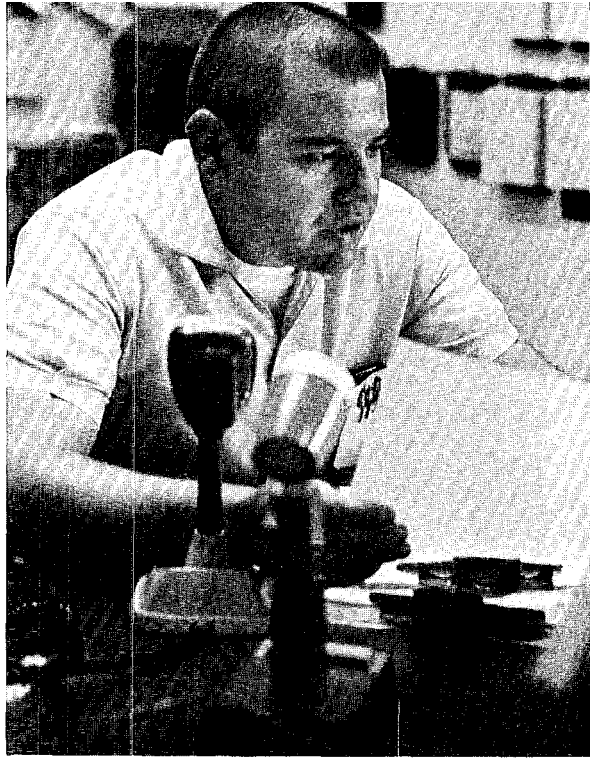
Determining more about an x-ray source of this type, Belian said, would give scientists a new factor to work with in their study of the evolution and structure of the universe.

The Vela Satellites are part of a joint research and development program of the Advanced Research Projects Agency of the U.S. Department of Defense and the U.S. Atomic Energy Commission.

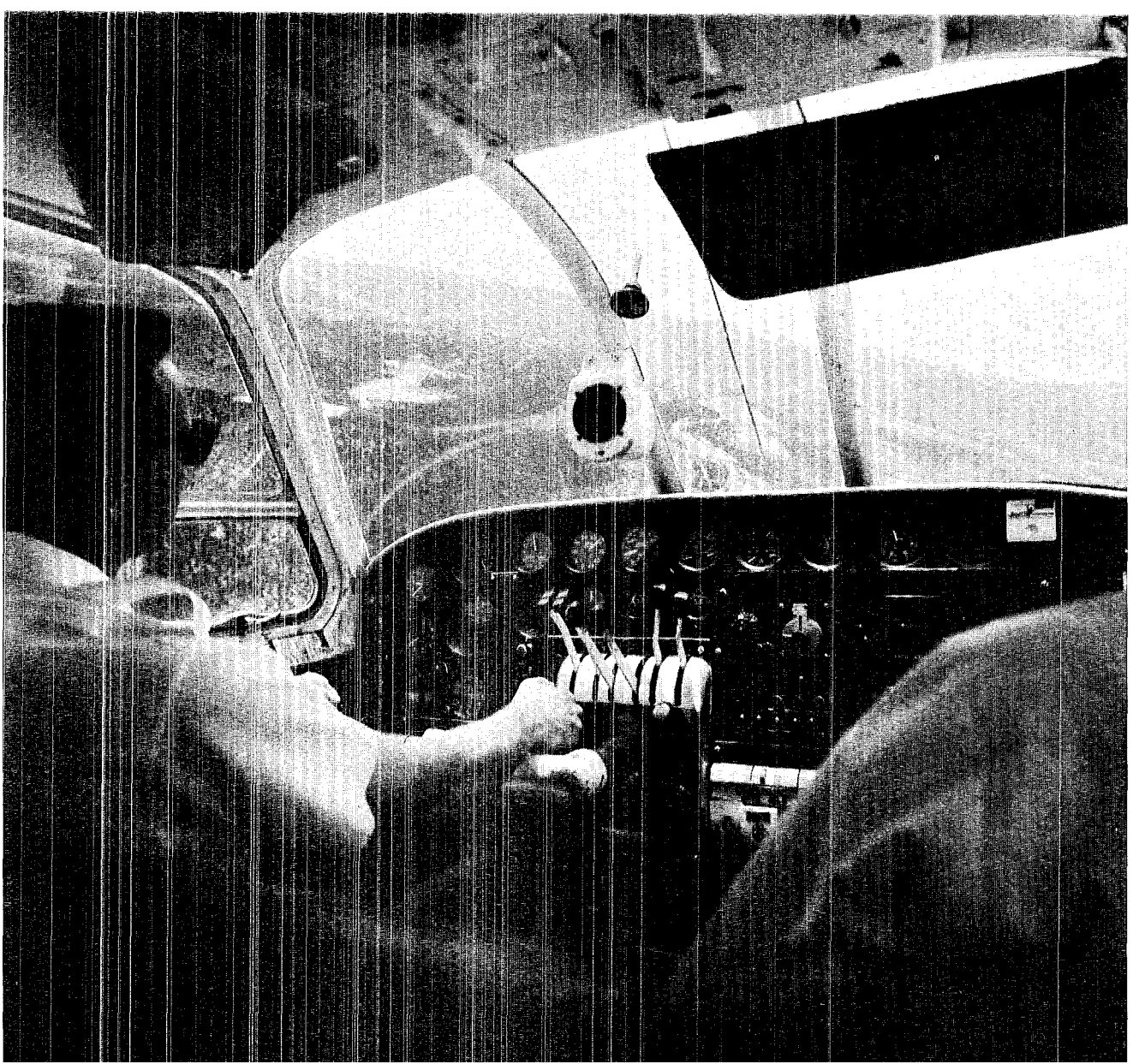
Carco

– a better way to travel when doing Buck Rogers–type work

By Bill Richmond



Joe Smith, right, radio operator and scheduling clerk for Carco in Albuquerque, keeps track of flights to and from Los Alamos and what passengers are aboard. Below, a plane piloted by Elbie Mendenhall approaches Los Alamos.



Sept. 1 marked 22 years since Carco was formed. What is Carco?

"The world's shortest scheduled airline."

"The airline that carries 'more brains per mile' than any other."

"The only way you can 'fly by Carr'."

These and many other sobriquets have been applied to Carco Air Service, Inc., the exclusive contractor with the Atomic Energy Commission for air service between Los Alamos and Albuquerque.

Carco was started more than 20 years ago by Clark Carr who had failed in 1926 to qualify as a cadet candidate in the air branch of the U.S. Army Signal Corps (forerunner of today's U.S. Air Force.) Carr later learned to fly by "putting the money on the line."

"I went to Dr. Bradbury in the fall of 1946 and made a proposal that I provide air service to Los Alamos. Here they were, doing Buck Rogers-type of work but commuting by mule up and down the mesa."

Carr says he had heard about a pilot who landed in a wheat field on Los Alamos Mesa sometime during the 1930's and took off again so the proposal wasn't as ridiculous as some people might have thought.

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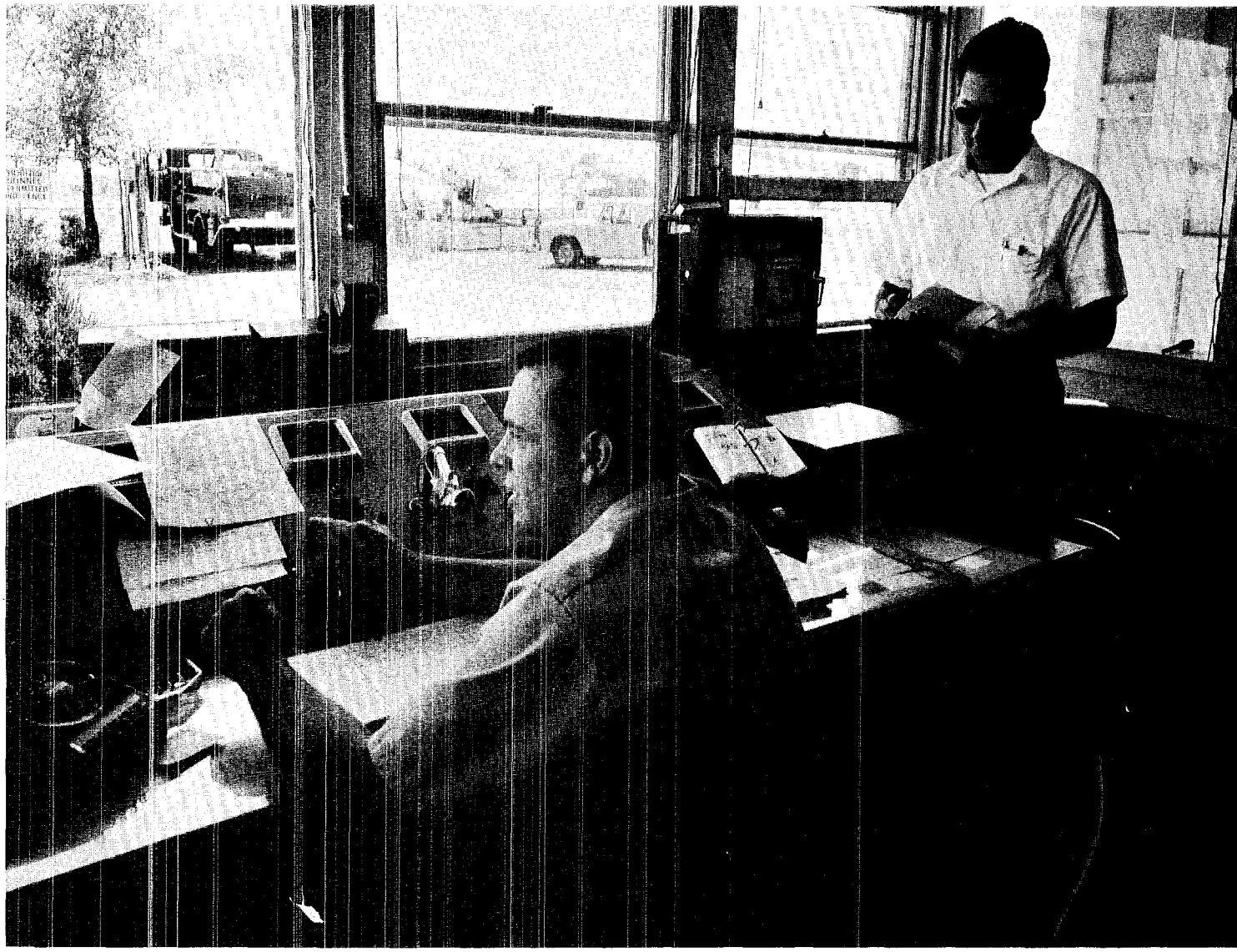
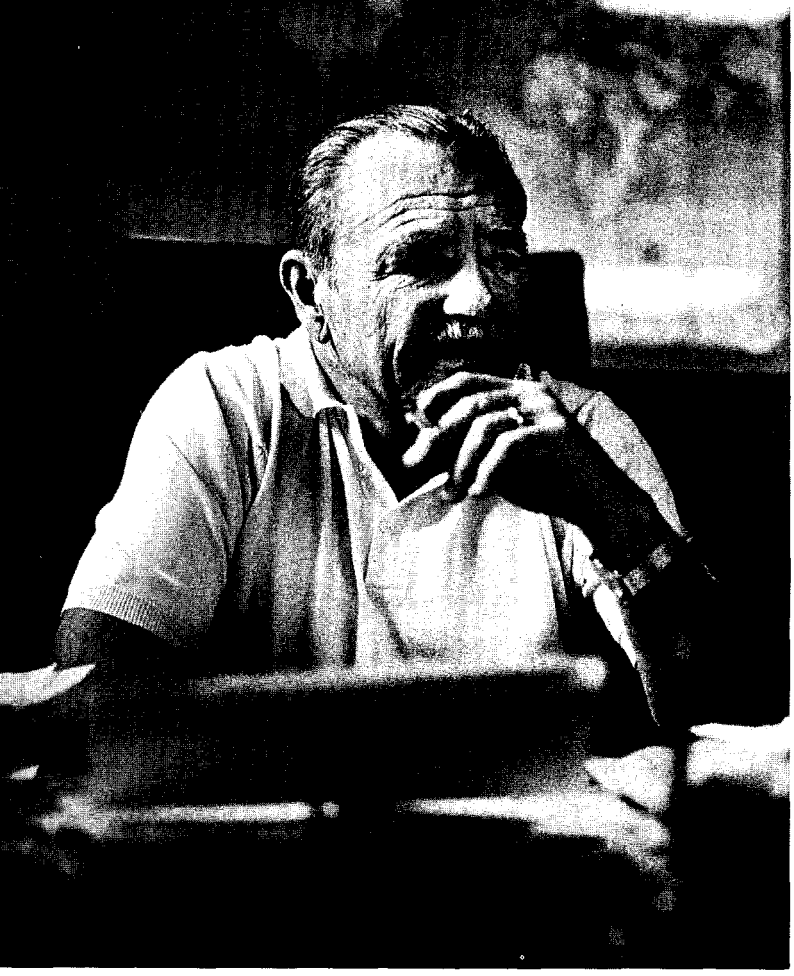


Chuck Hammond, left, senior dispatcher for Zia at the Los Alamos airstrip, informs Carco pilots of traffic in the area and wind velocity and direction. Carco Pilot Bill Lupton checks the passenger list. The firetruck in the background is manned with engine running for all takeoffs and landings at Los Alamos.



