Los Alamos—Coming to Terms with the 1980's

Birthplace of the Bomb now doubles in energy research and is under pressure to change its management habits

Los Alamos, New Mexico.—Thirty-five years ago this summer the first atomic bombs, designed and built at Los Alamos, detonated the nuclear age. Los Alamos today remains a one-industry town. The rough military camp of the most secret of wartime projects has been replaced by a sprawling national laboratory and what looks like a transplanted model suburb. Some of the secrecy and most of the mystique of the early beginnings are gone, too, and Los Alamos Scientific Laboratory (LASL) has changed with the times.

A year ago the laboratory got a new director, Donald M. Kerr (*Science*, 29 June 1979), who is prodding the organization to come to terms with the diversification of research and expansion of recent years and with demands from the lab's Washington patrons for a new kind of accountability. A Kerr reorganization plan shook things up and stirred ripples of dissension, rare at Los Alamos.

Through the 1960's, Los Alamos operated essentially as a weapons lab. Nonmilitary projects had direct nuclear energy applications. The main ones were a reactor research program and a project to develop a nuclear-powered rocket called Rover. Throughout the period the lab experienced slow, steady growth. At the end of the 1960's, however, there were some unaccustomed reversals. A few national security projects were canceled and a warming of Soviet-U.S. relations created some uncertainty about the future of weapons work. There was even a cutback in staff.

Los Alamos rallied, and under a new director, Harold Agnew, who took over in 1971, headed into a period of rapid change. LAMPF, the Los Alamos Meson Physics Facility, an 800 MeV linear proton accelerator and the first "open" scientific facility at the lab, began operation in the early 1970's. In the laboratory itself, diversification of research was pushed. With the onset of the energy crisis, Los Alamos became, in program and funding, a multipurpose national laboratory. Lab staff nearly doubled, reaching almost 7000, with about 2500 professionals, half of them Ph.D.'s. Defense programs account for about 50 percent of the fiscal year 1980 operating budget of $359 million. In the energy field, where growth was concentrated, Los Alamos has specialized in large, complicated research programs such as those that focus on magnetic fusion and geothermal energy. The Department of Energy (DOE), which owns the lab, and the Nuclear Regulatory Commission are major sponsors.

While its mission was broadening in the 1970's, the lab, in a sense, had to renegotiate its franchise. The Atomic Energy Commission (AEC) had run Los Alamos and its sibling weapons lab in Livermore, California, for a quarter-century. The AEC was broken up in the early 1970's, and control of the labs was transferred first to the Energy Research and Development Administration (ERDA) and then to its successor, DOE, with all the confusion such changes bring.

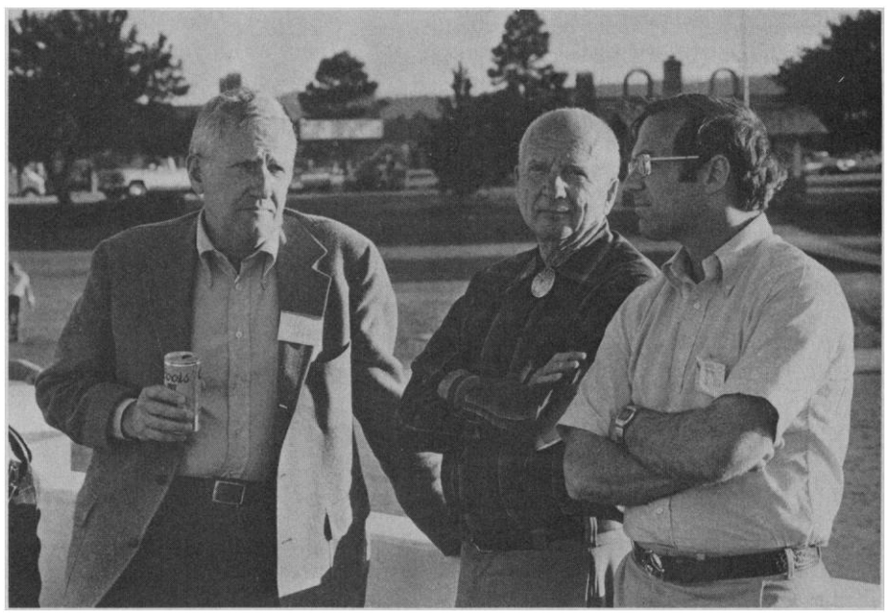
During most of the decade, the contractor for the weapons labs, the University of California (UC), was under pressure from critics of its management of the laboratories. Last summer, the UC regents rejected a motion by California Governor Jerry Brown that UC cut its ties with weapons work. Thus the regents reaffirmed UC management of Los Alamos and Livermore. (As if to emphasize federal ownership, the lab was officially made a national laboratory recently and the formal title now is Los Alamos National Scientific Laboratory, though there is no rush to change the stationery.)

