nuclear news

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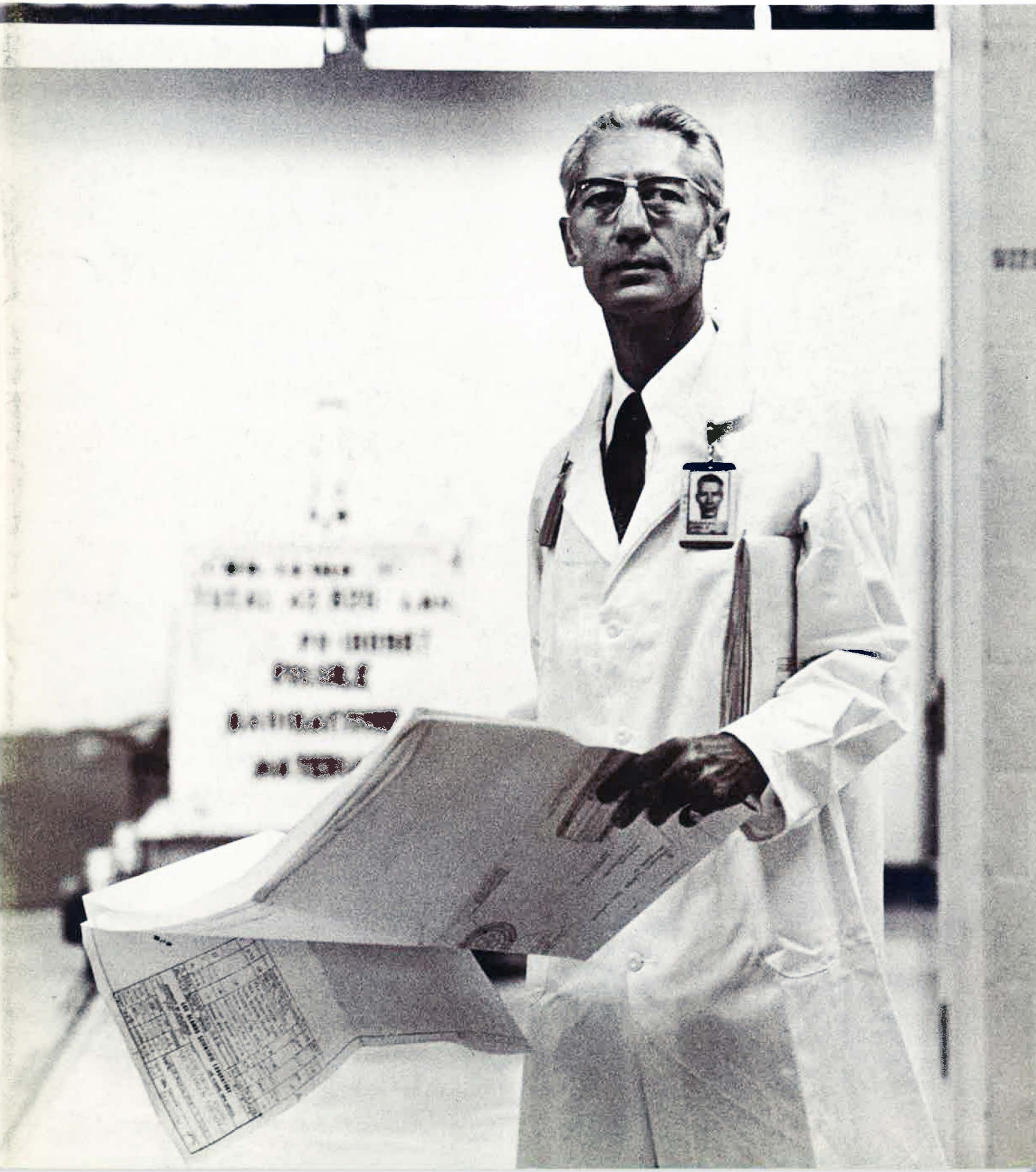


Lilienthal: Assignment for a diviner

Two days before he took office as president of the American Nuclear Society, James R. Lilienthal was named a Fellow of the Society. His citation, presented at the 18th Annual Meeting of ANS in Las Vegas, tells in a nutshell the reasons for his advancement to the Society's top post: "The candidate's membership in the ANS has been one of 'total commitment' in promoting the technical growth of this Society by application of his well-balanced administrative talents." Every year since 1960 he has served in some important role in the organization.* In terms of ANS experience alone, Jim Lilienthal is well prepared for the presidency.