Carco . . .

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Under Carr's proposal, he would provide air service if either the Los Alamos Scientific Laboratory or the AEC would construct the airstrip. Carr's proposal was submitted to authorities at Wright Patterson AFB in Dayton, Ohio, who approved the project and said the proposal was feasible.

Shortly thereafter the field was built.

"I was asked if I could guarantee safety," Carr says today. "Of course I couldn't do that—no one could. But I did promise that we would do all in our power to assure the safety of our passengers. Our concept has always been that it is people we are carrying, not material, and these people are most important to us. This is still our feeling."

Carco has flown nearly 100,000,000 passenger

Clark Carr, left, founder of Carco who has seen his airline grow from a small, struggling one to its present size, recently sold his controlling interest in the firm and plans to put less time in the business in the future. At bottom left, passengers deplane at Albuquerque to catch flights going all over the world . . . or just for a day's business in the Duke City.

miles without a passenger injury—despite occasional deer on the runway, high cross winds, and restrictions on landings and takeoffs from the Los Alamos airstrip.

Although it would be impossible to guarantee 100 per cent safety, Carr did promise Laboratory Director Norris Bradbury that no pilot would be used who had less than 4,000 hours of pilot time. He also promised that he would personally check out all pilots that would be flying the Albuquerque to Los Alamos run.

For some time after the war, Carr had been flying scientists to the Salton Sea area in Southern California. Both Los Alamos and Sandia were using the area, at that time, for certain air drop experiments.

"On one of my flights to the Salton Sea, four generals arrived in Albuquerque to attend a meeting in Los Alamos and they wanted air transportation. The airstrip was nearly completed but I refused to allow any of our pilots to fly them to the Hill because I had made a commitment to personally check out all the pilots and make them practice landings and takeoffs before carrying passengers.

"I was afraid my refusal might affect the negotia-

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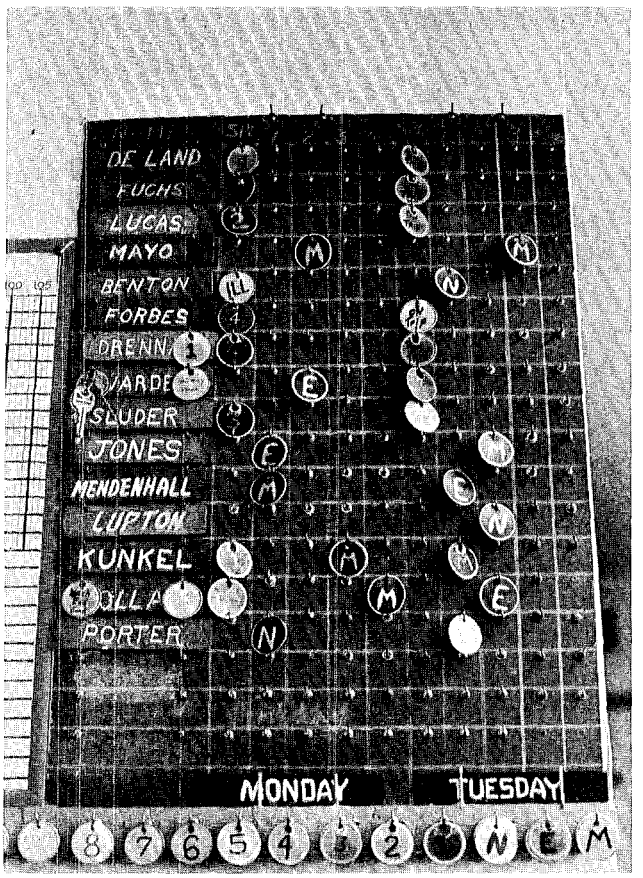

The duty board in the Carco office in Albuquerque tells each pilot what his assignments are.

Passengers seek shade under the wing and tail section of a Carco plane while Mendenhall loads freight bound for Los Alamos.

Carco . . .

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tions for air service then going on, but as it turned out the refusal worked in our favor. They were apparently impressed by our determination to let safety be the main factor."

In April, 1947, Carr made the first landing on the Los Alamos airstrip and on Sept. 1, 1947, Carco was formed. The initial equipment for Carco included two single-engine Bonanzas and one Beech-18 capable of carrying seven passengers. Only Carr and Vern Reaser—then the head mechanic and now a Carco vice president—are left of the original five who made up the company.

Born in Albuquerque in 1906, Carr received an appointment to Brooks Field in 1926 as a candidate-cadet in the Army's flying service. However, when he went to Fitzsimmons Hospital in Denver for the physical, he was rejected because of a slight astigmatism and color deficiency.

He went to Seattle and learned to fly by "putting the money on the line" and has been a professional commercial pilot since 1928. He now has more than 16,000 hours flight time.

After learning to fly he spent a couple years as a freelance flyer and barnstormer in the southwest and then went to South America where he was a demonstration pilot and representative for United Aircraft and Boeing Aircraft. He returned to Albuquerque in 1939 and formed Cutter-Carr Flying Service with William Cutter—another well-known name in early aviation.

Carr was with the U.S. Army Air Corps Training Command and Ferry Command during World War II and returned to Cutter-Carr after the war. He formed Carco shortly after as a separate corporation and began air service to the Hill.

"We started with no set schedule but instead were on an 'on call' basis," Carr said. "Whenever someone had to make a flight, we flew them when and where they wanted to go. But we soon had problems with planes flying empty on one part of the trip or having a request for another plane only minutes after landing with one passenger, and so on. So we had another meeting and decided to establish a schedule.

"At that time we had two round trips a day, shortly added a third and by the spring of 1948 we were up to five round trips a day. We now have eight in the summer and seven in the winter."

Today's Carco schedule is influenced by three main criteria: (1) to meet the working conditions of LASL people coming to Albuquerque; (2) to meet these same conditions for Sandia people coming to the Hill; and (3) to meet connections with commercial airlines.

"The schedules are worked out between LASL, Sandia and the AEC which then tell us what times they need us," Carr says.

Carco obtained its first C-47 in 1948 and started hauling freight and critical materials all over the world—which it still does today.

"We have moved all or some part of every atomic device, with one or two exceptions, since the bombs were dropped that ended the war," Carr noted. All Carco pilots and about half the mechanics have Q clearances.

Qualifications for a Carco pilot are spelled out in a contract with the AEC. To qualify, a pilot must hold an appropriate Federal Aviation Agency (FAA) airline Transport Pilot Rating (ATR), have a minimum of 3,000 hours logged pilot-in-command flying time, and have at least 1,000 hours experience operating from bases located in mountainous terrain. The Albuquerque-based Carco pilots, of which there are 15, average over 10,000-hours of flight time each. There are eight pilots stationed in Las Vegas, Nevada and five in Livermore, Calif.

FAA regulations limit a pilot to a maximum of 100 hours flying time per month. Also, a pilot may not exceed 1,000 hours per year nor may he fly more than eight hours in any 24-hour period.

"We try to better the FAA regulations," Carr says, "by limiting our pilots to 85 hours a month and eight hours a day." Also, Carco pilots are rotated on duty assignments so they are not always flying the Albuquerque-Los Alamos-Albuquerque run. "This would be very boring to a pilot and it would be hard to keep good experienced men if this was all they ever did," Carr says.

"Although we are known mostly for our operations between Albuquerque and Los Alamos, this amounts to less than 10 per cent of the total dollar volume of the company.

"Our commitment to the AEC is that we will have equipment ready for them when they need it—regardless of where they want us to go. And we do." In recent years Carco has made special flights to Fort Churchill, Canada; several places in the South Pacific; South America; and scores of places within the continental United States.

It also flys charter flights for all authorized LASL personnel including special flights for aerial photography.