A lesser challenge to the UC contract came from a group of universities in the Rocky Mountain and High Plains states (*Science*, 13 May 1977), who argued that Los Alamos had become an important regional energy research center and that they should take over as contractors or participate more directly in its work. The lab's federal patrons, in effect, vetoed this initiative.

When Kerr took over, therefore, major questions about the status of the lab had been answered, at least for the time being. His prime concern when he arrived with reorganization plan in hand last August was that the lab's management structure did not reflect the changes that had occurred.

The management system was still basically the "vertical" one that had served a weapons lab pretty well—line authority was divided among associate directors for weapons, research, and administration, who reported to the director.

Kerr's reorganization was to start an evolution toward a hybrid form of "matrix" management. The aim of this form, in managementese, is to "crosscut" responsibility. Diagramed, the system resembles a grid—thus matrix—rather



Post-World War II lab directors, left to right: Harold M. Agnew, Norris Bradbury, and Donald M. Kerr.

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than the pyramid of the old organization. Two kinds of managers wield line authority, program managers and disciplinary or functional managers. Program managers concentrate on overseeing projects; disciplinary managers are responsible for the hiring and professional development of manpower and the management of facilities.

When a manager is named to supervise a project he negotiates across the matrix for manpower and other resources. If serious disputes arise, they can be refereed by associate directors or, ultimately, by the lab director. The system, however, depends on cooperation and teamwork to a much greater degree than before. Kerr sees the advantages as a greater delegation of responsibility and a harnessing of talent at every level. His aspirations, he says, are for a lab that is "relatively well integrated," but that "avoids the pejorative sense of regimented."

Reactions to the reorganization, which has been implemented progressively over the year, were far from unani-

Hometown with a Difference

Los Alamos started out as the ultimate government town with Uncle Sam providing housing and all public services and even running the local newspaper and radio station. In stages, over the years, the town was defederalized, but its civic and social life are still dominated by relations with the laboratory.

The site, at 7300 feet in the Jemez Mountains, was picked for its inaccessability which still imparts a special character to the place. But isolation has not spared Los Alamos the worries that afflict most towns these days. Ironical as it may seem in the wide open spaces of north central New Mexico, there is even a housing squeeze.

The local housing problem has a typical Los Alamos twist. When the postwar division was made, much of the usable land on the flat-topped mesas was reserved for laboratory use. Los Alamos County has 110 square miles of which only 13 are controlled by the city-county government. The area allocated to residential development is hemmed in by Indian lands and state forests. Lab authorities remain unwilling to open new areas to other uses because of possible future needs.

The housing squeeze, of course, can't be blamed entirely on land policies. The Los Alamos mesa and canyon topography makes it necessary for roads and utilities to take the long way around and this adds to the expense. Building materials have to be brought long distances—Santa Fe is 35 miles away and Albuquerque nearly 100. And workers in the building trades have to be imported too.

The rapid growth of the staff of the lab in the 1970's increased the demand for houses and sent prices up. Total population of Los Alamos and nearby White Rock, which started out as a wartime construction camp, now totals about 20,000.

The days when lab employees were virtually the only householders are over. Many retirees from the lab have stayed on in Los Alamos. Not a few parents and relatives of lab staff members visited Los Alamos, liked it, and settled there. Los Alamos is old enough now to have been the hometown to a generation of people who grew up on "the Hill," as it has been called from the early days. The number of second-generation employees at the lab is growing. And a fair number of people even live in Los Alamos and commute to jobs in Santa Fe or elsewhere.

The attractions are the climate and scenery and a lifestyle that offers both the great outdoors and intellectual and cultural amenities not usually found in Western towns the size of Los Alamos. The climate is cooler and more humid than the hot and arid valley below. The winter is cold but sunny. Opportunities for camping, hiking, hunting, and fishing abound and the town has its own ski area nearby.