There are other reasons, however, why the time may be ripe for Jim Lilienthal. A lean, slightly built man of 56 years (whose weight of 132 pounds has never varied plus or minus two pounds since his graduation from college), Lilienthal is, for all his activity, an introspective person, a good listener. In his work at Los Alamos Scientific Laboratory over the past 25 years he has become known as a leader and a problem solver *par excellence*. And these qualities should serve him well as president of ANS at this juncture in its history.

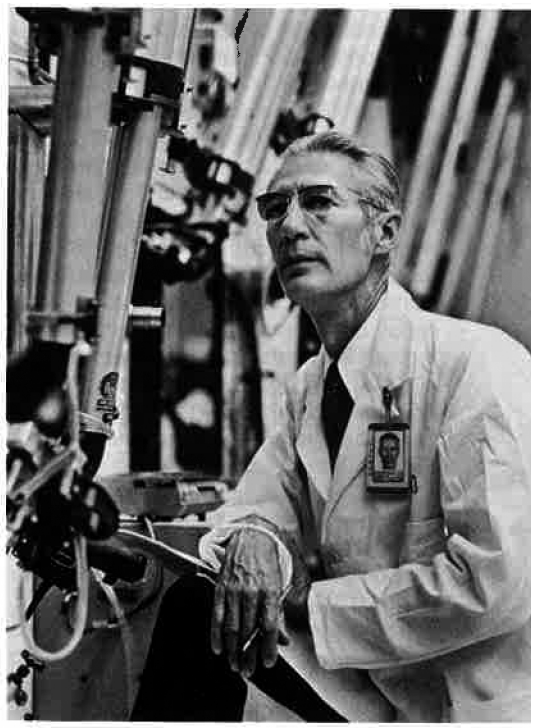
The Society has grown steadily both in numbers and in complexity, with new technical groups being established from year to year and some of these developing into new divisions until presently there are 13 divisions and three technical groups. In addition, of course, new local sections have been formed inside and outside the United States, and there has been a steady expansion in student branches.

This growth has been healthy, but along with it certain problems have developed. Chief among these, Lilienthal believes, are a breakdown in communications among members in the various groups of the organization, a resulting lack of cohesion, and a diffusion of the Society's objectives. He believes that this is a good time for the ANS to do some much-needed self-appraisal, and he is well-equipped to lead such an effort.

Origins of a problem solver

Dealing with problems seems to come naturally to Lilienthal. He has the perfect temperament for it: a keen intelligence, a basically optimistic viewpoint, an ease in meeting people and in communicating with them, patience, and a remarkable ability to go straight to the heart of a problem.

These traits didn't just happen, of course, but were developed over a lifetime of facing difficult situations and coping with them effectively. In his early forties, for example, he developed cataracts and had to undergo surgery. The lens of one eye was removed in 1960; the other, in 1961. His only lenses now are those provided by his glasses—thick, strong lenses that give him good central vision but poor peripheral vision. While this experience deprived Jim of some of his favorite pastimes, such as tennis and competitive pistol shooting, it did not deprive



Mastering problems on the Mesa

*In 1960, program chairman, Eighth Hot Laboratory and Equipment Conference and member, ANS Program Committee; 1961-67, member, Publications Committee; 1963, chairman, Remote Systems Technology Division; 1964-67, member, Board of Directors and member, Executive Committee; 1964-65, member, Finance Committee; 1965, member, Nominating Committee; 1968-72, ANS treasurer; 1971-72, vice president/president-elect. In addition, he was a member of the *ad hoc* Committee on Publications and of the *ad hoc* Committee on ANS Meetings and served as a member of the Steering Committee for the 1968 International Meeting and as publications chairman for that meeting.

Lilienthal with mother: From babyhood to young manhood

him at all of his warm sense of humor and spirit, as it might have done to a lesser man.