Carco has sufficient equipment today for just

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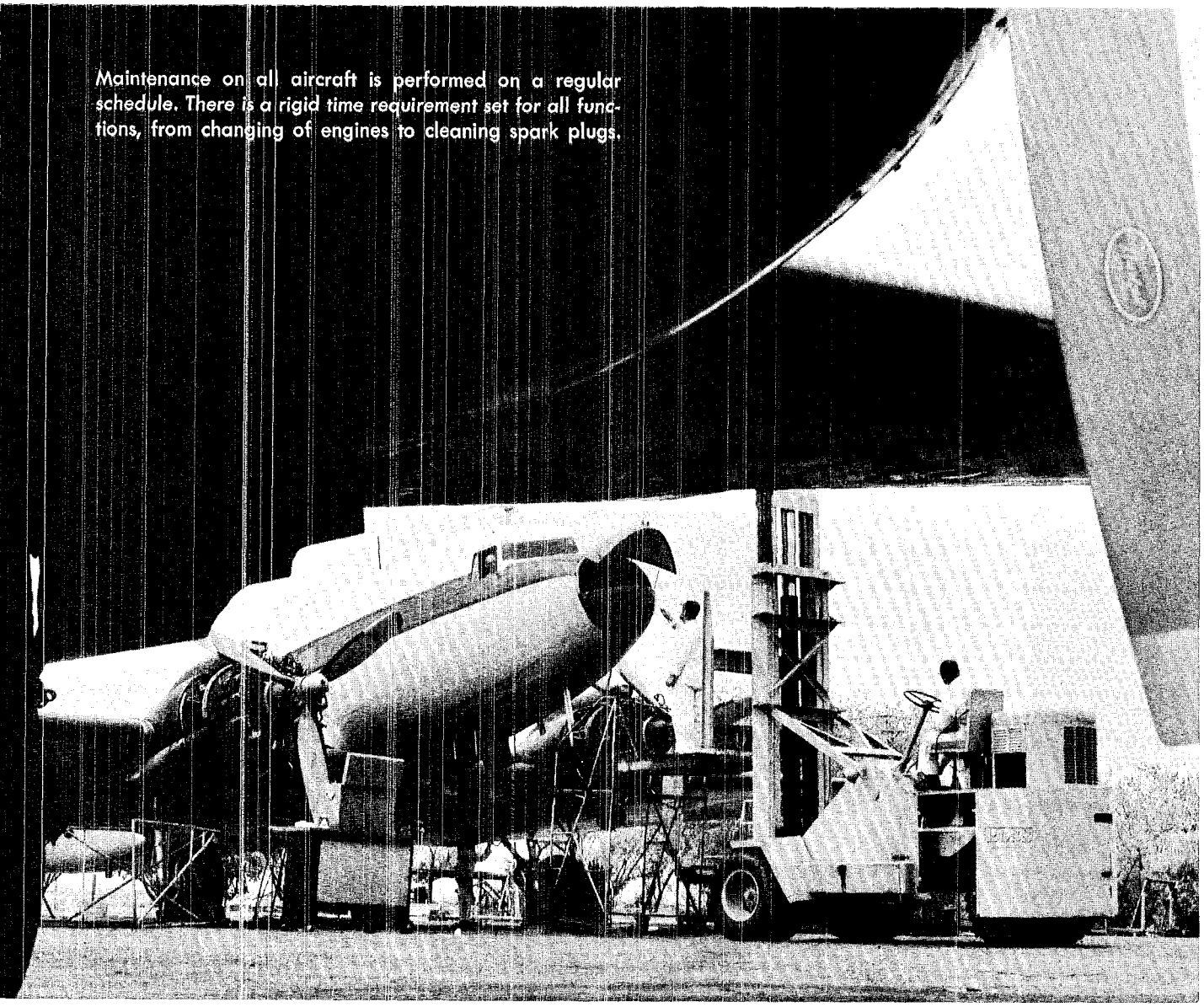
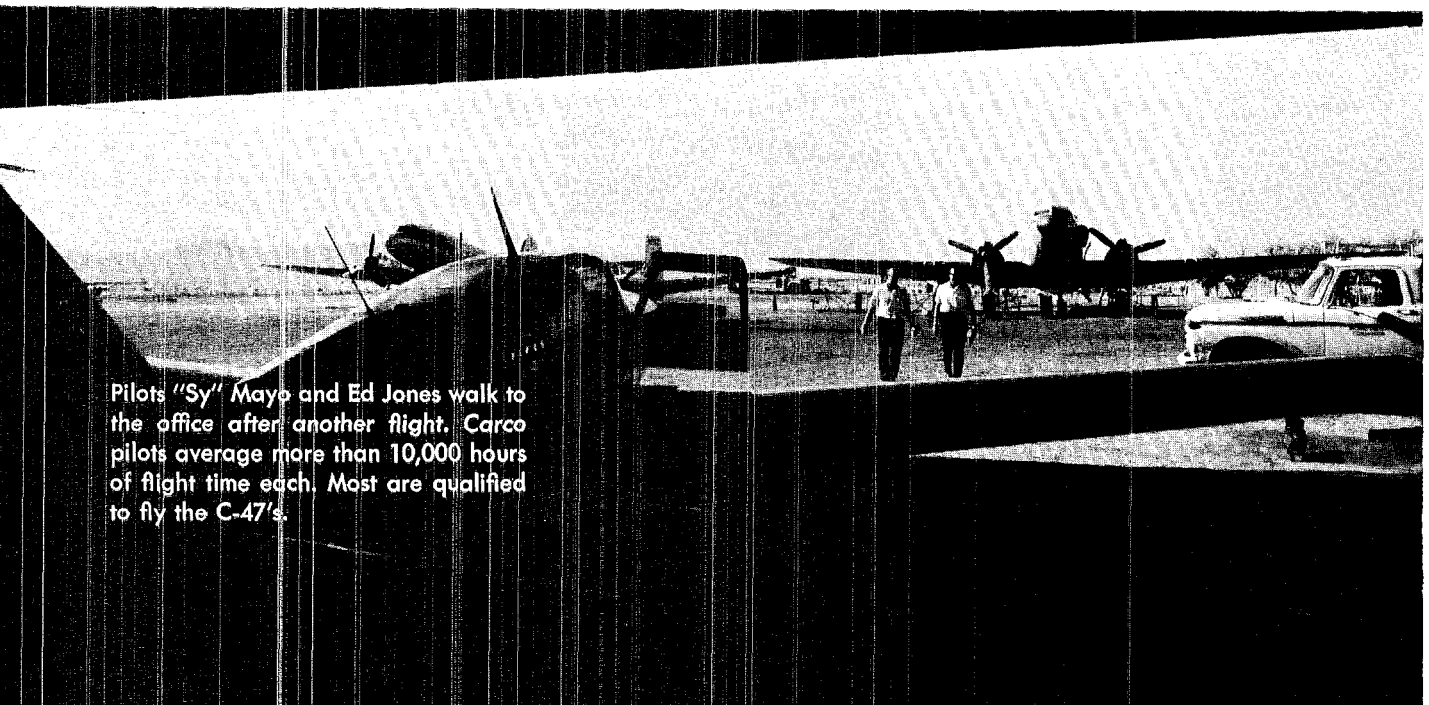
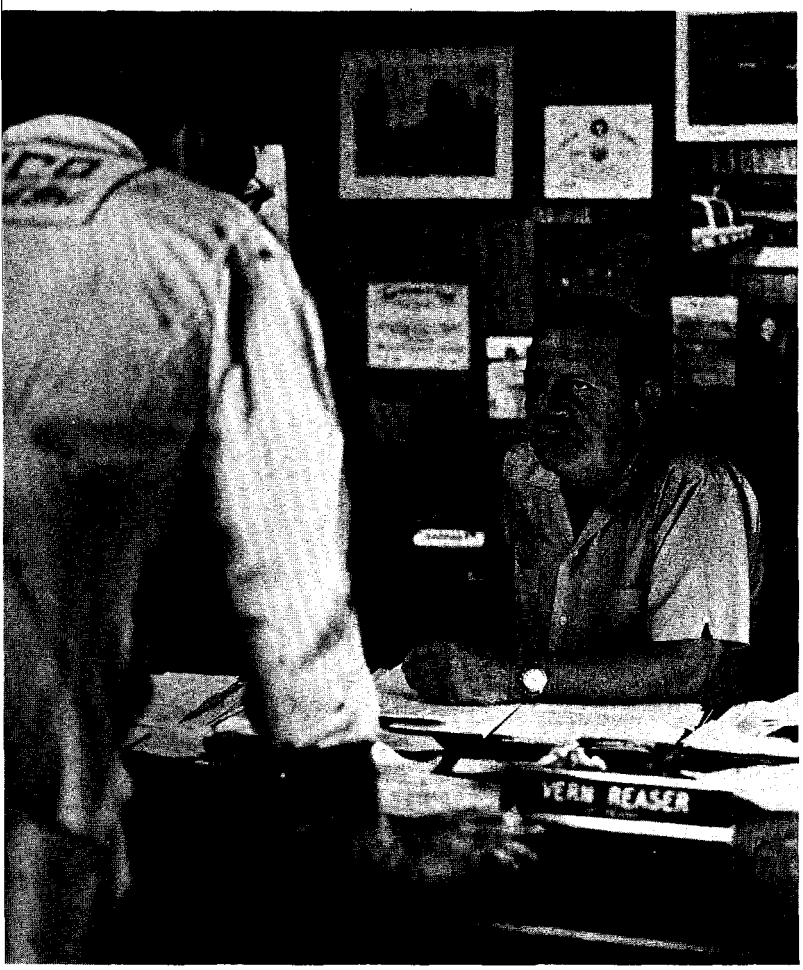


Maintenance on all aircraft is performed on a regular schedule. There is a rigid time requirement set for all functions, from changing of engines to cleaning spark plugs.



Pilots "Sy" Mayo and Ed Jones walk to the office after another flight. Carco pilots average more than 10,000 hours of flight time each. Most are qualified to fly the C-47's.



Vern Reaser, Carco vice president, talking with Mechanic Dave Waggoner, has been with the airline since it was founded. He was the company's only mechanic in the begining. Today, Carco has 19 mechanics and helpers.

Carco . . .

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about any special job as well as the regularly-scheduled runs. Aircraft based in Albuquerque include five Beech twin-Bonanzas; three Beech single-Bonanzas; one Beech D-18; one FH-1100 turbine-powered helicopter; four C-47's (three owned by the AEC and operated by Carco and the fourth owned by Carco); and one C-54 which is owned by the AEC.

Carco also has contracts with the AEC to provide air service between Las Vegas, Nevada and the Nevada Test Site; and for the Lawrence Radiation Laboratory at Livermore, Calif., and its employees who commute to NTS.

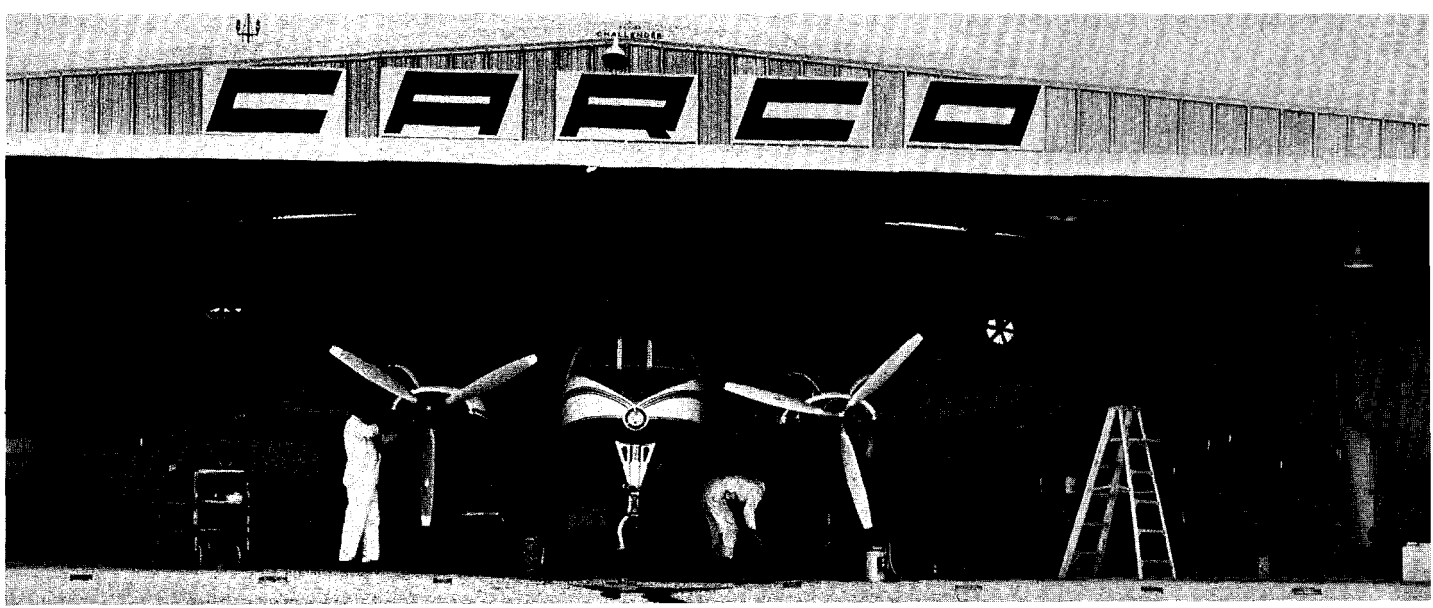
Equipment stationed in Las Vegas includes one twin-Bonanza; one Beech D-18; one single-Bonanza; one Beagle (a light twin-engine plane); three C-47's (two owned by the AEC); and one F-27 (a twin-engine aircraft with a 40-passenger capacity). At Livermore is one C-47 and one F-27.

Carco, being a regularly-scheduled airline between Los Alamos and Albuquerque, carries commercial passengers on some flights. These revenue passengers, however, are not allowed to fly on the aircraft owned by the AEC, due to FAA rules. Otherwise, this would place the AEC in the business of "flying for pay" and in direct competition with private enterprise. This is not allowed.

Carco has been able to compile its enviable record of 100,000,000 passenger-miles without an injury by keeping safety paramount. This is not something that "just happened" but has been carefully planned since the service started.

For example, each Carco pilot makes two radio checks on each flight between Albuquerque and Los Alamos and again on the return trip. On the Albuquerque-Los Alamos run, the pilot of a twin-engine aircraft will check in with the Albuquer-

Carco has a specially-equipped hangar in Albuquerque for painting, washing and cleaning all of its planes.



que radio operator when he is over Menaul Boulevard, shortly after takeoff, and with the Los Alamos radio operator when he is over Frijoles Canyon. Pilots flying single-engine planes also check in with Albuquerque and Los Alamos radio operators, but the second radio check comes when they are over Buckman Mesa. The single-engine planes fly a slightly different route than the twins to avoid the rougher terrain. On the Los Alamos-Albuquerque trip, the pilots again check in over Frijoles Canyon or Buckman and then at Menaul Boulevard.

This checking is also observed on cross-country flights with the nearest FAA Flight Service Station so that in the event of an emergency, the plane's location could be relatively easy to determine.

Probably the most impressive safety rules followed by Carco deal with maintenance of the aircraft—which is closely watched over by Vern Reaser.