Culturally, the town tradition was set by its first scientific settlers, many of whom were urban and urbane émigré Europeans. Los Alamos has something in the way of an organization for nearly everybody, with music, sports, crafts, and various arts represented and even a recently revived film society. Good schools are the pride of the town and a necessary inducement for recruiting young scientists and engineers for the lab. The high school recently produced a third of the state's National Merit Scholarship finalists.

Not everyone chooses to live on the Hill. Some can't afford the price of housing or can't stand the isolation or the laboratory-dominated society. Critics see the town as overorganized and its social life as incestuous. At quitting time, they flee to Santa Fe or to the greater isolation of the real backcountry.

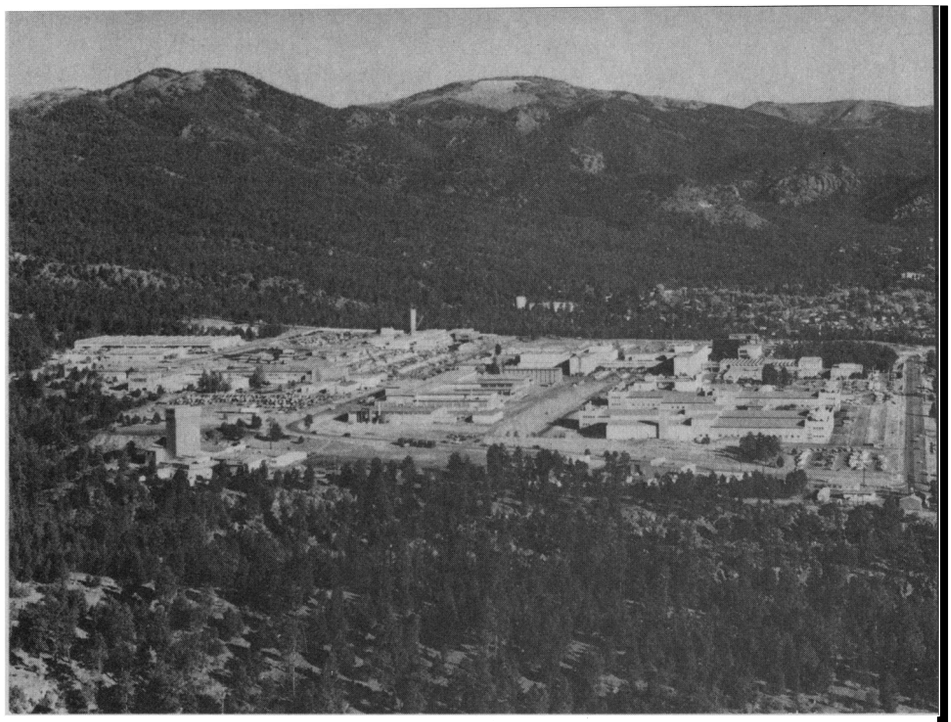
The education level of residents is high. Women find it difficult to get jobs equal to their abilities, and many resent being pigeonholed according to their husbands' jobs at the lab. Pressures on the isolated nuclear family are heavy, and there are said to be some particularly messy divorces. There is concern that Los Alamos young people seem to be drinking and drugging at a rate not much different from their national peer group.

Violent crime is happily rare. That there was only one recent armed robbery on the books is attributed to there being only one main route in and out of town. Los Alamos also remains socioeconomically isolated. The town is an Anglo enclave whose inhabitants have only the most limited contact with the Indians and Mexican-Americans who are the dominant groups in the areas nearby.

The town has not quite cut the federal silver cord. The fire department, which after all might need a security clearance to answer an alarm, is paid for by the Department of Energy. The federal government also pays the local government $850,000 a year in lieu of the taxes the lab does not pay. The municipal budget is $5 million. The schools receive $3.5 million from the federal government under the law that provides subsidies to schools with high enrollments of children of people employed on federal work. The prospects for new sources of tax revenue are not encouraging since Los Alamos has only a small commercial district with retail stores, fast-food franchises, and a couple of motels, usually booked up with earnest-looking visitors in East Coast or West Coast attire. There has been no growth of spin-off industries to help the tax base. The second industry in Los Alamos is real estate.—J.W.

mously positive. Objections tended to follow the theme that jurisdictions were unclear, responsibility diffused, and that there were "too many bosses." Restructuring was seen by some as a way to replace managers no longer in favor. An article in the spring in the Santa Fe *New Mexican* reported that the reorganization "may be doing more harm than good" and that lab morale was low. In unattributed quotes, lab staff members described the reorganization as "institutionalized conflict" and "pure madness." The newspaper story also noted a Kerr memo requiring managers to clear contacts with the press with the lab public relations office.