Lilienthal was born on August 14, 1916, in the Borough of Queens, N.Y., and was christened James Richard Barrell, III, the first and only child of James Richard and Mathilda Schreiner Barrell, II. His father, a bank employee, died when Jim was but two years old. In the ensuing early years of his life, he lived in Brooklyn with his mother and maternal grandmother. When he was 11 years old, his mother remarried, and Jim was legally adopted by his new father, August B. Lilienthal, whereupon Jim took the name James Richard Lilienthal. Like his natural father, his adoptive father worked in a bank, serving in the trust department of one of the branches of the Irving Trust Company. It was there that he met Jim's mother, who worked for him as a bookkeeper.

This marriage also produced a single child, Jim's half-brother, Kenneth G. Lilienthal, who at 44 is married, has five children, and is executive editor of *The Mart,* a magazine in the home appliance business published by Buttenheim Publishing Corporation of Pittsfield, Mass.

Getting an education

Even as he started high school, young Jim Lilienthal wanted to become an engineer, and it was part of the family plans that he would go to M.I.T. One of the Great Problems in Jim's life, however, was the stock market crash of 1929. By the time he graduated from Brooklyn Technical High School in 1933, the family had not survived sufficiently from the Depression to allow Jim to go to M.I.T. Instead, he enrolled at City College of New York, where the tuition was free. It was a long subway trip from his home in Flatbush to the CCNY campus at 137th Street in Manhattan, and Jim did much of his studying in transit.

Times were hard. Jim's allowance for the day was 35 cents, 10 cents of which went for the two subway rides and 25 cents for lunch. In those days, though, Jim could go to Bickford's and for a quarter get a fried egg, hash brown potatoes, a rasher of bacon, an English muffin, and coffee.

Even these meager expenses were a burden to Jim's family, however, and so they welcomed an opportunity to send Jim to a school where not only his tuition but also his room and board would be free. This was Webb Institute of Naval Architecture, a school founded in 1893 by William Henry Webb, who built clipper ships and who established the tuition-free school for young men who couldn't otherwise afford college and who wanted to enter a shipbuilding career. Jim was one of 380 who applied for admission at the Institute and one of the 18 who survived the stringent entrance examinations. He entered the school in September 1934 and was graduated in June 1938, ranking third in a class of 10. His average over the four years was 86.1 percent. He obtained 205 credit hours in those four years and at graduation had the equivalent of two BS degrees, one in Naval Architecture and the other in Marine Engineering.

One of the requirements at Webb Institute was that each student take a job in the shipping or shipbuilding industries during the summer. In the summer of 1935 he served as a cadet engineer on a Mystic Steamship coal collier; in 1936, an outside machinist's helper at the United Shipbuilding and Drydock Company; and 1937, junior surveyor for the American Bureau of Shipping. For the last two jobs he received a fair wage, but for the first his services went for a penny a month.

Getting a job

Upon graduation, Jim found that the job pickings were extremely lean. This was especially true in the shipbuilding industry, as no new commercial ships had been built in the United States since the close of World War I. After going jobless for two months, he finally was hired by Stability Meter Corporation at the rate of $100 per month, which was good money at that time. Soon this business became threatened, however, and he started to look for work elsewhere.

Jim and Betty: Happy beginning

His next job, which he took in 1940, was at Sperry Gyroscope Company, where he became assistant test engineer for the Gyrocompass Division. During this period he was responsible for acceptance tests for gyrocompasses and for product design for various servosystems for gyrocompasses and associated fire control equipment. In 1944 he became assistant product engineer for the development and production of an airborne gyroscopically stabilized radar system for B29's.

He was with Sperry all through World War II, a period of tremendous expansion for the company. In August 1940, when he started working there, the company had 3,000 employees, including 600 engineers; by the end of the war there were 35,000 employees, including 800 engineers. By this time, of course, Jim was pretty high up in the organization. When the war ended, he was transferred to Sperry's research laboratory to develop a commercial design of Loran equipment and to work as well on Doppler radar equipment.

Among his associates at Sperry who later went into the atomic energy field were: Harvard Hull, who was a section leader there and who later went to Argonne National Laboratory to become director of its Remote Control Division; and Ray Goertz, who was doing development work in servosystems at Sperry and who joined Hull's group at Argonne to develop the master-slave manipulators that were to become the basis for the commercial designs now in use in the nuclear industry. Goertz later succeeded Hull as director of the Remote Control Division.