Reaser, like Carr, is well-qualified in his field. He started in aircraft maintenance in 1942 as a civilian with the Army Air Corps. In 1943 he enlisted and spent three years in the European Theater of Operations. In England, he was the non-commissioned officer in charge of the engine overhaul shop for the 8th, 9th and 10th Air Forces. He then went to France and Germany as a crew member.

Moving to New Mexico in August, 1946, Reaser met Carr and went to work for him when Carco was formed. "I was the maintenance section—chief mechanic and all," Reaser says, "I was it in those days."

A mechanic for Carco is required to possess the FAA mechanic's certificate with both airframe and power plant ratings. The mechanics must pass a four-hour written test in each of these areas and then must take a practical test which is administered by Reaser "and is pretty rough." Reaser is qualified by the FAA to oversee these practical tests.

Carco presently has 19 mechanics and helpers with experience ranging up to more than 30 years.

Maintenance of the aircraft is all important and follows a strict "inspection sheet."

"The C-47, for example, has a 75-hour inspection check where we repair as necessary and a 300-hour inspection for certain mandatory changes," Reaser said. "This aircraft also requires a mandatory engine change each 1,400 hours."

The twin Bonanzas are inspected each 100 hours, as per FAA regulations, and the engines are changed each 900 hours. Carco even betters the FAA regulations for the twins that require engine change at 1,200 hours.

In his Albuquerque office, Reaser discusses a maintenance problem with Mechanic Chano Molina. At left is Archie Parker, and, at right, Jean Kristensen.

"Our mechanics work two shifts—8 a.m. to 4:30 p.m. and 4:30 p.m. to 1 a.m. The four mechanics on at night check each and every plane here. They also service the aircraft with gas and oil in case we have a rush special flight." Thus, a mechanic is on duty seven days a week between 8 a.m. and 1 a.m. In addition, a mechanic is on duty as least 45 minutes before the first flight of the day (currently 7 a.m.)

"Also, any pilot or mechanic that discovers a safety-of-flight item on any of our planes may ground that plane and report to me what the problem is," Reaser said. Reaser holds a private pilot's license so he knows the problems that can arise for a pilot if the equipment is not perfect.

Mapping the M of the Human

By Ken Johnson

How does the tongue move when an articulate person speaks? When this question can be answered with precision, persons with speech defects can be shown better how their's ought to move.

Prospects are good that significant inroads will be made in this area under a research and development program initiated recently at the Los Alamos Scientific Laboratory in cooperation with the University of New Mexico.

Jerry Beery, a P-3 staff member, and Samuel Fletcher, head of the Speech Pathology and Audiology Department at the University, instigated the program about five months ago to develop techniques and instrumentation to map the movements of the tongue. Jules Levin and Martin Kellogg, both of P-9, are collaborating in the program.

Experimental instrumentation has been developed at Los Alamos and initial testing has begun. The program centers on the use of an artificial palate which is placed against the roof of the mouth. On the palate are 48 tiny sensors. On the bottom side, the sensors are flush with the palate so that its surface is smooth like the roof of the mouth. On the upper side a thin copper wire goes to each sensor. These wires are gathered in two groups at the back of the palate and are strung around the back teeth, along the cheeks, and out the corners of the mouth.

The wires place a small amount of voltage on each sensor. From there, the current flows across the palate where it is reduced in strength to a few microamperes by the electrical resistance of the mouthpiece. It reaches the moist surface of the mouth and then flows to a ground electrode on top of the palate which is in contact with the roof of the mouth.

When the tongue strikes a sensor, the digital computer records a change in voltage in the circuit to which that particular sensor is programmed. This is because the tongue has less electrical resistance than the palate, or in other words is a better conductor and therefore provides an easier path for the current to follow.

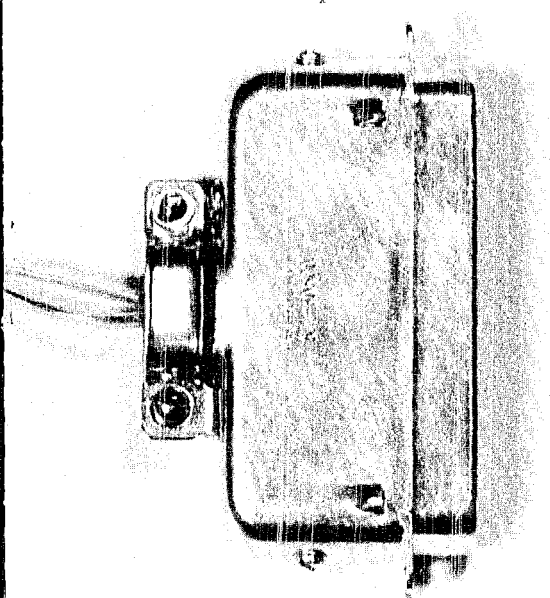
The current is held at a fixed

ovements Tongue

value so that the only voltage change recorded is when the tongue touches a sensor. If not regulated, the current will occasionally vary because of changing conditions in the mouth. For example, mineral content and amount of saliva can influence the strength of the electrical current allowed to flow in the mouth. An external interface unit is used to regulate the current that goes from the mouth to the computer.

The computer reads each sensor 100 times per second. To the computer, the interface unit is like a series of 48 switches that are either on or off and it is these switch positions that are recorded. They are recorded on magnetic tape and, simultaneously, are displayed on a printed listing.

This data by itself, however, reflects only tongue positions relative to the palate at various times. Unless it can be overlayed with letters of the alphabet or words, the information is practically useless. For this reason acoustical information is taken simultaneously.



The subject's voice is taped. So that the computer data can be overlayed with precision, the instant of time when each word was spoken must be known. This is done by connecting a tone burst generator to the tape recorder. The generator "beeps" 25 times per second at a frequency normally higher than the human voice so its sound is not intermingled with the spoken message.

The tape is then played into a frequency analyzer at the University which breaks the voice down into frequencies and converts them to visual images on paper.

Each voice sound has a different frequency so that when converted to voice-prints they arrange themselves in much the same manner as notes are arranged on a musical scale.

Joyce Beery places the artificial palate in her mouth. She is a student of Samuel Fletcher's, center, and wife of Jerry Beery, P-3, right. Dots on the screen are indicative of sensors on the mouthpiece. A dot on the screen will be momentarily brighter when its sensor on the mouthpiece is contacted by the tongue.

By correlating the physiological data from the digital computer and accoustical information from the frequency analyzer, experimenters expect to be able to tell how the tongue moves against the palate during normal speech.

For each person tested, a palate must be custom made to fit his mouth. The one currently being used was made by the Veterans Hospital in Albuquerque. Dentists made a cast of the subject's mouth just as if they were fitting him for false teeth. This cast was then used as a mold in making the palate.

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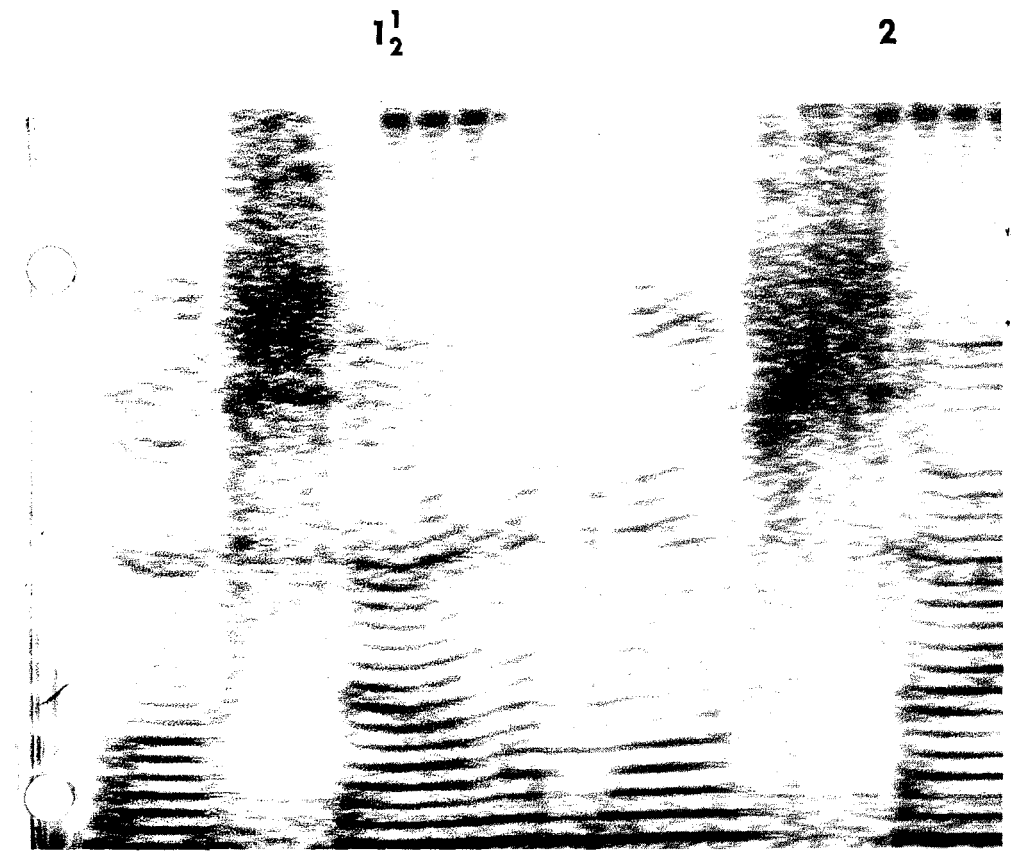
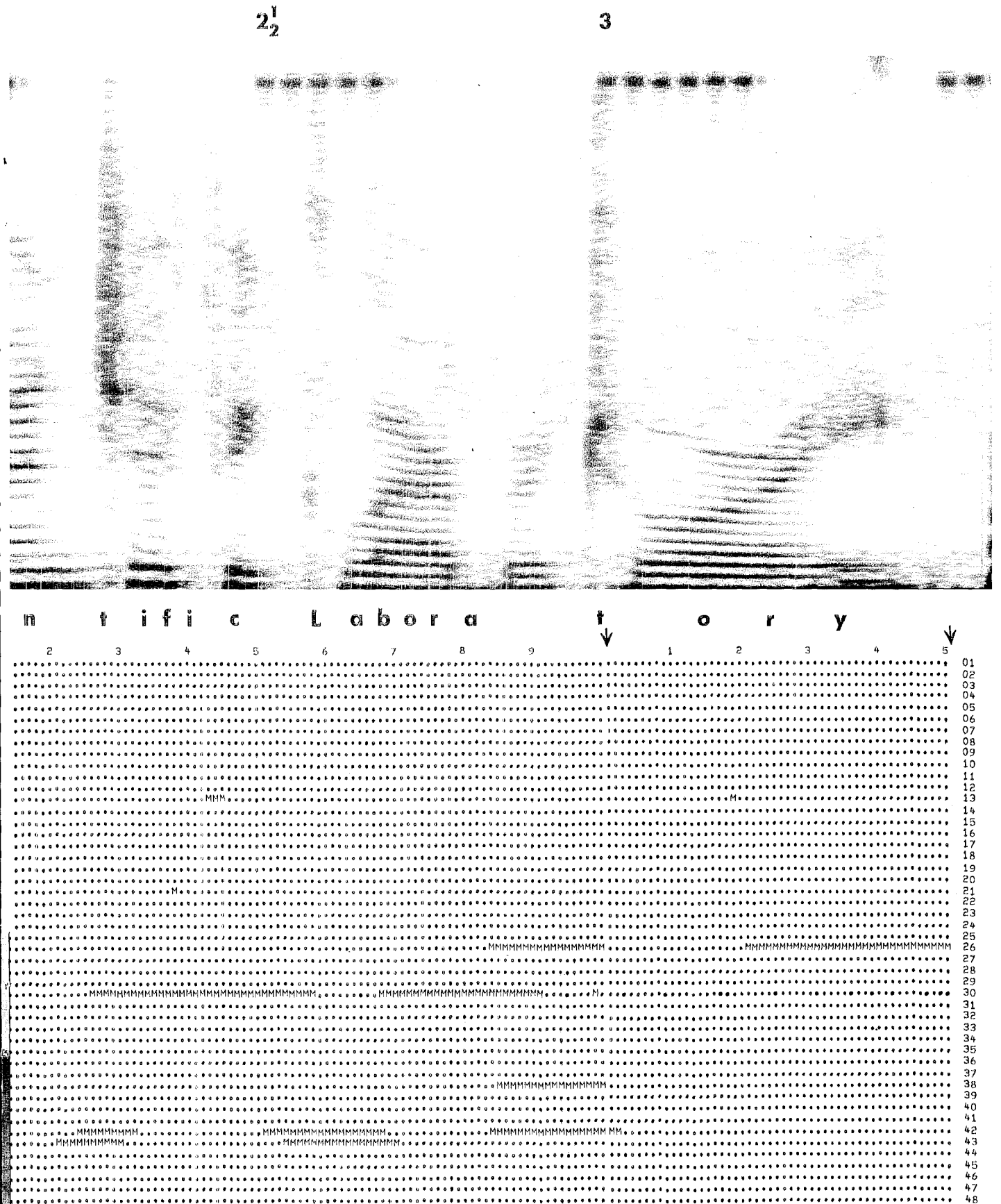
The illustration at top is a voice print made on the frequency analyzer at the University of New Mexico. Along the top of the illustration are four groups of dots, each of which has one more dot than the group before it. From the beginning of one group to the beginning of the next is a time duration of half a second. The letters along the bottom that make up the words "Los Alamos Scientific Laboratory" are spaced to give an approximate idea of how the voice print can be interpreted. The consonants, particularly the S's are the easiest to pick out because, when spoken, they have higher frequencies and make sharper prints than most sounds made by humans. The illustration below is a printed listing made simultaneously with the voice print. The listing has been put together in sections and reduced in size so that it is in approximate alignment with the voice print above. The arrows along the top of the printed listing indicate where sections have been joined. The numbers at far right are relative to the 48 sensors on the mouthpiece which are read by the computer like a series of switches that are either on or off. When there is no contact between tongue and sensor dots appear. When there is contact, it is indicated by the letter M.