Protest never surfaced in an organized way. This could be, in part, because Los Alamos does not have a professional organization like Livermore's Society of Professional Scientists and Engineers, which is affiliated with the California State Employees Association, the lab union. For what it is worth, one Livermore scientist observed that, in comparison with Livermore staff, who work in the San Francisco Bay area's urban and politically yeasty atmosphere, Los Alamos staff are isolated, tend to be individualistic, and are used to an administration that has had generally easier relations with the staff. At any rate, the furor, which many at Los Alamos blame on the impact of a new system on old habits, seems to have died down.



Main technical area with part of town and Jemez Mountains in background.

Unquestionably, one purpose of the reorganization was to improve managerial alignment of the lab in respect to DOE headquarters. Kerr, himself a Los Alamos lab alumnus, served in the DOE Washington high command for 3 years before returning to take the director's job. While in Washington, he participated in the effort to bring the national laboratories under firmer control of the home office.

In the AEC days, when many things were simpler, the dominant management style in dealing with the labs was laissez-faire. Some labs thrived, apparently including the weapons labs; some did not. With the coming of ERDA, a tentative start was made toward establishing more consistent policies for managing the national laboratories. In the early days of DOE, under James R. Schlesinger, a plan for decentralization was laid out under which headquarters would take the lead in policy-making and budgeting while responsibility for implementation would be placed in the field. More rigorous reporting requirements accompanied the plan. While Kerr was in Washington, the effort to make the labs more "responsive" was carried further. The major management tool was to be longer term planning by the labs in consultation with headquarters.

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Progress varies among the labs. The process hasn't been helped by the difficulties that DOE has experienced in jelling as a bureaucracy. And the game of blindman's buff played in Washington in search of an energy policy has further confused matters. But DOE officials are encouraged by what they see as a new capability to look at the labs as entities and not simply to examine particular programs as was often done in the past.

So far, DOE has not found a way to make an effective general evaluation of the work done at Los Alamos, Livermore, and its other R & D facilities. DOE has joined the Department of Defense as a major operator of government laboratories so it must also share the burden of the chronic questioning as to whether the performance of the federal labs justifies the resources invested in them.

Inside LASL, the new demands for accountability draw some criticism. Under the AEC, individual scientists could apply decisive leverage in Washington. One Los Alamos veteran, J. J. Wechsler, leader of WX Division, the engineering design division whose responsibility ranges across both weapons and nonweapons programs, put it this way. "Division leaders were very strong in the lab. One who felt strongly something should be done could make it happen. Now he can propose it, but it has to go through a rigorous review process," and may get lost.

Wechsler sees dangers in the new emphasis "on better money controls and on identifying objectives and setting time scales. There's a lot to be said for a systematic approach, but not all." "In-lab guidance" has improved, he says, and more specific guidelines are all to the good, but "now they try to force an answer. When somebody doesn't come up with it they beat him about the ears. Such accountability squelches any technology with a long-term payoff; it has to be constantly reevaluated, rejustified. People are trying to make short-term gains to get renewed, not doing the re-

search. Good financial management doesn't mean harassment. We should learn that." His view is that DOE is still "thrashing around" in its effort to manage both military and nonmilitary research programs.

In its original business, weapons design, Los Alamos did well in its decade under Agnew in terms of competition with Livermore. Los Alamos is the design source of warheads for all new strategic weapons entering the stockpile—Minuteman III, the Trident submarine missile, cruise missiles, and the proposed MX land-based mobile missile. This marks something of a comeback for Los Alamos, which had earlier lost out in contests with Livermore for a number of strategic warhead designs.