A case of boss meets girl

The "associate" at Sperry who was to become the most important to him, however, was a young woman by the name of Betty Haworth. She was one of two women hired early in 1943 to work in the Compass Test Division under Lilienthal's direction. Formerly only men were hired to do this work, but the company hired the women as an experiment since so many men were being drafted. From Jim Lilienthal's standpoint, the experiment was an unequivocal success, for he and Betty Haworth were married about a year after she came to work.

Betty is originally from Huntington, W.Va., where her father James R. Haworth was city editor and columnist for the Huntington Herald-Advertiser. After her graduation in 1941 from Brenau College in Georgia (BA, English Literature), she went to New York to study photography and worked with some of the city's name photographers. She soon decided, however, to contribute to the war effort, and this led her to Sperry and to her future husband.

Jim fondly recalls his approach in asking her for that first date. One of his hobbies was collecting and studying tropical fish. So one day he said to her, "You should learn more about tropical fish, Betty. Why don't we go to a concert at Lewisohn Stadium, and I'll explain it all to you." The approach evidently was successful, and, interestingly enough, the Lilienthals have two tanks of tropical fish at their home in Los Alamos.

It isn't difficult to understand why Jim was attracted to Betty. She is a vivacious, attractive person with a rich sense of humor, a lively interest in art and cultural activities, and no small amount of energy (On the day before my interview with the Lilienthals, Betty climbed Truchas Peak, about 13,000 feet elevation, not far from Los Alamos).

At the time of their marriage Betty was living with two other young women at Tudor City, an apartment complex at 42nd Street and East River in Manhattan. The wedding took place on May 27, 1944, giving them the long Memorial Day week end for their honeymoon in the Poconos. At that time the people at Sperry were working a 54-hour week, leaving little time for personal matters—like finding an apartment! So they left on their honeymoon, troubled only by the prospect of coming back with no place to live. Jim had figured that Betty would go back to live with her friends at Tudor City, while he would go to his home in Brooklyn and somehow find time to locate an apartment of their own. As it turned out, however, they received a welcome surprise when they returned to Betty's place. On the door of the apartment Betty's friends had written a note: "IT'S ALL YOURS! WE'VE MOVED OUT!" Which goes to show that some problems take care of themselves, and we "get by with a little help from our friends."

The Lilienthals enjoyed life in their new home, and it wasn't long before the first of their four children, Marguerite ("Meg"), was born. One thing made their life less than idyllic, however, and this was Jim's long trek, against traffic, commuting from Manhattan to Sperry's plant in Brooklyn or to its research laboratory in Garden City, L.I., and back each day. At length, Jim and Betty decided that they should move either to Long Island (in order to get closer to Sperry) or to California (and find a new job). Well, as it turned out, they did decide to go West, but didn't quite make it all the way to California. They went to Los Alamos, N.M., instead and have never been sorry about their decision to do so.

Getting started at Los Alamos

The job that brought the Lilienthals to Los Alamos was in the Chemistry Metallurgy Research Division of the Los Alamos Scientific Laboratory. The Division was headed by Eric R. Jette, who had taught previously at Columbia University with a good friend of Jim's in New York City. Jim learned through his friend that Jette was visiting New York and was looking for an engineer who could help design a new laboratory and hot cell facility to handle radioactive material. Lilienthal contacted Jette, arranged for an interview at LASL in November of 1946, went there, and was accepted for the job.

Because of his prior clearances with the Navy and the Air Force connected with his work at Sperry, clearance from the AEC came through quickly, and the Lilienthals were on their way to Los Alamos by January 18. Jim and Betty, pregnant with their second child, Richard ("Rick"), boarded a train with their daughter Meg, then one year and three months old, and proceeded to Washington, where they

were to get a through car that would take them all the way to Santa Fe. It was quite an adventure for the young couple, heightened by the fact that they were to share the journey with Jette and Darol K. Froman (associate director of LASL under Norris Bradbury), who happened to be on the same train. It was an auspicious beginning of Jim Lilienthal's career at the Laboratory.

The times were also auspicious for a young engineer getting started at LASL. The Atomic Energy Act had been passed, and the control of the operation of the Laboratory was being shifted from the Manhattan Engineering District to the Atomic Energy Commission, with the University of California becoming the operating contractor. The AEC officially took over LASL on January 1, 1947, so that Jim was interviewed for the job while the Lab was still being run by the Manhattan Engineering District and came to work shortly after the AEC took over. New emphasis was being placed on peaceful applications of nuclear energy, and new projects, including the one that Jim was to work on, were being organized. His work, as well as his social life, brought him in contact with many talented. interesting people with whom he became friends—Enrico Fermi, Hans Bethe, George Gamow, to name a few.