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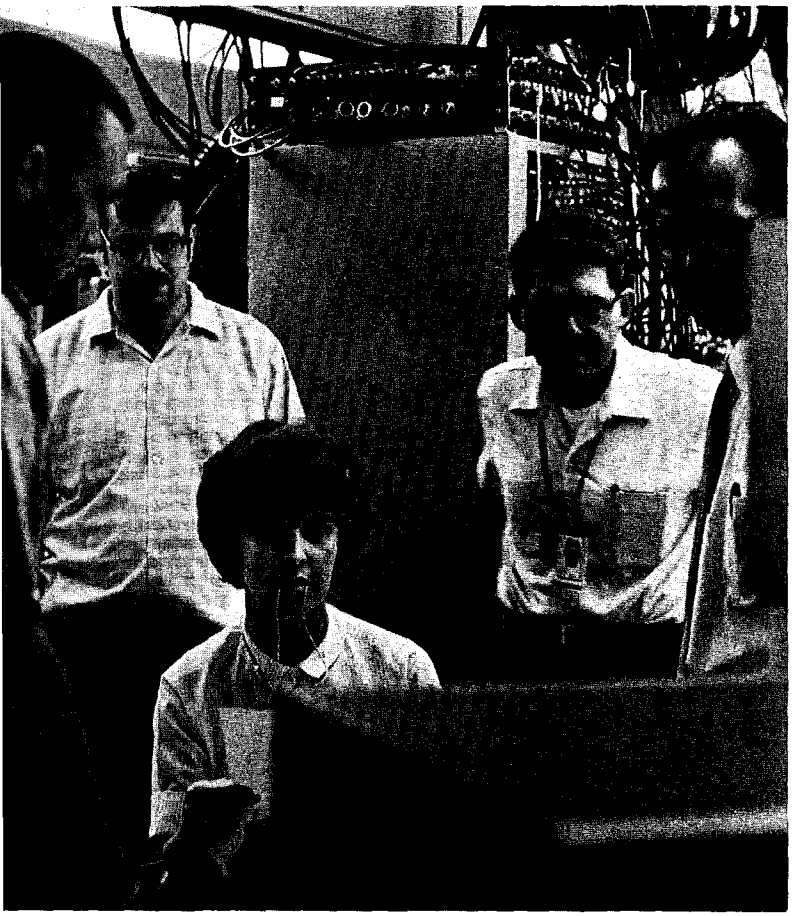


Beery worked closely with Stuart Orbesen, P-DOR, while Orbesen was emplacing sensors, ground electrode and wires on the artificial palate.

Mrs. Beery, with the artificial palate in her mouth, reads from a prepared script and watches a screen in front of her where mouthpiece sensors are displayed. Also watching are husband, Jerry, Martin Kellogg and Jules Levin, both of P-9, and Fletcher.

Mapping the Movements . . .

continued from page 13

Emplacement of the electrical sensors, ground electrode and wires was done by Stuart Orbesen, P-DOR. The sensors and the ground consist of an epoxy material that is a good conductor of electricity. One-third of the sensors are placed at the front of the palate because tongue-palate contact is most often at the front.

The palate is two millimeters thick. Although adequate for initial experiments, Beery said, this thickness can interfere with normal tongue movements. For this reason an experimental palate one-tenth of a millimeter in thickness is being developed for the program by CMB-6, the Laboratory's materials technology group. It is being made from a flat sheet of acrylic. The sensors and wires will be plated on it much the same as a printed circuit.

The interface unit used to translate changes in current to the computer was built by Harold Lang, P-9. Lang also developed the tone burst generator that introduces an audio timing signal in the tape recording.

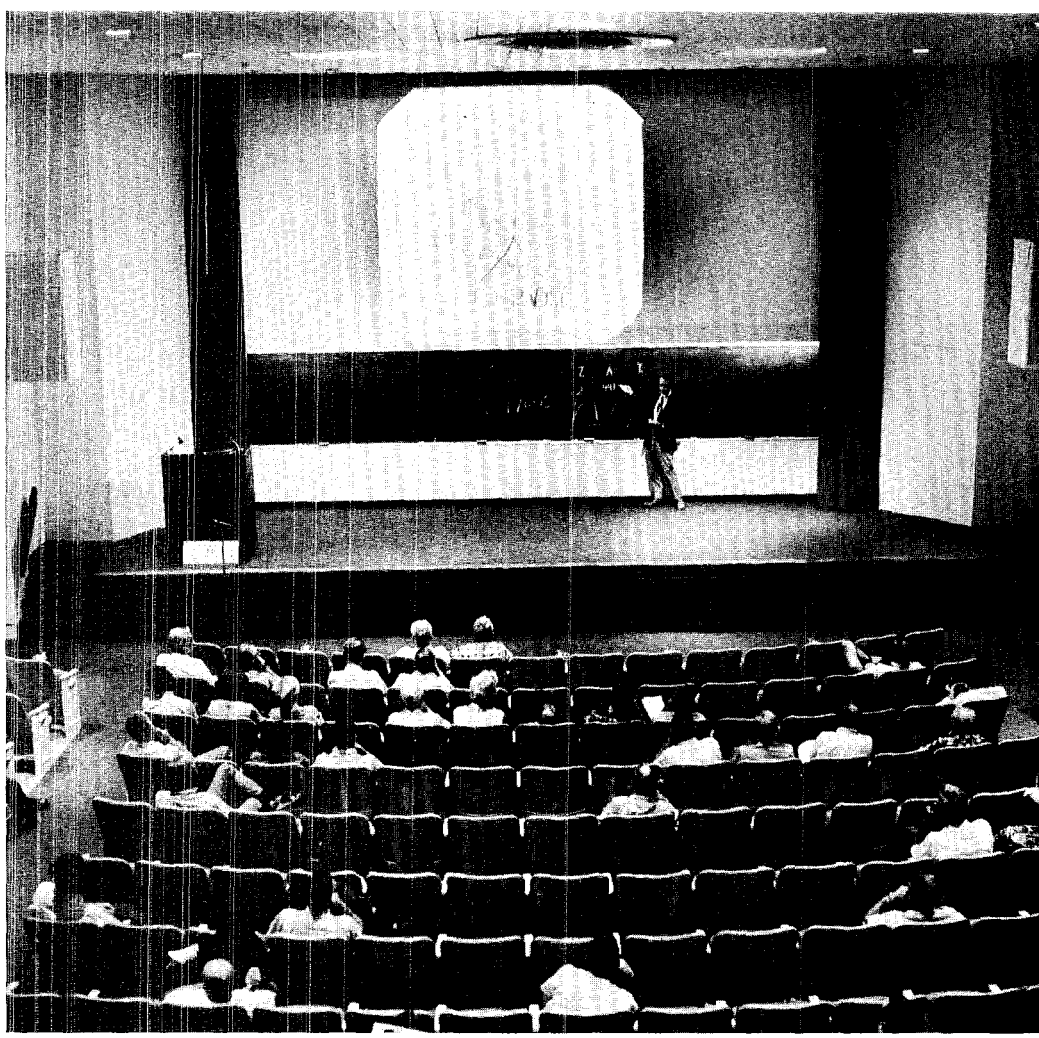
The computer system being used is the P-9 Tandem Van de Graaff 930 SDS. Beery noted that the system is probably more elaborate than will be needed for the program, but its needs have not yet been determined. It is anticipated that a smaller computer system will be obtained for a long term project at the University.

After it has been determined how the tongue should move in relation to the palate, Fletcher believes it possible that persons with speech defects can be aided in still another way. He is interested in determining if, by introducing additional voltage into the mouthpiece, the tongue can be forced to touch the palate at the proper time and place so that persons undergoing speech therapy can actually feel how their tongue should move.

How it moves and how it should move has been studied by many scientists. A similar approach to the problem was that of a group of dentists who used an artificial palate and an analogue computer. Beery noted this palate did not have enough sensors to adequately map the movements of the tongue and the use of an analogue recorder resulted in "yards and yards of paper data" that was difficult to reduce. X rays have also been used, he said, but for adequate analysis, too large a dose of radiation is required.

A More Useful Auditorium

After several weeks of construction, LASL's main auditorium looked like this for the Aug. 19 colloquium.



We haven't yet figured out how to make a new man out of an old one. Age wrinkles his skin, slows his pace, and there is nothing we can do about it. Only those things he makes can man make young again.

Take a room that has weathered many years of use. Hammer and nails, new wiring and fixtures, a little paint, some new and contemporary furnishings, a little time, and the room regains youth.

Such was the case of the Los Alamos Scientific Laboratory's main auditorium. A modification program incorporating bright new colors and functional contemporary design has made it young again.

The facility, located in LASL's Administration building, was built nearly 15 years ago, and until renovations were completed last month, had received only modest cleaning and equipment maintenance. Frequent use for major Laboratory meetings, conferences, lectures and other events over the years aged its appearance and equipment.