Weapons work itself has been changing. Testing and maintaining the reliability of the nuclear stockpile has become as important a part of the labs' mission as design of bigger—or smaller—and better weapons. In the words of one weapons scientist, "The job is to make hazards less hazardous. By seeing that [weapons] need less care and feeding and will sustain in an [adverse] environment, we make them more credible, not for use but for potential."

One change that Los Alamos staff members say makes for easier recruiting of lab staff and for fewer awkward moments in conversations on airplanes is that negative attitudes toward weapons work among the public have diminished. Weapons scientists are a self-selected group who do not suffer from an occupational sense of sin, but some say they keep mum about their work for reasons ranging from not wanting to be "hassled" to some nervousness about "the kooks out there." A fair number of scientists who came to Los Alamos during the buildup of energy R & D took pains to make clear that they were not involved in weapons work. One Los Alamos old timer observed of them, "We got some pretty good peaceniks up here, still do, but as they get older they get more pragmatic." And toward the recent bleak developments in international affairs and their military implications there is, among the Los Alamos regulars, a quiet air of "We told you so."

That Los Alamos has a future as a multipurpose lab is the current consensus although there have been times when that seemed much less certain. As for Kerr's stewardship and the 1980's, it is never safe to predict what is in store, but, although it appears that the 1970's growth spurt is over, a good bet is that life at Los Alamos will not get any less complicated.—JOHN WALSH

Republican Candidate Picks Fight with Darwin

Ronald Reagan recently had kind words for creationism, a nationwide movement that over the last decade has been trying to get the biblical view of creation inserted into public school curriculums on an equal footing with evolution.

At a press conference following a speech to a fundamentalist religious coalition in Dallas, the Republican presidential nominee was asked if he

Roger Sandler photo

thought the theory of evolution should be taught in public schools. The governor responded:

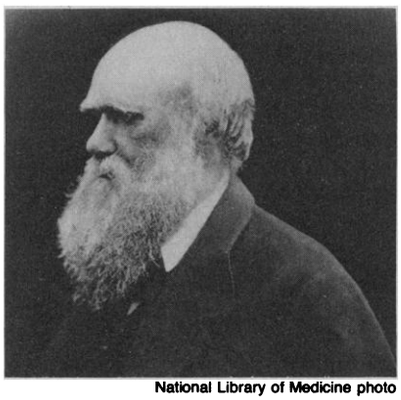
"Well, it is a theory, it is a scientific theory only, and it has in recent years been challenged in the world of science and is not yet believed in the scientific community to be as infallible as it once was believed. But if it was going to be taught in the schools, then I think that also the biblical theory of creation, which is not a theory but the biblical story of creation, should also be taught."

Asked if he believed in the theory of evolution, Reagan replied: "I have a great many questions about it. I think that recent discoveries down through the years have pointed up great flaws in it."

Where has Reagan been getting his update on evolution? As it happens, the only "recent discoveries" casting doubt on evolution have been made not by scientists but by persons associated with the Creation Research Society, which wants the Bible given equal time with Darwin in biology classrooms.

According to G. Ledyard Stebbins, a geneticist at the University of California at Davis, Reagan's sympathy with the creationists was common knowledge when he was governor. Reagan supported an unsuccessful 1972 suit brought by the state school board—whose superintendent was a friend of the governor—to bring the teaching of creationism to public schools.

Creationism is an increasingly powerful movement that has been working through state legislatures for laws that would give the Bible "equal time" with Darwin. So far, such legislation has been introduced in 15 states, and in 27 states textbook selection committees have come under heavy pressure to accommodate creationism. Where the issue has come to court the creationist forces have been turned back. But support by a major presidential candidate of what has so far been a grass-roots anti-intellectual movement raises interesting questions about the extent to which it may be able to affect school curriculums in the future.



National Library of Medicine photo

In the speech to the fundamentalists, Reagan furnished another clue about his thoughts on science teaching. Accusing the government of having become "morally neutral," Reagan dredged up an issue that caused a stir in Congress 5 years ago. That was a course developed by the National Science Foundation called MACOS (for Man, a Course of Study), which went into a lot of detail about the social life of Eskimos. Reagan described it as a course "which indirectly taught grade school children relativism, as they decided which members of their family should be left to die for the survival of the remaining ones." Added the governor, "I don't recall the government ever granting $7 million to scholars for the writing of textbooks reflecting a religious view of man and his destiny."

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