His work immediately called upon his problem-solving ability. In fact, the group that he was chosen to head within the CMR Division was named Special Problems Group. Its mission: to design one of the first remote-control hot laboratories in the country. The facility was being created for the extraction of radiolanthanum, a good gamma source with a relatively short half-life. The hot cell, as designed, was quite elementary in concept and equipment. Its 5-foot-thick concrete walls formed a labyrinth with mirrors strategically arranged for viewing operations. It had no lead glass windows, no master-slave manipulators. One of Jim's ideas for the operation of the hot cell was to use a jib crane, fitted with a drill press head that could be raised, lowered, and rotated. A T-bar at the bottom of a spindle engaged bayonet slots in various cups and pieces of equipment for transfer operations.

Two cells were built, each 12x24x10 feet high. These and the building that housed them were completed in 1950.* In the process of getting the facility designed and in operation, the staff for the project grew to some 20 persons, and Lilienthal accordingly became increasingly engaged in management activities.

This work brought Lilienthal into contact with others around the country doing hot cell work and ultimately drew him into the American Nuclear Society. He was among those who formed the Hot Laboratory Committee in 1948. Through this informal organization, which predates the ANS by six years, Lilienthal met people like Frank Ring, Ray Goertz, Mel Feldman, Herb Duggan, John Farmakes, Lou Stang, and Ken Ferguson.

*The building is still in use, but not the hot cells; these eventually provided shielding for the LAMPRE reactor at LASL.

On the beach: Lilienthal (far right) and "Operation Ivy" associates

The Committee merged with the ANS in 1958, when it was formally established as the Hot Laboratory Division, later to become in 1963 the Remote Systems Technology Division, as presently constituted.

Other work at the Laboratory

After the hot cells were built, a new Instrumentation and Engineering Development Group (CMR-7) was formed at LASL, and Lilienthal was named group leader, a position he held from January 1950 until April of this year. One of his most memorable projects in this position was to handle one portion of the instrumentation for the first thermonuclear weapons test conducted in 1952 under the code name "Mike" at Eniwetok in the South Pacific. Jim was a member of a group engaged for some six weeks on the island in a project known as "Operation Ivy." The Mike shot was, of course, a success and for Jim, to say the least, an experience he will never forget.

Back at LASL, Lilienthal was engaged during the early '50s in the designing and building of the CMR Materials Sciences Building. Later he was involved in the creation of another hot cell complex, known as Wing 9. This facility has 16 hot cells, eight for work in the examination of irradiated uranium fuel and eight for irradiated plutonium. Most of the fuel comes from EBR-2 for post-mortem examination as part of the fuel examination program conducted by the AEC's Reactor Development and Technology Division. Also examined at this facility is graphite fuel from the Rover program.

While continuing to serve as group leader of CMR-7, Lilienthal in 1967 was also named assistant division leader of the CMR Division, which has since been split into two divisions, Chemistry-Materials Science Division and Chemistry-Nuclear Chemistry Division. At present, Jim is assistant division leader to both divisions.

Living in Los Alamos

When the Lilienthals first came to Los Alamos, they lived in one of the Army-built quadruplexes (two families upstairs, two down). These had coal furnaces with forced-air systems, and the Lilienthals remember well the many times they were awakened at two or three o'clock in the morning by the racket of the furnaces being stoked by Indian janitors and by the sound of the blowers going on. Later they moved into the so-called Western area of Los Alamos, where most of