Laboratory Director Norris Bradbury, in April, appointed a com-

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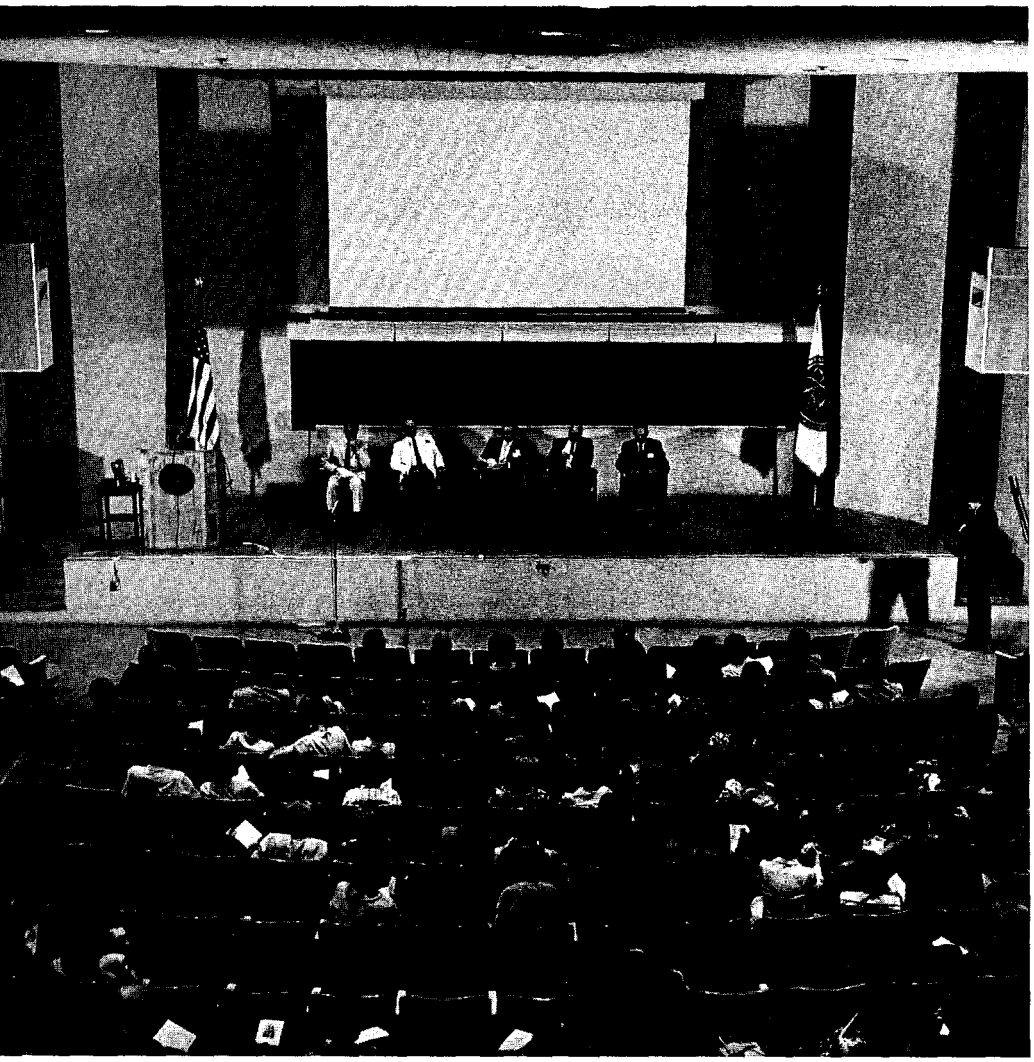


Before renovations were undertaken, the front of the auditorium looked like this. This photograph was taken about a year ago during ceremonies for Carroll L. Tyler, former AEC manager in Los Alamos.

. . . Auditorium

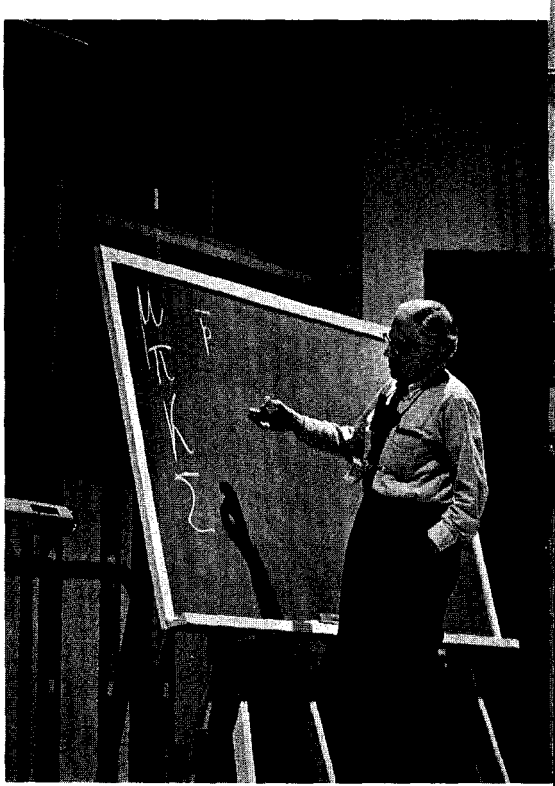
continued from preceding page

mittee, whose members were well acquainted with problems and needs of the auditorium, to determine what modifications would be required to make it more useful and attractive. Harold Agnew, Weapons-division leader was named chairman. Other members were Philip Reinig, Engineering department head; John Manley, research advisor to the director; Robert Porton, PUB-2 group leader; Edward Laymen, alternate personnel director; and Frank Tallmadge, P-DO. Technical Associate Director Raemer Schreiber was an ex officio member of the committee, representing the Director's office.

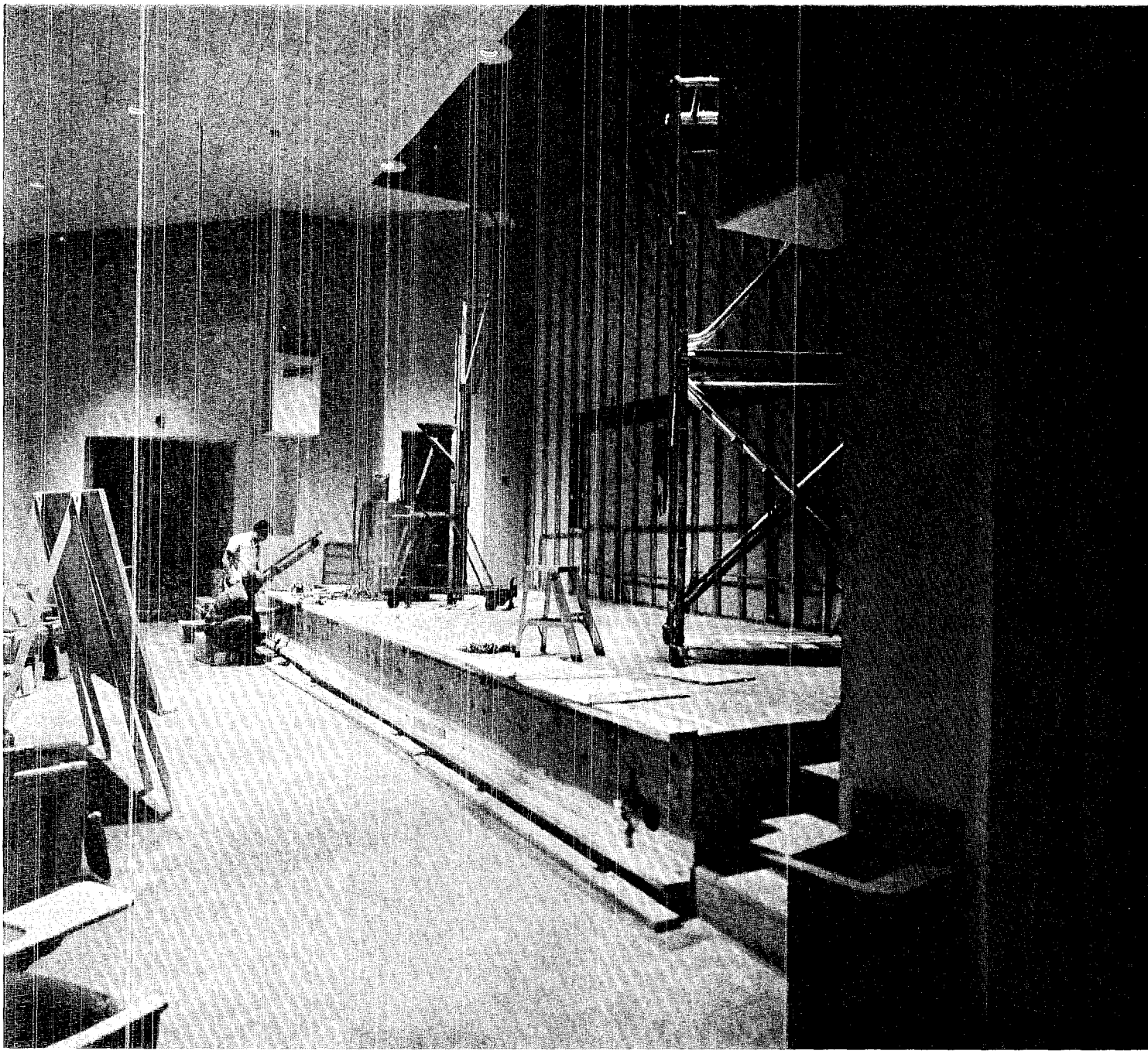
As a result, walls of the facility were painted a vanilla color and the ceiling, bone white.

The stage, steps, aisles and vestibules on either side of the auditorium are covered with Viking red carpet. A new clock was installed above the vestibule on the right.

New stage furnishings to include folding tables, chairs and lectern were purchased.



Colloquiums and other meetings were held in the auditorium despite limitations imposed by construction that was underway. Here Nobel Prize Winner Emilio Segre of the Department of Physics, University of California, Berkeley, lectures at a colloquium in June, using a portable chalk board and screen. Segre was a physicist and group leader at the Los Alamos Scientific Laboratory, 1943-46.



When meetings weren't being held in the auditorium, construction work progressed. The stage area is shown here about midway in the project.

The front of the stage is covered with walnut-finish paneling. Chalkboards have been installed. Above them is a new projection screen, running the length of the stage. When the chalkboards and screen are not in use floor-length Spanish red drapes can be drawn across them.

Space behind walls which protruded onto the stage from either side has been enclosed and access doors installed. The space on the left side formerly contained a sink and an electric water cooler. These have been removed and the area is now used for storage. The sink was moved to the enclosure on the right which also contains stage light and audio controls.

Controls include new light dimmer-switches and a patch panel which will provide for the use of

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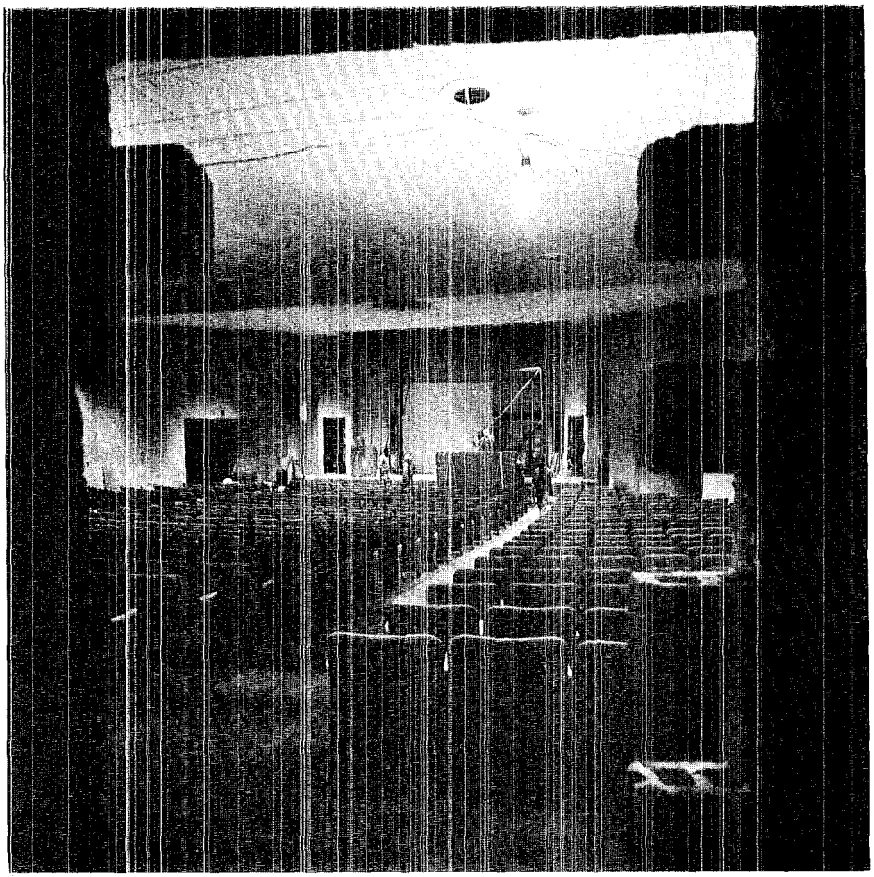


Through an unfinished door at the rear of the auditorium is a view of the facility while modifications were in progress.

. . . Auditorium

continued from preceding page

more microphones than previous capabilities allowed. Microphone jacks on the front of the stage and a communications line from the lectern to the projection booth at the back of the auditorium were installed. Speakers were adjusted and recovered.

New ceiling fixtures were emplaced to improve aisle and stage lighting. The stage fixtures include four banks of lights, two of which point down from the rear and two from the front.