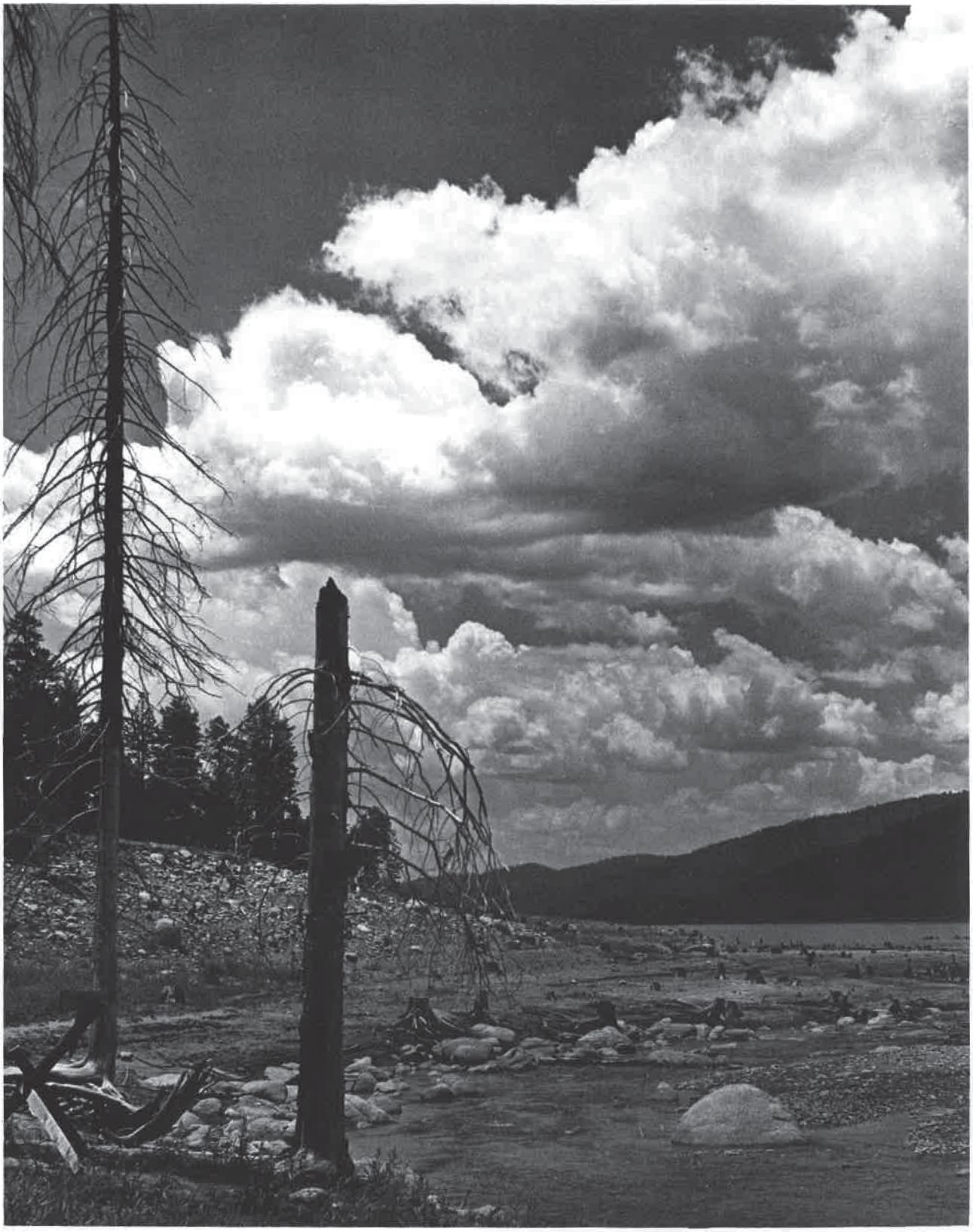
A Photographic Portfolio

Pussycat (1970)

Portrait of Betty (1971)

A Study in Circles (1972)

by Jim Lilienthal



Rain Clouds over Ballecitos (1968)

the new housing was being built, and this was much more to their liking, although still not the house they wanted. In 1951, they were able to get that house, again through a stroke of good fortune.

Although their names were twentieth down the priority list for housing when this house, located in the Central area of Los Alamos, became available, no one else ahead of them on the list wanted it, favoring instead the Western area, where the newer housing and newer schools were situated. The Lilienthals, however, were enthralled with the house, a vertical-log, one-story duplex structure.

It is one of the original buildings connected with the Los Alamos Ranch School, the private boys school which was taken over by the government to make room for the Los Alamos project. The Lilienthals' home originally was the senior boys' dormitory. Its former tenant was Enrico Fermi, and their first neighbors in the other part of the duplex were Stanislaw and Francoise Ulam, with whom they became very close friends. (The Ulams left in 1968, and Stanislaw is now chairman of the Department of Mathematics at the University of Colorado at Boulder.)