Along the back wall of the auditorium are vertical wood battens and a telephone booth.

ENG-2 planned the modifications. Design consultation was by Giffels and Rossetti, engineering-architect firm from Detroit, Mich. Audio improvements were the responsibility of ENG-5 and P-1. ENG-4 coordinated construction through Los Alamos Constructors, Inc. (LACI). Stage furnishings and some electronics were procured by Supply and Property department.

Recovering the backs of the seats in the auditorium is tentatively planned next year.

short subjects

William A. Ranken, N-5 assistant group leader will be on Professional Research and Teaching Leave from the Laboratory for one year beginning in September.

Ranken will be working on basic material problems associated with the development of thermionic conversion reactors at Kernforschungsanlage, a government nuclear research center in Julich, West Germany. The project is a part of the German reactor development program.

James A. Grundl, N-2, is participating in a collaborative effort between the Los Alamos Scientific Laboratory and the National Bureau of Standards at the Bureau's Center for Radiation Research in Gaithersburg, Md.

The effort is in the area of fast-neutron standardization. Its goal is a measurement of the responses of basic fissionable materials to their own fission neutrons.

Grundl is participating on a change-of-station basis for one year which began Aug. 1.

Charles R. McNeely has been appointed assistant manager for administration at the Atomic Energy Commission's Albuquerque Operations Office.

McNeely was employed at Los Alamos in 1946 as chief of the Budget and Accounting Branch of the Manhattan Engineer District. In 1948 he was named deputy director of the AEC's Finance Division in Los Alamos. He transferred to Albuquerque in 1951.

Four Laboratory employees have been named to senior membership in the American Vacuum Society. They are **Karl W. R. Johnson,** CMB-11; **E. Dan Loughran,** GMX-2; **Claude R. Winkelman,** K-3; and **Hairston G. Worstell,** MP-3.

Senior membership is contingent upon active participation in the field of vacuum science and technology for at least ten years, with concomitant attainment of distinction through publication, teaching or creative accomplishment.

There were four retirements from the Laboratory during August.

Mildred Capron, H-1, retired Aug. 15 after working for the Laboratory since 1953. She was originally employed by PER-4 and later transferred to H division. She plans to help her husband with a car rental business in Santa Fe.

Kenneth Lilly, N-7, is facing a junior high school class for the first time in twenty years. He retired Aug. 15 after 17 years with the Laboratory. He spent 10 years with N division. He and his wife, Edith, H-4, will continue to reside in Santa Fe.

John D. Steely, GMX-1, retired July 31 after 20 years with the Laboratory. He was with GMX-1 for the entire length of time. Steely and his wife plan to remain in Los Alamos.

Project Truck Driver **Francisco Garcia** retired Aug. 1 after being employed by LASL since 1953. He originally worked for GMX-3 but later transferred to the Shops department. He resides in the valley.

William W. Clendenin, T-1, died July 23 following a heart attack. He had been with T division since joining the Laboratory five years ago. He is survived by his wife, Emma, and one son, Andy. Memorial services were held at the Unitarian Church in Los Alamos. Interment was at the Santa Fe National Cemetery.

D. C. "Hank" Winburn, CMB-3 assistant group leader, has been appointed chairman of the 1969 Los Alamos United Fund Drive.

Winburn's appointment was announced by Elbert Bennett, a member of Group J-14 and president of Los Alamos United Fund, Inc.

William J. Larkin, who worked at the Los Alamos Scientific Laboratory in both military and civilian capacities during World War II, has been appointed director of the Office of Nuclear and Criticality Safety at the Atomic Energy Commission's Nevada Operations Office in Las Vegas.

Prior to his new assignment, Larkin was chief of the Reactor Contracts Branch in the Laboratory and University Division at Oak Ridge.

Eleven Los Alamos Scientific Laboratory employees are named inventors or co-inventors on six patents recently released by the Atomic Energy Commission for public use.

The patents and their inventors are: High Temperature Stress Free Thermocouple Junction by **P. G. Salgado,** K-5; Electrolytic Desalination of Saline Water by a Differential Redox Method by **E. I. Onstott,** CMB-8; Thermionic Converter Device by **G. M. Grover,** N-5, **C. A. Busse,** Laveno, Italy, and **R. J. Caron,** Ispra, Italy; Dipole Current Lead for a Plasma Containment Device by **J. E. Hammel,** P-17, **D. A. Baker,** P-18, **L. C. Burkhardt,** P-14, **J. N. DiMarco,** P-14, **R. M. Henson,** T-2, **H. J. Karr,** P-14, and **J. Marshall,** P-17; Preparation of the Rare Earth Sesquicarbonates by **E. L. Head,** CMF-2; Vapor Pressure Gauge and Calorimeter for High Temperatures by **G. M. Grover,** N-5, **C. A. Busse,** Laveno, Italy and **J. Bohdansky,** Taino, Italy.

The patents were among 46 released by the AEC, bringing to 4,151 the number of unexpired Commission–held U.S. patents and patent applications which are available for licensing.

For Reporting Change of Address

If your address has changed please inform THE ATOM by clipping and filling out this coupon. Print or type your name and both your old and new addresses.
Mail to: The Atom
Los Alamos Scientific Laboratory
Box 1663
Los Alamos, N.M. 87544

Previous Address

name

address

city state zip code

New Address

address

city state zip code

Graves Takes 18-Month IAEA Post in Vienna

Glen A. Graves, assistant N-2 group leader, has been appointed head of the physics section of the Division of Research and Laboratories of the International Atomic Energy Agency in Vienna, Austria.

Graves, an employee of the Los Alamos Scientific Laboratory since 1952, is on an 18-month Leave of Absence to serve in his new position. He is the third LASL staff member to head the physics section. The first was N-6 Group Leader G. Robert Keepin in 1963-65. The second was Lewis Agnew, MP-6, in 1966-68.

The IAEA is an autonomous inter-governmental organization under the aegis of the United Nations and is composed of nearly 100 member states. Its objectives are to "seek to accelerate and enlarge the contributions of atomic energy to peace, health and prosperity throughout the world" and to ensure "that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

The physics section is responsible for implementing the Agency's tasks in the area of fundamental physics science. To do this, it organizes and conducts meetings and conferences which promote the international exchange of scientific information, placing particular emphasis on the fields of fission, fusion, and neutron physics; it evaluates proposals for the support of research and sponsors several research contracts in subjects of interest to the Agency; it reviews the needs and qualifications of candidates from developing countries for technical training fellowships; and it assists in selecting persons to provide expert technical assistance sought by the member states.

Louis Rosen, MP-division leader takes Gerald Tape on a tour of the Equipment Test Laboratory at the Los Alamos Meson Physics Facility (LAMPF). Rosen, right, shows Tape accelerating cells for the waveguide portion of the accelerator. Tape, a former Atomic Energy Commissioner, is president of the Association of Universities, Inc. and a member of the Weapons Subcommittee of the President's Scientific Advisory Committee.

The Technical Side

Presentation at DASA Symposium on Physics and Chemistry of the Upper Atmosphere, Stanford Research Institute, Menlo Park, Calif., June 24-25:

"Fluorescence Efficiencies and Collisional Deactivation Rates for N_2 and N_2^+ Bands, Excited from the Deposition of Soft X Rays" by K. B. Mitchell, J-10

"Fluorescence Efficiencies of Nitrogen Excited by 1 to 5 MeV Positive Ions" by J. L. Dunn, J-10

Presentation to study group on Collision-Free Shocks sponsored by the European Space Research Institute, Frascati, Italy, June 11-19:

"Observations of the Earth's Bow Shock Wave with the Vela 4B Satellite" by M. D. Montgomery, P-4

Presentation at lecture in a course on Nuclear Propulsion, UCLA, June 25:

"Testing Nuclear Propulsion Reactors and Engine Systems" by K. Boyer, J-DO

Presentation at Hahn-Meitner-Institute in Berlin, Germany, July 1:

"Fast Nucleon Interactions with the Isotopes of Hydrogen and Helium" by J. D. Seagrave, P-DOR

Presentation at seminar at University of Washington, Seattle, July 7:

"Status of the Nuclear Rocket Propulsion Program" by K. Boyer, J-DO

Presentation at Second International Congress of Heterocyclic Chemistry, Montpellier, France, July 7-11:

"Picrylamino-Substituted Heterocycles Pyrazoles" by M. D. Coburn, GMX-2

Presentation at seminar, joint meetings of plasma physics groups from Stanford University and University of California at Berkeley, Stanford, Calif., July 8:

"Application of Hamilton's Principle to Numerical Analysis of Vlasov Plasmas" by H. R. Lewis, P-18

Presentation at International Conference on the Three-Body Problem in Nuclear and Particle Physics, Birmingham, England, July 8-10:

"The Elastic Channel in Nucleon-Deuteron Scattering" by J. D. Seagrave, P-DOR

Presentation at Physical Metallurgy Gordon Conference, Providence Heights College, Issaquah, Wash., July 9:

"High Temperature Creep of Graphite" by W. V. Green and E. G. Zukas, CMF-13

Presentation at seminar, Sandia Laboratory, Albuquerque, July 11:

"The Microscope, Refractive Index and Chemical Composition of Complexes" by R. A. Penneman, CMF-4

continued on page 24

new hires

C division

Joseph H. Kleczka, Santa Fe, C-1
Richard G. Kellner, Cleveland, Ohio, C-6

CMB division

James M. Hansel, Jr., Mulberry, Fla., CMB-1 (rehire)
Billy W. Powell, Grady, N.M., CMB-6
William S. Montoya, Santa Fe, CMB-7
Franklin Miley, Philadelphia, CMB-11

D division

Carol A. Banks, Los Alamos, D-6 (part time)

Engineering department

William S. Gregory, Hagerman, N.M., ENG-DO
Welton Smith, Las Vegas, Nev., ENG-4
Michael J. Lopez, Santa Fe, ENG-5
Alton L. McNeil, Jackson, Miss., ENG-5

GMX division

Ralph E. Lomax, Whittier, Calif., GMX-3

Personnel department

Theresa G. Martinez, Santa Cruz, PER-DO
Barbara S. Gonzales, Los Alamos, PER-1 (casual)
June H. Pizzuto, Los Alamos, PER-1 (Casual)
Emmy D. Stice, Los Alamos, PER-3 (casual-rehire)
Deanna D. Brooks, Los Alamos, PER-7

Shops department

Armando M. Rendon, Velarde, SD-1
Delbert D. Stewart, Reed, Okla., SD-1

Supply and Property department

Jeannie S. Goode, Los Alamos, SP-DO
Clarence V. Lithgow, Santa Fe, SP-10

T division

William H. Reed, Sylvania, Ga., T-1
Leonard G. Margolin, Jersey City, N.J., T-2
James C. Porter, Jr., Urbana, Ill., T-2

W division

Emma M. Lopez, Fairview, W-3
Thomas E. Sampson, Garrettsville, Ohio, W-7

J division

Robert Goldman, College Park, Md., J-10
Peter B. Lyons, Boulder City, Nev., J-14

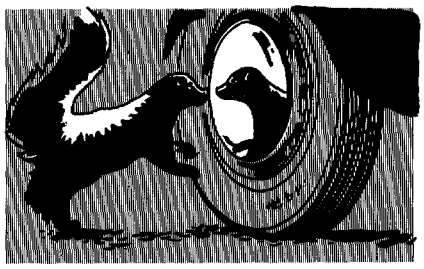
MP division

Margaret M. Eutsler, Los Alamos, MP-DO (casual)
Michael P. Dugan, Los Alamos, MP-3
Robert F. Harrison, Alexandria, La., MP-3
Benjamin F. Ortiz, Santa Fe, MP-3

P division

Ole Hansen, Philadelphia, P-DOR
Robert M. Rodriguez, Harlingen, Texas, P-DO
Duncan G. Foster, Jr., Richland, Wash., P-DO
David W. Ignat, Oberlin, Ohio, P-13 (postdoctoral)
Larry D. Caudill, Oneida, Ky., P-15
Carroll R. Harder, Milwaukee, P-15
Barry M. Marder, Springfield, N.J., P-18

20 years ago in los alamos



Culled from the Sept., 1949, files of the Santa Fe New Mexican by Robert Porton

Air Pollution on Increase in Atomic City

Skunks are showing up with alarming frequency according to town police. Recently, a confused motorist was refused admittance to his own car while a polecat conducted a ten minute inspection of his tires, then trotted away with great dignity. Later, a security service inspector who left his dorm to stand a night watch shouldn't have bent over to stroke the nice furry animal standing just outside the door. A few seconds later, he was refused readmittance to the dorm, and the duty officer wouldn't let him come to work.