The Lilienthals' house, like the others situated in "Bathtub Row"—so-named because, unlike the later houses and apartments built at Los Alamos, they have bathtubs rather than showers—has been designated an historic dwelling.

The years in Los Alamos have seen the expansion of the Lilienthal family to four children. After Rick was born in Los Alamos, there came James ("Chip") and, finally, Ann. Meg grew up to become Mrs. Dennis E. Lienemann and now lives at Aptos, Calif. She has a BA in Social Sciences from the University of California at Santa Barbara. Rick is employed as a cook in Albuquerque, N.M., and is working toward a degree in Fine Arts at the University of New Mexico. Chip received his degree in Anthropology, also at the University of New Mexico, and is presently living in Aptos with his wife, Jeanette, and their daughter, the first grandchild of the Lilienthals. Ann, who is just starting junior high school, is the only one of the children still living in Los Alamos with her parents.

Lilienthals at leisure

In addition to raising their family, Jim and Betty have kept themselves busy with a number of social, cultural, and recreational activities. Jim has served on the Board of Trustees of the Mesa Public Library and as a member of the Town Council, an elective office. He is a member of the Board of Associates of St. John's College in Santa Fe. He has also been active in scouting work, serving in posts from Cub Scouts through Explorer Scouts.

For her part, Betty is vice president of the Los Alamos Art Council and currently is the chairman of this year's Arts Festival. She is a member of the Los Alamos Choral Society and was previously choir director for 10 years at the Trinity-on-the-Hill Episcopal Church (The Lilienthal marriage has been an ecumenical experience, as Jim is a Catholic).

Betty and Jim are members of the Los Alamos Guild of the Santa Fe Opera, of the Los Alamos County Historical Society, and of Museums of New Mexico, Inc.

Both are expert photographers, Betty doing most of her work in color and Jim, in black-and-white. Jim uses a Graphic View camera with a 203 mm Kodak Ektar lens, which shoots a 4×5 image. Betty uses a Rolleiflex with a *f*/2.8 lens. Jim has converted one of the bedrooms in the house into a combined studio and darkroom. It is equipped with a 6-foot-long stainless steel sink with temperature-controlled water. He uses a Durst L1,000 enlarger with cold light (135 mm-50 mm lens) and also has a Solar 2¼-3¼ enlarger with condenser lenses.

In the past few years Jim has entered photographs in two Los Alamos County Fairs and has won first place awards on each occasion. He has studied informally under the tutelage of his friend Laura Gilpin, nationally renowned photographer who has written a number of books on Indians and the Southwest,* which are illustrated with her remarkable photographs.

Jim and Betty both share an interest in the theater and about 15 years ago were involved in the Los Alamos Little Theater, Jim as a set designer and Betty as production manager.

Both are quite athletic. Betty enjoys hiking and does this on a regular basis with a Los Alamos group. Jim was a major letterman in baseball while at Webb Institute, playing center field and relief pitching. During his high school years he won the backstroke championship in a Boy Scout swimming tournament in Brooklyn. Both he and Betty developed into fairly good tennis players and often played mixed doubles until Jim's eye trouble developed.

*Among her books are *The Enduring Navaho, The Pueblos, The Rio Grande: River of Destiny,* and *Temples of Yucatan.*

At home with a camera

Jim enjoys gardening and has beautiful grounds around his home as testimony to his attentive care. He has been a stamp collector since high school days and now has six volumes of Scotts International albums, as well as some specialty albums. He is a member of the Stamp Club in Los Alamos and owns some $3,000 worth of investment stamps.

In addition to his ANS activities, Jim's professional associations include the following: member, New York Academy of Sciences; senior member of IEEE; and registered professional engineer in New York and in New Mexico. In 1960 he served as chairman of the Residential Real Estate Committee set up by the AEC at that time to advise on the disposal of property at Los Alamos.

Last and perhaps least, Jim claims to be a water witcher. With a pair of L-shaped sections of coat hanger wire balanced precisely in his outstretched palms, Jim is able to divine the presence of underground pipes and water sources as he walks slowly over the ground. It's a tricky operation, calling for sensitivity, precise control, and receptivity. These same qualities should help Jim Lilienthal to cope with problems during his year as president of the American Nuclear Society.—C.F.