Articles of Incorporation Filed for Hospital

Articles of incorporation for the Los Alamos Medical Center were filed Friday by Paul Agar, president of the Center. The Medical Center will actually be the Los Alamos hospital operating on its own as a non-profit organization. Transfer date of the structure from the Zia Company to the new corporation will not be set until contract negotiation with the AEC has been completed. Agar stated that he expects that the hospital's Board of Trustees can take over before the end of 1949. Included in the roster of Board members are Mrs. Elizabeth R. Graves, John Manley, Wendell Miller and H. Clifford Goodson, Jr.

Superintendent Anticipates 1,600 in Local Schools

An enrollment of 1,600 in Los Alamos Public Schools is the prediction of County Superintendent F. Robert Wegner. The new high school here will be open for occupancy on Tuesday's opening, but some work will be necessary after the new term begins, Wegner said. Non-Hill resident workers may enter their children in public schools here with a tuition payment of from $150 to $200, according to Wegner. Exceptions include employees of the University of California, the Zia Company and the Atomic Energy Commission who are awaiting housing at Los Alamos, for whom there will be a charge of $25.

British Consulted on Hazards of Atomic Reactors

Members of an Atomic Energy Commission Reactor Safeguard Committee are in England discussing with British and Canadian officials the "potential hazards of atomic reactors." The conferences are devoted to talks concerning reactor information gathered by the three countries.

what's doing

NEWCOMERS CLUB: Skit night, Sept. 24, 7:30 p.m., Aspen School Gymnasium. For information call Mrs. Fran Talley, 662-4110.

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

Sept. 6-7—Cabresto Canyon, Dibbon Hagar, 2-6209.

Sept. 20-21—Santa Fe Ski Basin to Cowles, Marlene McKee, 2-4988.

Sept. 27—Pecos Hike, Ken Ewing, 8-4488.

MESA PUBLIC LIBRARY: Aug. 20-Sept. 17, Althea Howard, oils. •

VIA ENCANTADA II HILLCLIMB: Camp May Road, 9 a.m. to 5 p.m., Sept. 6-7. For further information contact Gene Willbanks, 8-4365.

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Tuesday of each month at South Mesa Cafeteria. For information call Cecil Carnes, 672-3593.

SIERRA CLUB: There will be no meetings of the Sierra Club until further notice. For information call Brant Calkin, 455-2468.

LOS ALAMOS ARTS COUNCIL: General meeting and chamber music; Jean Furnish, soloist. No date has been set. For information call Mrs. Marie Filip, 2-2135.

. . . technical side

continued from page 23

Presentation at seminar in the Materials Science Department, Stanford University, Calif., July 11:

"Strain-Rate Effects in Compression" by J. E. Hockett, CMF-13 (invited)

Presentation at workshop on Hardware-Software Interaction for System Reliability and Recovery in Fault-Tolerant Computers, Pacific Palisades, Calif., July 14-15:

"Error-Tolerant Algorithms and Software for a Linear Accelerator" by R. F. Thomas, Jr., T-5

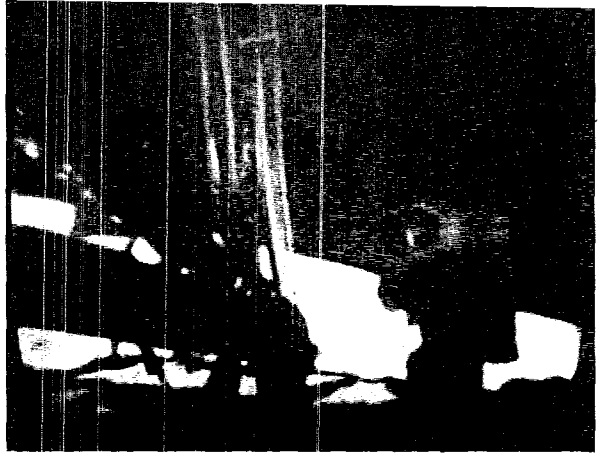
On their television sets, millions of people all over the world saw American astronauts walk on the moon. PUB-1 Photographer Bill Jack Rodgers was one viewer who recorded much of the walk on film by photographing pictures shown on his television set. Some of his results are shown on this page.

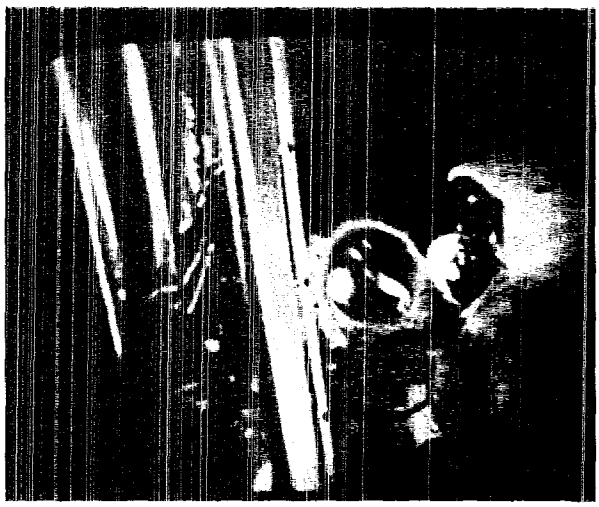
For those who would like to follow suit during the next American moon landing, presently scheduled for November, Rodgers has some advice for taking good photographs.

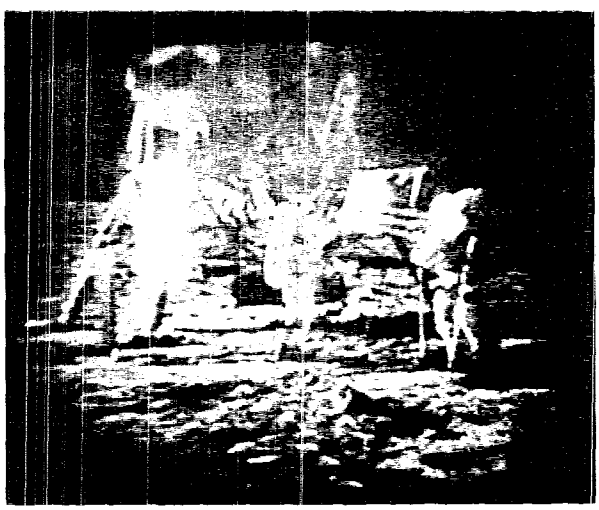
"Adjust the fine tuning on your set for the best possible resolution," he said, "and adjust the contrast so there is good separation between grays, but not so much that the white's block up."

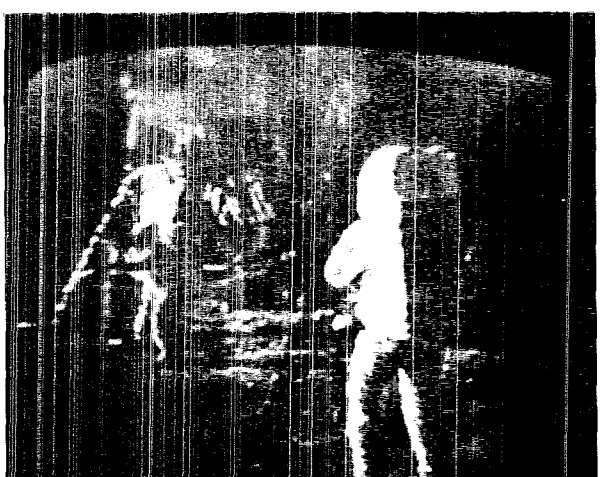
The camera should be placed on something solid, a tripod preferably, although a coffee table and some books to give the camera proper elevation will do. The camera should be located on the same horizontal plane as the center of the picture tube.

With Tri-X film (ASA 400), camera shutter speed should be set at 1/30 of a second and lense aperture should be f/5.6. "Be sure to focus and watch for reflections on your set's tube, caused by light coming through windows or from lamps," Rodgers said.

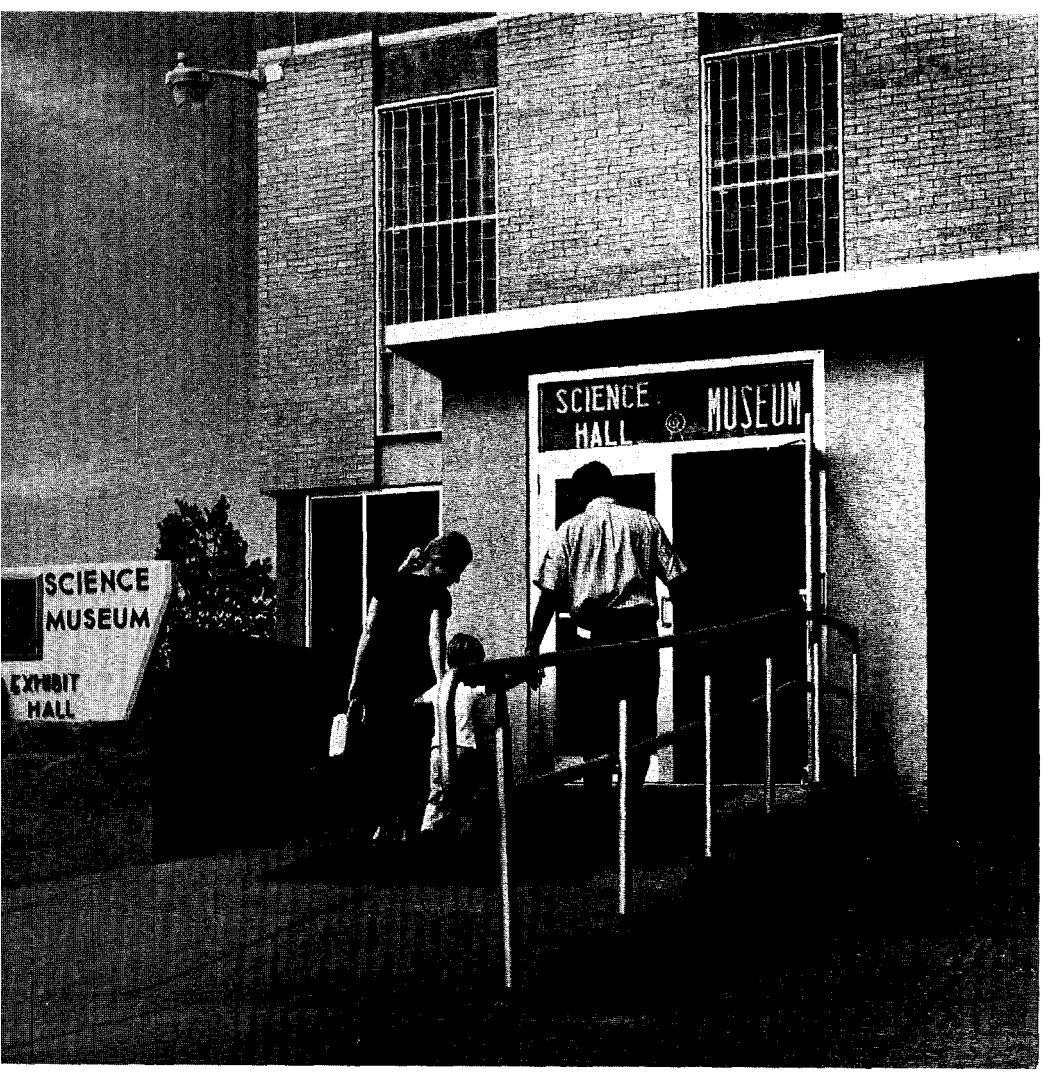








Henry T. Motz
3187 Woodland
Los Alamos, New Mexico 87544



Visitors to the Laboratory's Science Museum and Exhibit Hall now enter the facility through a newly completed entrance. Prior to its completion, visitors entered and left through the same door. Just inside was where they registered for and terminated tours. The new entrance was built to eliminate conjestion. The old door is now used as an exit only.